# Decision making, agenda setting, and preference shaping in Ghana's agricultural climate change adaptation policy regime: a political ecological perspective




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A thesis submitted for the degree of
*Doctor of Philosophy*

Hilary 2016

*For Chief*

**Abstract**

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Where power lies and how it is conceived in studies of environmental governance is not often discussed. The development and implementation of agricultural climate change adaptation policies calls on diverse stakeholder groups, each with their own interests and objectives. How debates around policy design and content are resolved is shaped by the power and influence of actors within the adaptation regime. Smallholder farmers are often considered marginalized within the adaption policy development and implementation process in Ghana, and in the developing world more broadly. This study seeks to demonstrate the ways in which smallholder farmers are susceptible to domination by other actors within adaptation policy regimes, and to identify the features of those regimes (institutional and otherwise) that enable one group to wield influence over another. This dissertation seeks to make power the subject of analysis instead of, in the words of Mitchell, "an answer known in advance", providing a more thoroughgoing synthesis of power than previous treatments in environmental governance literature. Drawing on the field of political ecology, I aim to provide an alternative to the predominant view of powerlessness among smallholders as a product of limited capability or adaptive capacity (i.e. power-to) and towards powerlessness as a relational construct (i.e. power-over). To that end, I adopt Steven Lukes' dimensional framework of power-as-domination to illustrate that associating power with 'behaviorist' (i.e. visible decision making and agenda setting) theories alone is to adopt too narrow a view. Instead, a third dimension of power, preference shaping, which examines the way in which certain actors are "denied privileged access to their own reasons for actions" is necessary. I extend Lukes' analytical framework to include three replicable sources of preference shaping: dominant narratives and discourses, prevailing rationalities of governance, and systemic institutional bias. The results suggest that, true to political ecology, the study of adaptation policy in Ghana begins in contradiction: while climate adaptation policy is politically charged and contested at international levels, and it remains surprisingly devoid of politics at the sub-national levels. Adaptation policy development has been effectively 'rendered technical' in Ghana, eroding the need for active participation from non-experts in policy decision making, and leading to the neglect of important underlying political forces (a-politicization) that shape adaptation outcomes through policy implementation. This thesis extends important findings from development theory, particularly the work of Ferguson and Murray Li, in to the adaptation context, builds on an expansive body of power in social science literature, and develops a novel methodology for empirically mapping influence in complex system regimes.

**Acknowledgements**

PhD students often remark on how lonely this academic endeavor is. Yet, my experience has been a shared one; shared with my SIA teammates and a global network of CCAFS researchers that I have come to call family. As such, there are many people that I have to thank. First and foremost, I am indebted to Andy Jarvis and Osana Bonilla of CIAT/CCAFS for their faith and investment in me over the past five years. Andy threw me in to the proverbial deep end when I first arrived in Colombia in 2011. From that I've gained confidence, experience, and a host of perspective on the world. Ariella Helfgott for her amazing mind, huge heart, and for her vision that was SIA. Ariella is both a dear friend and great mentor. To my supervisor, Tom Thornton, whom I met with on countless occasions to share ideas. Tom's work and publishing ethic were a key source of my own motivation during this thesis. To Joost Vervoort for always being the first to provide feedback on my work. He encouraged me, more than anyone else, to start writing and keep writing. To David Matthews, whose words have stuck with me throughout the writing of this thesis. David taught me to how to write for journals, how to be clear in my message, and concise in my delivery. To the peer reviewers who have contributed to this dissertation through feedback on my journal articles and working papers, you have renewed my faith in the peer-review process, made my skin just a little bit thicker, caused me to think and rethink, and my work is all the better for it. To Robert Hall of the Environment institute who invested in me late in the game when funds began to dry up. To Abrar Chaudhury and his wonderful family. Abrar put a roof over my head when I showed up in Oxford in 2012, and we have shared far too many adventures together to chronicle here. To Jessica and Meghan, my SIA teammates. We have suffered the immense heat of Nepal together, the Sahel of Northern Ghana, and managed to have a lot of fun along the way. To Angelica (and Quentin, meow!), whom I met at Green Templeton College on my first day at Oxford, and stole her scone like a middle school boy in an effort to win her heart. Over the past three years she has suffered through my anxiety, absentmindedness, and late night sleepwalks to my computer to capture a fleeting idea. If I'd left Oxford without a degree I'd still be endlessly thankful for leaving there with her. Finally, to my mom, dad, and brother—I am who I am today because of your guidance, example, and love. Chief, this thesis is for you.

**A contextual note**

This dissertation represents one component of a broader research initiative called Systemic Integrated Adaptation (SIA). SIA aims to produce a truly integrated research program bringing together DPhil students with backgrounds in sociology, ecology, economics and finance, and politics—SIA's four 'lenses'. The team is exploring topics relevant to multi-level complex adaptive systems charged with improving food security for small-scale farmers while reducing environmental degradation. The SIA initiative is built on two separate case studies in Nepal and Ghana, and as such, this dissertation has benefited from 'pilot' activities in Nepal that helped to shape the methods applied here (Paper 1, especially). The SIA initiative is funded through the CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS) based out of the International Centre for Tropical Agriculture (CIAT) in Cali, Colombia. CCAFS Flagship One: Climate Smart Agricultural Practices (previously Theme 1: Adaptation to Progressive Climate Change) provides the institutional backstopping for the project and coordinates with other CCAFS thematic areas to leverage SIA research outputs. By way of funding obligation, the SIA initiative is required to conduct research in CCAFS working countries— a set of 5-6 designated countries within five principal working regions (South Asia, East Africa and West Africa, Southeast Asia and Latin America). Additionally, community level research must occur within designated "baselines sites" within each country, a selection of communities falling within a 10x10km zone specified by CCAFS coordinating body. CCAFS has conducted comprehensive assessments of agricultural adaptive capacity in all baseline sites with the intent to monitor change over the lifetime of the CCAFS research program (10 years). The local component of this study takes place at CCAFS Lawra-Jirapa baseline site in Ghana. For detailed information regarding CCAFS working regions as well as criteria for site selection can be found at http://ccafs.cgiar.org/where-we-work.

**A personal note**

*"If some combination of narcissistic morality and raw self interest does not help reduce vulnerability, then perhaps some good analysis and political engagement may."*

Jesse C. Ribot (2009)

During my time researching and writing this thesis I have been an active member of a growing agricultural adaptation professional community. I have attended UNFCCC meetings, presented my research at Community Based Adaptation (CBA) conferences, worked with CCAFS—my funding agency— to develop methodologies for adaptation policy development and implementation, and even stress-tested those policies using novel socio-economic scenarios. This work over the past three years has brought me to Nepal, Ghana, Costa Rica, Colombia, Peru, Tanzania, and Brazil, and a host of countries in between, working with both policy decision makers and rural communities in those countries. It has been an immense privilege. I am inspired by the many intrepid individuals that I met along the way, humbled by the immense poverty that I have encountered, and, at times, overwhelmed by the task at hand: feeding nine billion people in the next half century in the face of climate change.

My motivation for viewing adaptation through the 'lens' of politics —and its principle currency, power—stems from these very experiences and a growing frustration with site-specific agricultural adaptation interventions that are denied permanence, sustainability, or even impact by the broader political economy. Can superior agricultural extension services lead to the improved adaptive capacity of smallholders when the Ministry of Finance in Accra fails to make funds available to district agricultural development offices? Can new maize varieties introduced by an International Non-Governmental Organization (INGO) lead to improved food security when domestic agricultural policy promotes export-led growth through cash crops? Meanwhile, in international forums our conversations have grown stagnant. Five years on and in adaptation policy circles we continue to have the same cyclical debates, fueled by the empty rhetoric of 'mainstreaming', and 'climate policy integration'. All the while adaptation perpetually fails to transition from theory to practice. This is not to say that I've grown cynical, just that I firmly believe that we cannot leave the task of reducing the vulnerability of small-scale producers to institution building alone. Instead, we must begin to work in new, politically informed ways and on a systemic level. I was, as a result of these experiences, naturally drawn to political ecology.

What started as a three-country comparative analysis, this thesis now addresses power in adaptation policy solely in Ghana, but has benefited from a virtual 'trial run' in Nepal in 2012. I began hoping to address politics in Nepal and Ghana's agricultural adaptation regime head-on, in its most recognizable and visible forms. I thought, for example, to examine the impact of term limits on national adaptation preferences, to compare the preferred adaptation strategies of competing political parties, or to chronicle parliamentary debates on climate change. What I found when exploring these possibilities, however, was a distinct lack of political conflict in the adaptation regimes of these countries. I had been conditioned by own experiences in the United States and United Kingdom where the main limiting factor in climate action was political will. Instead I was struck by how invisible the politics of adaptation seemed to be, especially in Ghana. National newspapers there frequently print lofty calls-to-action to address climate change, national climate change policies and adaptation strategies have been popularly approved by the Cabinet, and, most recently, a host of parliamentarians have signed a pledge to support climate smart agricultural practices. Yet despite the prevailing of consensus over conflict, there remain critical adaptation deficits across the country. One is left with the question "where does the power to deliver success in adaptation actually lie within this regime if not among high level political actors?"

That the outcomes of adaptation policy are the direct result of power relations between different actor groups should not come as a surprise. While the study of power in the United States' adaptation regime, for example, would invariably begin with an assessment of congressional and executive action, power in Ghana's adaptation regime plays out in far less visible settings. Might adaptation simply be swept up by the existing inequality-producing development industry? Has adaptation become an industry of its own, propelled by uncertainty and the need for technical interventions that only international experts could supply? I set out in this thesis to determine the origins and sources of power in Ghana's adaptation regime, knowing that I'd have to reach beyond simple policy outcomes and visible decision making. This required setting aside my lofty three-country, rapid appraisal of power and concentrating on this sole context.

What I've increasingly realized while writing this thesis is that true political debate and analysis is needed as much as technical decision support tools for adaptation success. In many ways, adaptation theorists and practitioners are guilty of perpetuating a political deficit in adaptation. We view climate change and its responses as a purely technical endeavor—modeling impacts, and using empirical data to prioritize adaptation actions. Science rightly tells us that this is the correct approach. But when humans are involved, so too is power. The way for adaptation to transition from theory to practice—especially in a sector characterized by extreme agro-ecological, economic, and social diversity —is to shift the locus of decision making from technical actors to the true implementers: farmers. Politics need not be a dirty word in climate change adaptation. Quite paradoxically, I believe that if we are to make headway in a growing Climate Smart Agriculture (CSA) movement, we have to make sub-national debates more political, not less.

**Acronyms**

| | |
|---|---|
| AAGDS | Accelerated Agricultural Growth and Development Strategy |
| AAP | Annual Action Plan |
| ADB | Agricultural Development Bank |
| ADC | Agricultural Development Company |
| AEA | Area Extension Agent |
| AGRA | Alliance for a Green Revolution in Africa |
| AMSEC | Agricultural Mechanization Service Center |
| ARI | Animal Research Institute, CSIR |
| BAU | Business As Usual (agricultural development) |
| CAADP | Comprehensive Africa Agriculture Development Programme |
| CAN | Climate Action Network |
| CBA | Community Based Adaptation |
| CBDR | Common but Differentiated Responsibilities |
| CCAFS | CGIAR Research Program on Climate change, Agriculture and Food Security |
| COP | Conference of the Parties, UNFCCC |
| CSA | Climate Smart Agriculture |
| CSH | Critical Systems Heuristics |
| CSIR | Council for Scientific and Industrial Research |
| CSO | Civil Society Organization |
| CST | Critical Systems Thinking |
| DA | District Assembly (see also, MMDA) |
| DACF | District Assembly Common Fund |
| DADO | District Agricultural Development Office |
| DCD | District Coordinating Director |
| DCE | District Chief Executive |
| DDF | District Development Funds |
| DPCU | District Planning Coordinating Unit |
| EBA | Ecosystem Based Adaptation |
| ECOWAS | Economic Community Of West African States |
| EPA | Environmental Protection Agency |
| ESG | Earth Systems Governance |
| FARA | Forum for Agricultural Research in Africa |
| FASDEP | Food and Agricultural Sector Development Policy (I & II) |
| FBO | Farmer-Based Organizations |
| FC | Forestry Commission |
| FOAT | Functional Organizational Assessment Tool |
| G-CAN | Ghana Climate Action Network |
| GCM | Global Climate Model or General Circulation Model |
| GECCA | Ghana Environmental Conventions Coordinating Agency |
| GEF | Global Environment Facility |
| GHG | Green House Gases |
| GMET | Ghana Meteorological Agency |
| GoG | Government of Ghana |
| GPRS | Growth and Poverty Reduction Strategy (I & II) |
| GSGDA | Ghana Shared Growth and Development Agenda (I & II) |
| GSOP | Ghana Social Opportunities Project |
| HIPC | Highly Indebted Poor Country |
| IFAD | International Fund for Agricultural Development |
| IGF | Internally Generated Funds |
| IMF | International Monetary Fund |
| INGO | International Non-Governmental Organization |
| IPCC | Intergovernmental Panel on Climate Change |
| LDC | Least Developed Country |

| | |
|---|---|
| LDCF | Least Developed Country Fund |
| MCTA | Ministry of Chieftaincy and Traditional Affairs |
| MDA | Ministries, Departments and Agencies |
| MDBS | Multi-Donor Budget Support Programme |
| MESTI | Ministry of Environment, Science, Technology and Innovation |
| METASIP | Medium Term Agricultural Sector Investment Plan |
| MLGRD | Ministry of Local Government and Rural Development |
| MLNR | Ministry of Land and Natural Resources |
| MMDA | Metropolitan, Municipal and District Assemblies |
| MOF | Ministry of Finance |
| MOFA | Ministry of Food and Agriculture |
| MP | Member of Parliament |
| MSIM | Multilevel Stakeholder Influence Mapping |
| MTDP | District Medium Term Development Plan |
| MTEF | Medium term Expenditure Framework |
| NADMO | National Disaster Management Organization |
| NAP | National Adaptation Plan |
| NAPA | National Adaptation Programmes of Action |
| NCCAS | National Climate Change Adaptation Strategy |
| NCCP | National Climate Change Policy (I & II) |
| NDC | National Democratic Congress, political party |
| NDPC | National Development Planning Commission |
| NEPAD | New Partnership for Africa's Development |
| NGO | Non-Governmental Organization |
| NMTDF | National Medium Term Development Framework |
| NPP | National Patriotic Party, political party |
| NRECC | Natural Resources, Environment and Climate Change, MOF |
| NRGP | Northern Rural Growth Programme |
| ODA | Official Development Assistance |
| OECD | Organization for Economic Cooperation and Development |
| PE | Political Ecology |
| PPP | Public-Private Partnership |
| PRV | “Power, A Radical View” (I & II) |
| RCC | Regional Coordinating Council |
| REDD+ | Reducing Emissions from Deforestation and Forest Degradation |
| RELC | Research Extension Liaison Committees |
| RPCU | Regional Planning Coordinating Unit |
| SADA | Savannah Accelerated Development Authority |
| SALM | Sustainable Agricultural Land Management |
| SAP | Structural Adjustment Programs |
| SARI | Savanna Agricultural Research Institute, CSIR |
| SBSTA | Subsidiary Body for Scientific and Technical Advice, UNFCCC |
| SCCF | Special Climate Change Fund |
| SES | Socio-Ecological Systems |
| SGI | Shallow Groundwater Irrigation |
| SIA | Systemic Integrated Adaptation |
| SNA | Social Network Analysis |
| SSA | Sub-Saharan Africa |
| SSI | Semi-Structured Interview |
| TA | Traditional authorities |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UER | Upper East Region, Ghana |
| UWR | Upper West Region, Ghana |

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# 1. Introduction

*"Who came to the Earth first? Was it tradition or politics? If it is politics, then OK, politics is the highest. If it is traditional, then tradition is the highest. So you give what belongs to Cesar to Cesar and to God to God."*

Local Interview (2013)

**Summary**

Small-scale agricultural producers in developing nations face persistent livelihood threats, both of the natural and socio-economic variety. Increasingly, climate change presents a major new constraint to these producers, threatening global food production. Modest estimates of global warming trends indicate a 2°C rise in global mean temperatures within the next century with some recent estimates suggesting as much as 4.5°C (Moss et al. 2008; IPCC 2013). Even a 2°C rise in mean temperature will destabilize current farming systems transforming production patterns and crop productivity (Easterling et al. 2007). It is in lower latitude countries, especially Sub-Saharan Africa (SSA), where achieving food security is already problematic and crops are grown closely to their limits of heat tolerance and moisture availability that the impacts of climate change will be most hard felt (Parry et al. 1999; Lobell et al. 2008; Funk and Brown 2009).

Whether food systems in developing nations can keep pace with growing food demands in the face of progressive climate change is a question concerning producers, decision-makers and researchers alike (Hazell and Wood 2008; Ziervogel and Ericksen 2010). While efforts to encourage the mitigation of green house gases (GHGs) have dominated international forums over the past decade, adaptation to the imminent impacts of climate change has achieved greater visibility in recent years owing to the surge of adverse impacts on agricultural systems and an increase in the frequency of extreme events (Kates 2000; Smit and Wandel 2006; Pielke et al. 2007; Parry 2009).

As such, calls for the integration of adaptation measures in to existing sectoral and development plans are widespread (Kok et al. 2008; Urwin and Jordan 2008). Yet after over a decade of national adaptation plan development and implementation, adaption has been slow to transition from theory to practice (Schipper et al. 2012). Questions remain, in particular, over the best means to translate international and national adaptation objectives in to on–ground, site-specific actions that can support local actors (Cooke and Kothari 2001; Dodman and Mitlin 2013; Few et al. 2007; Reed 2008; Sherman and Ford 2014). Yet the gap between

powerful actors in climate adaptation regimes is not merely a product of a lack of available participatory forums. Smallholder farmers are often systematically excluded and denied the resources for adapting due to pervasive socio-economic and institutional structures (Perez et al. 2015; Eriksen and Silva 2009). This despite the fact that farmers possess critical, local knowledge and expertise that can be used to better inform public policy (Agrawal 2002). Climate change adaptation planning provides new challenges and opportunities for development practitioners, and improving the representation and adaptive capacity of smallholders will require working in new and politically informed ways (Wild et al. 2015).

*Power*

Climate change adaptation involves actors at multiple levels biding for financial resources, constructing and maintaining institutions, prioritizing actions, and determining the allocation of scarce resources among competing interests. The adaptive capacity of smallholder farmers depends, in part, on the relative power of actors within the regime. Yet power is often not explicitly addressed within climate change adaptation literature (Chaffin et al. 2014; Biermann et al. 2010). Instead, it is most commonly captured in fleeting anecdotes to the 'underlying power dynamics between actors', 'inevitable power asymmetries', or 'local power structures'. Explicitly acknowledging the role of power in adaptation regimes can improve our understanding of its origins and manifestations, and lead to improved policy and institutional design that increase the effectiveness of stakeholder participation (Sherman and Ford 2014).

Yet how to study power empirically has long been the subject of debate, and only recently among socio-ecological systems (SES) theorists (Biermann et al. 2010; Barnett and Duvall 2005b; Lebel 2006; Yates 2012; Clement 2013; Boonstra 2016). Power is a ubiquitous term and its various origins, ontological and epistemological foundations are difficult to identify. Given the 'essentially contested' nature of power, multiple typologies and theories have developed in order to capture its essence (Gallie 1956). 'Bases', 'foundations', 'sources', 'species', 'manifestations', and 'faces' have all been used in describing power or its characteristics.

One consistent dichotomy used by power theorists that is of particular interest here consists of distinguishing between 'power-to' and 'power-over' (Morriss 2002). This reflects the understanding that power is derivative of not only one's individual or collective agency (power-to) but also the relational, and asymmetrical interactions between the agencies of two or more individuals (power-over). Power-to refers to power as a capacity, whether or not that

capacity is exercised. Meanwhile, power-over indicates the securing of compliance, or domination, by one group over another. Of course, these two framings cannot exist independently of one another, and power-over is considered by some authors to be a 'subspecies' of power-to (Lukes 2005).

Climate change adaptation theorists have written widely on the concept of adaptive capacity. Adaptive capacity can be defined as "the ability or potential of a system to respond successfully to climate variability and change" (Adger et al. 2007). In the language of power theorists, adaptive capacity represents a clear 'power-to' framing. This focus on power-to, I will argue, does not place sufficient emphasis on the subtle ways in which certain actors exercise power-over others within adaptation regimes. That is, when 'power-to' interventions fail to achieve the desired results and commensurate improvements in adaptive capacity, we must look beyond the capacity framing at asymmetrical or relational dynamics between actors. Some adaptation interventions designed to increased adaptive capacity, in fact, can contribute to increased vulnerability when structural power dynamics are not properly accounted for (Eriksen and Lind 2009).

**Conceptual framework**

In an effort to demonstrate the landscape of power in which smallholder farmers find themselves, I propose the use of a framework of power advanced by Steven Lukes in his seminal work, *Power: A Radical View* (1974, 2005). Lukes' 'dimensional' view of power distinguishes between power-over in decision making, agenda setting, and preference shaping, providing an empirical framework for the study of power. It is on Lukes' framework that this thesis builds. A summary description of Lukes' three dimensions is found below in Table 1.1, while a more thoroughgoing treatment is provided in Section 3, Paper 3, and Paper 5 of this dissertation.

**Table 1.1 Lukes' three dimensional power framework**

| One-Dimensional view of power (D1 -Decision making) | Two- Dimensional view of power (D2 -Agenda setting) | Three- Dimensional view of power (D3 -Preference shaping) |
|---|---|---|
| Focus on:<br>(a) behavior<br>(b) Decision making<br>(c) (key) issues<br>(d) Observable (overt) conflict<br>(e) (Subjective) interests, seen as policy preferences revealed by political participation | (Qualified) critique of the behavioral focus. Focus on:<br>(a) decision-making and nondecison-making<br>(b) issues and potential issues<br>(c) observable (overt or covert) conflict<br>(d) (subjective) interests, seen as policy preferences or grievances | Critique of behavioral focus. Focus on:<br>(a) decision making and control over agenda (not necessarily through decisions)<br>(b) Issues and potential issues<br>(c) Observable (overt or covert), and latent conflict<br>(d) Subjective and real interests |
| "Focuses on behavior in the making of decisions on issues over which there is an observable conflict of (subjective) interests, seen as express policy preferences, revealed by political participation" (p. 19) | "Allowing for the consideration of the ways in which decisions are prevented from being taken on potential issues over which there is an observable conflict of (subjective) interests, seen as embodied in express policy preferences and sub-political grievances" (p. 25) | "Potential issues or conflicts can be successfully kept out of politics – in both formal and informal venues—by shaping the perceptions, cognitions and preferences of subordinate in such a way that they accept their role in the existing order of things or imagine no alternative to it" (p. 28) |

Source: Lukes (1974, 2005)

Lukes' three dimensions of power can be applied and assessed in Ghana—and in the United Nations Framework Convention on Climate Change (UNFCCC) context in Paper 3— by studying the outcomes of climate change adaptation policy in formal decision-making forums, by examining the ways in which actor groups can successfully deviate from stated policy agendas, and by elucidating the way in which certain actors are denied access to their own preferences in adapting to climate change. Relying on first and second dimension analyses (i.e. behavioral, visible power) alone can provide deceptive understanding of where power lies in the regime. This, I argue, is especially true in the area of agricultural climate change adaptation policy where the multi-level, transnational nature of the regime, extreme uncertainties, and the 'anticipatory' nature of decision making provide high-barriers to entry in to the decision making forums. Here, the conditions for an especially active third dimension of power are met.

**Goals and objectives**

This thesis does not take as its starting point a 'demonstrable event' as described by Robbins (2011) and required by so-called 'event ecologists'. Instead, it focuses on Ghana's agricultural adaptation regime as a system, taking particular note of structural features, or higher-order categories that shape regime outcomes for smallholder farmers in northern Ghana. It is state-centered, focused primarily on Ghana's public policy response to climate change, while recognizing the critical roles that non-state actors play in the regime. As Ghana's agricultural adaptation policies have not yet been implemented, the study focuses on the policy development process and the existing development 'machinery' in to which climate change policies are to be integrated.

Specifically, I seek to demonstrate the ways in which smallholders are potentially susceptible to domination by other actors within Ghana's agricultural adaptation policy regime, and to identify the features of that regime that enable one group to wield influence over another. Yet this thesis reaches beyond visual instances of 'power–over' to include so-called third dimension power plays, thereby assuaging the critique of 'causalists' over the simple reification of politics and shallow 'discovery' described by Robbins (2011)—i.e. simply unearthing political ecology (PE) concepts widely known to exist. En route to these ends, this thesis asks:

(1) Which actor groups are considered (perceived to be) most powerful in Ghana's agricultural adaptation policy regime?
(2) What are the features of Ghana's agricultural adaptation policy regime that enable one actor group to wield influence over that of another?
(3) In what way might power/influence disparities contribute to the shaping of adaptation 'preferences' among smallholders in Ghana's agricultural adaptation policy regime?

In addition to developing a new power-mapping methodology—Multilevel Stakeholder Influence Mapping (MSIM)—I build on existing three dimensional power literature to bring Lukes' seminal framework into the environmental sciences, offering three replicable sources of preference shaping (D3.a dominant narratives and discourses, D3.b prevailing development rationalities, and D3.c systemic institutional bias). I also explore the interrelated nature of the dimensions and propose a truly three dimensional vector-based view of power that can be taken forward by both researchers and practitioners in a host of settings, socio-ecological systems (SES) and beyond.

Ultimately, this is a power-centered analysis. The thesis marks a convergence of theory and practice around power in complex system regimes in environmental change, making power the subject of analysis instead of, in the words of Mitchell, "an answer known in advance" (2002 p. 53) and providing a more thoroughgoing synthesis of power than previous treatments in environmental governance literature. It seeks to provide an alternative to the predominant 'view' of powerlessness among local actors (smallholders and district level agents) as a product of limited capability or adaptive capacity (i.e. power-to) and towards powerlessness as a relational construct (i.e. power-over), taking in to account the sometimes-distant political economic factors that shape local adaptation contexts.

**Thesis structure**

This thesis adopts the 'published papers route' to the DPhil as it works with distinct themes around power in agricultural adaptation. Peer reviewer comments received throughout the writing of these articles (and working papers) have proved valuable in shaping the direction of this thesis. The papers provide a coherent overarching narrative along the following lines: Paper 1 seeks to build a framework for making power dynamics legible between actor groups, and develops a step-by-step methodology—Multilevel Stakeholder Influence Mapping — for visualizing power relations in complex system regimes. Paper 2 applies the MSIM methodology in Ghana's agricultural climate change adaptation regime, revealing where power is perceived to lie from various stakeholders' perspectives in the existing policy regime. Paper 3 reviews the current treatment of power in social sciences and in adaptation literature and settles on an appropriate conceptual and analytical framework for the study of power in adaptation policy that builds on Lukes' three dimensional view. It then demonstrates the utility of the framework by applying it to National Adaptation Plan (NAP) development within the UNFCCC. Paper 4 explores Ghana's climate change and agricultural policy environment, focusing on the ecology of power in 'D3.b neoliberal development rationalities' and how they come to shape the country's preferred adaptation portfolio. Finally, in Paper 5, the modified three dimensional view of power is applied to Ghana's multi-level adaptation regime using interview data to provide a high resolution case study, drawing in content from the previous four papers.

**Figure 1.1 Geographic distribution of journal articles for assessment**

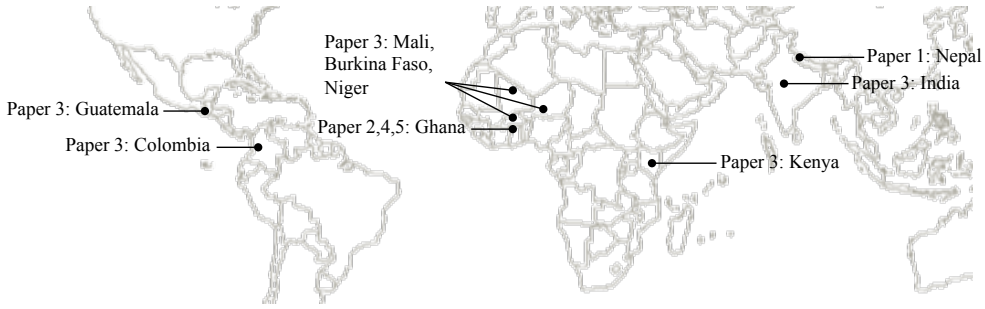



**Table 1.2 List and status of journal articles for assessment**

| Paper # | Title | Classification | Journal | Status |
|---|---|---|---|---|
| 1 | Multi-level Stakeholder Influence Mapping: Visualizing power relations across actor levels in Nepal's agricultural climate change adaptation regime | Methodology paper | Systemic Practice and Action Research | Published |
| 2 | Power and influence mapping in Ghana's agricultural adaptation policy regime | Results paper | Climate and Development | Published |
| 3 | Exploring farmer preference shaping in international agricultural climate change adaptation regimes | Literature review and results paper | Environmental Science and Policy | Published |
| 4 | Agricultural climate change policy in Ghana: examining neoliberal and techno-fix influences | Results paper | Journal of Environmental Policy and Planning | Submitted |
| 5 | Decision making, agenda setting, and preference shaping in Ghana's agricultural climate change adaptation policy regime: a political ecology perspective | Results paper | Journal of Political Ecology | Submitted |

Source: Author

Given the interdisciplinary team contributing to the underlying project behind this thesis, it is worth clarifying the extent of my contributions to each paper listed above. Given university examination requirements, I was the primary contributor (95%+) to the written content in each article. Additional authors were included for their conceptual contributions through the supervision process, and, in some cases, for assistance in data collection. The academic journal articles comprising this thesis have benefited from several working papers, reports, and policy briefs that I have produced over the past two years. These include:

Sova, C.A., and A.S. Chaudhury. "State of Agricultural Climate Change Adaptation Policy in Nepal." In Working Paper No. 46, edited by CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS). Copenhagen, Denmark, 2013.

Sova, C.A., A. Helfgott, and A.S. Chaudhury. "Multilevel Stakeholder Influence Mapping in Climate Change Adaptation Regimes." In Working Paper No. 50, edited by *CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS)*. Copenhagen, Denmark, 2013.

Sova, C.A., A.S. Chaudhury, W.A. Nelson, and D.K. Nutsukpo. "Climate Change Adaptation Policy in Ghana: Priorities for the Agriculture Sector." In Working Paper No. 68, edited by CGIAR Research Program on Climate Change Agriculture and Food Security (CCAFS). Copenhagen, Denmark, 2014.

Kissinger, G., D. Lee, V.A. Orindi, P. Narasimhan, S. Mutua King'uyu, and C.A. Sova. "Planning Climate Adaptation in Agriculture: Meta-Synthesis of National Adaptation Plans in West and East Africa and South Asia." In Report No. 10, edited by CGIAR Research Program on Climate Change Agriculture and Food Security (CCAFS), 2014.

**Defining key terms**

Several recurring terms should be defined early on in this thesis. This includes laying out my understanding of 'power', 'adaptation', and 'farmers' and what is meant by the frequent mention of climate change and agricultural 'regimes' and systems'.

*Power:* Power in the social sciences is commonly defined as the ability of an agent to obtain a desired outcome, with or without resistance (Weber 1978 [1922]). Power is often divided in to 'power-to' and 'power-over' sub-categories, and can manifest both overtly and covertly. Ultimately, power remains an 'essentially contested' concept that has different meaning to different groups (Gallie 1956)[1]. As such, power in this study is considered for its manifesting 'dimensions' (decision making, agenda setting and preference shaping), rather than a specific definition, to facilitate its empirical study (Lukes 2005). Power and 'influence'[2] are used interchangeably throughout the text.

*Regime:* A specialized system of governance that assembles rights and rules, and determines decision making procedures and programmatic activities across different levels of social

[1] Wittgenstein asserts that given the plurality of definitions of power, it is perhaps best to consider the related but distinct aspects of power as having "family resemblance" (2006 [1953]), thereby avoiding the restriction of viewing power from a single source or dimension.

[2] Power and influence are used interchangeably across social science literature. While important distinctions have been defined (see Nagel 1975), a deep dive in to the nuance between the concepts would fall outside of the scope of what this work hopes to achieve.

organization (adapted from Young 2012). Specifically, 'regime' in this study refers to the actors, organizations, and institutions both formally and informally involved in agricultural climate change adaptation policy in Ghana.

*System:* A section of the real world that we take to represent the relevant context. 'System' in this study most often refers to the 'agricultural system' in Ghana, which has different boundaries— the 'line' drawn between a system of interest and its surrounding environment— depending on the perspective of the observer. The predominant perspective adopted in this study is that of smallholder farmers in the north of Ghana.

*Adaptation:* Adjustments in natural and human systems in response to actual or unexpected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC 2007). Adaptation can be planned or autonomous, proactive or reactive, incremental or transformation, and short or long term, among other such dichotomies. This study is especially focused on 'hard' (relying predominately on artificial human-built infrastructure) versus 'soft' (using forms of natural infrastructure or natural capital, such as ecosystems and forests, together with low-impact technology, empowering local communities) adaptation.

*Adaptation/mitigation:* This thesis centers on climate change adaptation. However, I acknowledge the sometimes-fluid distinction between adaptation and mitigation as it exists in the agricultural sector. Once referred to as 'win-wins', and more recently 'Climate Smart Agriculture', many adaptation measures have co-benefits with regard to GHG emission reductions. This is especially true of agroforestry interventions. As such, mitigation measures are referenced throughout this thesis, but always with respect to their impacts on adaptation.

*Farmers:* Farmers in Ghana (or elsewhere) are not a homogenous group. They differ in land holding size, production systems, family structures, and a host of other variables. In this study, I use the term 'farmers' in reference to subsistence farmers in the north of Ghana. These individuals and families farm less than five hectares of land, rely on rainfed cropping systems, and are food insecure for one or more months of the year. These farmers tend to be most vulnerable to the impacts of climate change.

**Why study power?**

To date, there remain few attempts to study power explicitly within socio-ecological systems research (Biermann et al. 2010). This is due to the esoteric nature of power, but also to a genuine lack of analytical frameworks built to accommodate the topic (Clement 2013). If we

accept that power is 'essentially contested' (Gallie 1955; Lukes 1974), then pursuing power as a topic of study requires that the analyst to be clear about their assumptions, biases, and reasons for engaging with the topic in the first place—that is to say, the important question of "why study power at all?" remains.

Morriss (2002) suggests three reasons that power is important, distinguishing between practical, moral, and evaluative purposes. Practical importance simply suggests that we need to know our own powers and those of others in order to find our way around a world populated by human agents. Moral importance, in contrast, is based on the concept of responsibility—"when we say that someone is powerful we are assigning responsibility to a human agent or agency for bringing (or failing to bring) about certain outcomes that impinge upon the interests of other human beings" (Ball 1976). To set these imperatives on responsible agents is "sociological realistic, morally fair and politically imperative" (Mills 1959 p. 100). Finally, evaluative importance refers to the judging or evaluation of social systems of the distribution and extent of power within a society. Practical, moral, and evaluative power each feature centrally in climate change adaptation regimes:

*Practical:* As suggested by Pattberg and Widerberg (2015), the climate change 'opportunity' promotes a proliferation of new actor groups in the global development regime. This has been seen in a flurry of new non-governmental organizations involved in climate change negotiations (Schroeder and Lovell 2012) and civil society organizations (CSOs) and government agencies in domestic contexts. From a practical standpoint, mapping power dynamics within Ghana's adaptation regime provides a 'visible' landscape of power that can be used by researchers, development practitioners, and governments when designing and improving adaptation interventions.

*Moral:* Funding for climate change has increased dramatically in the last decade, with the Organization for Economic Cooperation and Development (OECD) reporting nearly US $62 billion mobilized in 2014 alone, with 16% of total funding in 2013-14 destined to adaptation activities (2015). Yet the capacity of developing nations to spend allocated funds has come under question (WaterAid 2015). From a moral standpoint, then, the study of power helps to assign responsibility for adaptation outcomes to those self-appointed intermediaries of these resources, especially government agencies and development partners that have established policies and plans to assist vulnerable communities.

*Evaluative:* Climate change adaptation in the agricultural sector has increasingly been framed as a development imperative as opposed to a purely environmental challenge (Lemos et al. 2007). This has prompted calls for mainstreaming of adaptation in to existing development

regimes (Reid and Huq 2014; Dasgupta and Baschieri 2010). Yet mainstreaming will not be effective if existing development trajectories are inconsistent with the objectives of adaptation or if they directly contribute to vulnerability (Schipper 2007). From an evaluative perspective, given the existing inequities in global development, studying power in an emerging adaptation regime allows us to see the ways that adaptation is co-opted by the business-as-usual (BAU) development agenda, and thus how adaptation might be used as a catalyst for a different growth model. To date, the majority of adaptation conceptualizations have been 'adjustment' oriented, effectively perpetuating the status quo development regime despite calls for more transformative adaptation (Bassett and Fogelman 2013; O'Brien 2012; Schulz and Siriwardane 2015).

To render visible the landscape of power, to assign responsibility for adaptation outcomes (beyond farmers themselves), and to monitor progress away from the BAU development regime, then, serve among my primary reasons for studying power in Ghana's agricultural adaptation regime. While this thesis focuses centrally on the systematic marginalization and exclusion of smallholders, it is my sincere desire to avoid what Silverman refers to as the temptation to favor the underdog at the expense of everyone else— i.e. "does the research convey as much understanding of its villains as its heroes?" (2001 p. 172). I do not propose the existence of any 'villains' in this work. The myriad actors involved with agricultural adaptation in this regime I believe to be well intentioned and committed to the cause of reducing vulnerability (myself included). It is for this precise reason I find the third dimension of power so intriguing; its exercise does not rely on a conscious or intentional act.

## 2. Study Setting

*"Decision making in climate change adaptation regimes are best described as incremental, complex and messy, involving actors with competing goals and interests, and where policy decisions are shaped by those who are able to mobilize coalitions and networks around particular solutions gaining political traction."*

Lars Otto Naess (2014)

Ghana is highly vulnerable to climate change given its existing development deficits and heavy reliance on rain-fed agriculture, especially in the north of the country. Yet, Ghana's economy is among the most robust in West Africa, and its political institutions are considered stable and democratic. The country has made advances unique to the West African region in establishing adaptation and climate change policies, as well as processes for mainstreaming adaptation in local development planning procedures. It serves, then, as a unique backdrop for a study of this kind.

Decision makers in Ghana widely agree that climate change will impact their country, and knowledge of climate change is generally high among opinion leaders (BBC 2010). This contrasts with the highly politicized and divisive nature of domestic climate change policy in developed countries—particularly in the United States— and climate adaptation policy in UNFCCC negotiations. In fact, Papers 2 and 3 of this thesis find that political groups in Ghana are not perceived as relevant or highly influential with regard to climate change adaptation policy development and implementation.

True to political ecology, then, the study of adaptation policy development in Ghana begins in contradiction: while climate change is politically charged and contested at international levels, and it remains outwardly devoid of politics at the national level. Climate policies have been adopted in Ghana with near universal consensus from key stakeholders, technical and political, national newspapers consistently print lofty calls to action[3], and Parliamentarians

[3] During the research period (2013-2014), I collected newspaper articles related to climate change in Ghana: "President Moahama launches climate change policy", "Ghana Maps out strategy on climate change", "Ghana works at mitigating impact of climate change", "National climate change policy developed", "Address climate change issues now – Prez Kufuor", "[Ex President] Kufuor calls for action to stem climate change", "750,000 farmers to benefit from climate change project", "Control human activity to contain climate change – Ex Prez Kufuor", "The climate change crisis: a focus on Ghana's coastal communities", "Environment Minister courts support for climate change", "Climate change centre to be established", "Climate change summit: Global rallies demand action", "health effects of climate change will be grave – research findings", "Climate change is real – go REDD plus", "Sermon on climate change", "African voices must count at UN Climate Change conference in Paris", "African govts urged to support research on climate change", among others. Of these myriad headlines, only one, "Climate change battle: political will and the economy", suggests conflict of any sort.

have signed on in support of climate smart agriculture (Zougmore 2014). The political ecology of adaptation in Ghana thus is not revealed through stark debates in formal policy decision making forums, but rather in less visible manifestations of power. This is the subject of this thesis, and is addressed in detail in Paper 5.

What follows is a brief introduction to agriculture and climate change in Ghana, and an overview of the research setting. Detailed background on agricultural climate change adaptation policy in Ghana can be found in Sova et a. (2014), a working paper produced during this thesis.

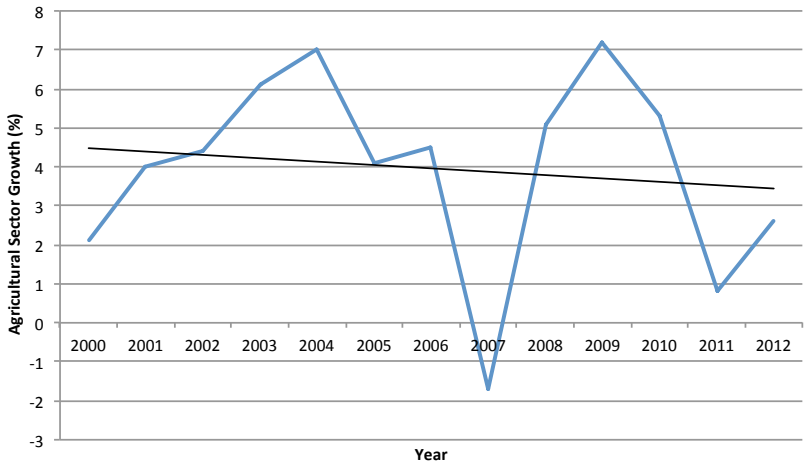
**Agriculture and climate change in Ghana**

Agriculture is a mainstay of the Ghanaian economy, contributing to nearly 40% of the country's gross domestic product (GDP) (Government of Ghana 2007). Relying heavily on rain-fed systems with limited irrigation infrastructure, the sector is particularly vulnerable to the impacts of climate change. In the northern regions, where the bulk of Ghana's cereals crops are produced, already harsh median temperatures are expected to further increase by the year 2030 (Jalloh et al. 2013).

The country's medium-term planning framework, Ghana Shared Growth and Development Agenda (GSGDA), places agriculture at the center of the country's growth and structural transformation strategy, calling particularly for private sector engagement—through public-private partnerships (PPP)—in the sector (Government of Ghana 2010c). As per the Maputo Declaration, the country aims to achieve investment levels of 10% of the national budget in the sector and an agricultural GDP growth rate of 6% per year. Yet, falling sector budget allocations parallel declines in agricultural sector growth (see Figure 2.1). The agriculture sector recorded a growth rate of only 2.6% in 2012 (against a 4.8% target) and 0.8% growth in 2011 (5.3% target), for example[4].

[4] Key to interpreting the performance measures of the agricultural sector is recognizing the central role that cocoa production—the country's principal cash crop—plays in the economy. Ghana is the second largest cocoa producer in the world (Cote d'Ivoire leads in global cocoa production), and has created a centralized and regulated market for cocoa beans managed by the Ghana Cocoa Board (COCOBOD) to market the nearly one million tons it produces annually (Oxford Business Group, 2012).

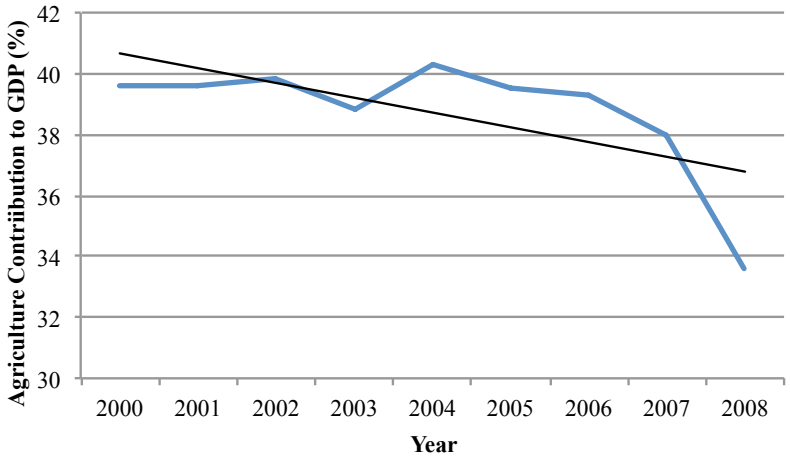
**Figure 2.1. Agricultural sector growth in Ghana (%)**




Source: Government of Ghana (2010c), 2011 Budget Statement, 2012 Budget Statement, and 2013 Budget Statement.

Given the sector's poor growth performance, the share of the agricultural production in Ghana's broader economy (historically near 45%) has declined in recent years (see Figure 2.2), due in part to the emergence of competing industries like timber, mining and a growing oil industry (Government of Ghana 2010c). In fact, in Ghana's most recent medium term planning document, the GSGDA II, the agricultural sector is said to account for only 21.9% of GDP, and is expected to drop to 19% by 2030. Presently, the service sector accounts for approximately 49.6% of GDP, and industry 28.5% (Government of Ghana 2014).

**Figure 2.2 Ghana's agricultural sector contribution to GDP (% of total GDP)**




Source: Government of Ghana (2010b)

Generic constraints to agricultural sector performance in Ghana include poor soil fertility (due, in part, to limited access to fertilizer and other inputs), limited access to credit, heavy reliance on rain-fed agriculture, minimal availability of tractors and mechanization, high post-harvest losses due to inadequate storage and marketing facilities, poor agricultural extension services, low performing livestock breeds, and climate variability and change (Government of Ghana 2010b). Each of the challenges is magnified in the Ghana's northernmost regions given the particularly harsh climate and distance from the country's administrative center.

In terms of climate impacts, an increase of 1 °C in mean temperatures across Ghana has been noted over the past 30 years, together with a 20% reduction in rainfall (Asante 2004). The country's second UNFCCC national communication cites one recent projection that estimates temperature increases in Ghana's northern savannah regions between 1.7 °C and 2.04 °C by the year 2030, with high temperatures peaking at 41 °C (Government of Ghana 2011). The effects of climate change will vary across Ghana's five principal geographical zones: coastal plains (south), forest plateau (inland), evergreen rainforest (southwest), the hilly Akwapim-Togo Ranges (east), Volta River Basin (central) and high plains (north). Rainfall decreases in the country from south (2000 mm) to north (<1100 mm), providing the south with two distinct growing seasons and the north with a single season (May–October). Statistical analysis has demonstrated a delay in the rainfall arrive in northern Ghana from April to May over the past 60 years (Laux et al. 2008). Here, several interview respondents describe climatic changes and impacts in the Upper West Region (UWR):

> "Our farmers are planting as if our rainfall pattern is like [it] was over a hundred years ago. So now there is hunger and they are importing more rice; why not just tell them that this year the rain will come in June and not in November so that you start planting at the right time? And it's having a total effect on the north. There is either too much rain or no rain. (Interview, National, 30, 2013)

> "Now when it rains, the rains are so heavy and it's very sporadic, and when the heat comes it is so unbearable" (Interview, National, 29, 2013)

> "The rainy season was not that good. The rain started later than we expected, and we recorded two major droughts. [First] around July [for] about three weeks, then it came in again after two weeks and just before September ended. And we also had some floods—unexpected. And the rains were abrupt, stopped at a time we didn't expect." (Interview, Local, 68, 2014)

> "When I was growing up it was very easy to have two crops in a year. But of late, I mean for the past four years or so, it is becoming increasingly difficult to even have one crop. Because in those days we used to plant somewhere in May or early June. but now for the past four years even on the research plot we are not able to plant in June. We normally plant in second week of July, and it looks like the rains do not go beyond first week of October. So the growing period has shortened" (Interview, Local, 75, 2013)

In the Guinea Savannah zone of northern Ghana, MacCarthy et al. (2013), using crop simulation models, indicate that maize yields are expected to fall between 19 and 41% by 2050. This reflects similar findings to Jones and Thornton (2003), estimating yield losses of approximately 15% in that same period. Meanwhile, sorghum, millet, and groundnut yields—staple crops in Ghana's northern regions — are expected to decrease by approximately 20% by mid century (Schlenker and Lobell 2010). This will be accompanied by a 12% annual loss of GDP by 2050 given these and other productivity losses in the agricultural sector (Asafu-Adjaye 2013). Similar projections are made for rain-fed rice (Jalloh et al. 2013). While the most common climate stressor facing the Savannah Zone is drought, infrequent flooding does also occur (Tschakert et al. 2010). The impact of these events and trends are summarized in Table 2.1.

**Table 2.1 Yield trends to 2050 for staple crops in Ghana's northern regions**

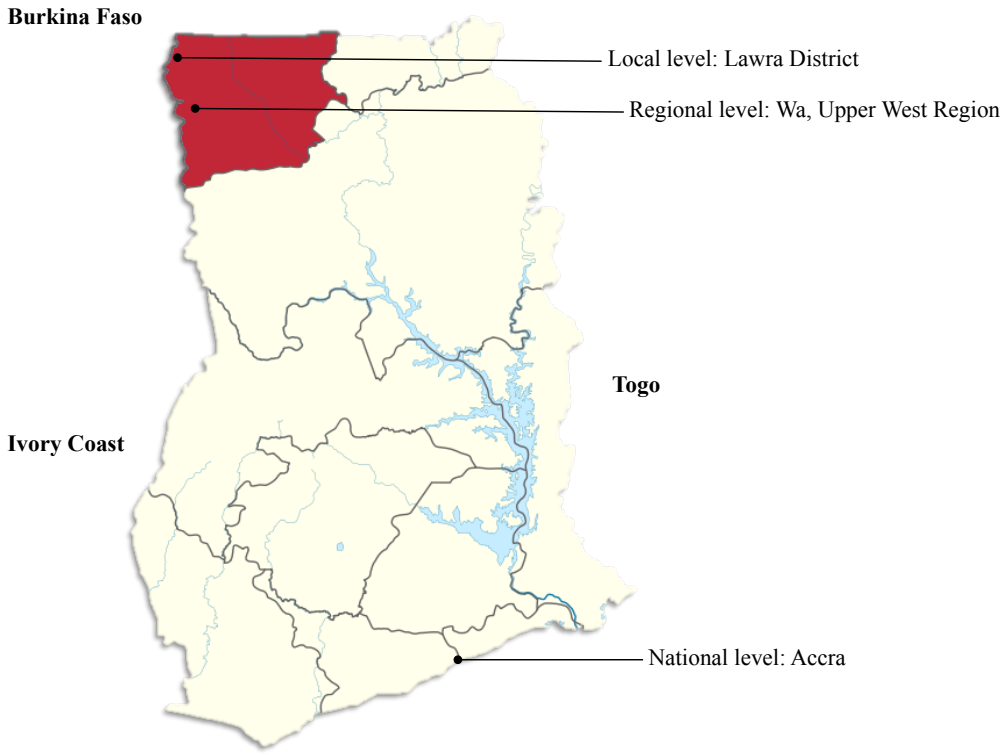
| Crop | Yield Trend (2050) | Source |
|---|---|---|
| **Maize** | - 15-42% | MacCarthy et al. 2013; Jones and Thornton 2003 |
| **Rice** | - 25% | Jalloh et al. 2013 |
| **Sorghum** | - 20% | Schlenker and Lobell 2010 |
| **Millet** | - 20% | Schlenker and Lobell 2010 |
| **Groundnut** | - 20% | Schlenker and Lobell 2010 |

Source: Author

**Research setting**

This multi-level study focuses on three administrative levels in Ghana's agricultural adaptation regime: national (Accra), regional (Wa, Upper West Region), and District (Orbili, Lawra), as illustrated in Figure 2.3. What follows is a brief description of relevant political ecological considerations at each operational level.

**Figure 2.3 Locations of primary data collection in Ghana**




Source: Author

*National level*

Nationally, it is estimated that over 50% of the working population in Ghana is engaged directly in agriculture (Government of Ghana 2007). The bulk of agricultural production remains concentrated in the hands of smallholder farmers, with some 2.75 million households engaged in the sector and approximately 90% of landholdings less than 2 hectares in size (Government of Ghana 2010b). The Ministry of Food and Agriculture (MoFA), Ministry of Environment, Science, Technology and Innovation (MESTI), and the Environmental Protection Agency (EPA)—MESTI's implementing agency—are the three principle government bodies charged with promoting adaptation to climate change for the agricultural sector nationally. The National Development Planning Commission (NDPC) and Ministry of Finance (MoF) meanwhile, work with these agencies to integrate climate change in to national development plans. These government agencies are supported in this endeavour by a host of Non-Governmental Organizations (NGO), bi-lateral and multi-lateral donors, and

other civil society actors.

The national legislative and policy environment is dense, with agricultural climate change objectives introduced across a number of documents. This includes but is not limited to the National Climate Change Adaptation Strategy (NCCAS) (Government of Ghana 2012b), the National Climate Change Policy (NCCP) (Government of Ghana 2014a), the Medium-term national development policy framework: Ghana Shared Growth and Development Agenda (GSGDA) (Government of Ghana 2010c), the Food and Agricultural Sector Development Policy II (FASDEP II) (Government of Ghana 2007), and the Medium Term Agricultural Sector Investment Plan (METASIP) (Government of Ghana 2010b). Ghana is also currently undertaking a process of political, fiscal, and administrative decentralization (Government of Ghana 2010a), led by the Ministry of Local Government and Rural Development (MLGRD), which is placing more budgetary and planning responsibility on local administrative and technical units (Amankwah et al. 2014; Lentz 2006). Total budgeted expenditure on climate change in Ghana in 2014 across these policies was GH $637 million (US $ 210 million), accounting for less than 2% of total spending, and with activities effectively concentrated in four ministries (Asante et al. 2015). The NCCP draft implementation document, meanwhile, proposes spending of US $9.3 billion between 2014 and 2020 across 22 ministries, departments and agencies (MDAs), with approximately 10% of the funding destined toward agricultural activities (ibid). Table 2.2 introduces the key policy documents examined in this dissertation (used primarily in Paper 4).

**Table 2.2 Key governance, agriculture and climate change policies in Ghana**

| **Governance and institutional policies** |
|---|
| The Constitution of the Republic of Ghana, 1992 |
| Growth and Poverty Reduction Strategy (GPRS II), 2005 |
| Medium-term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA), 2010 |
| Medium-term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA II), 2014 |
| Decentralisation Policy Framework, 2010 |
| NDC 2012 Manifesto: Advancing the Better Ghana Agenda; Jobs. Stability. Development, 2012 |
| NPP 2012 Manifesto: Transforming Lives, Transforming Ghana; Building a Free, Fair and Prosperous Society, 2012 |
| **Agricultural policies** |
| Food and Agriculture Sector Development Policy (FASDEP), 2002 |
| Food and Agriculture Sector Development Policy II (FASDEP II), 2007 |
| Economic Community Of West African States Agricultural Policy (ECOWAP) and Comprehensive Africa Agriculture Development Programme (CAADP) Compact, 2009 |

| |
|---|
| Medium-Term Agriculture Sector Investment Plan (METASIP), 2010 |
| G8 Cooperation Framework to Support the "New Alliance for Food Security and Nutrition" in Ghana, 2012 |
| Northern Rural Growth Programme (NRGP), 2007 |
| Savannah Accelerated Development Authority (SADA), 2012 |
| **Climate change policies** |
| Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa (AfricaAdapt), 2009 |
| Integrating Climate Change and Disaster Risk Reduction into National Development, Policies and Planning in Ghana, 2010 |
| Ghana's Second Communication to the UNFCCC, 2011 |
| National Climate Change Adaptation Strategy (NCCAS), 2012 |
| National Climate Change Policy (NCCP), 2013 |
| NCCP II (Implementation Schedule), Forthcoming |

Source: Authors

*Regional level*

Regionally, the Upper West Region of Ghana is located some twelve hour's journey by bus from Accra and is sparsely populated with less than 2.8% of the country's population (Government of Ghana 2012a) of which 70.7 % are considered 'poor', and 45.1% 'extremely poor'—the highest incidences of poverty in Ghana's ten regions (Government of Ghana 2014d). Given the high levels of poverty and deteriorating environmental conditions, the Upper West is considered among Ghana's most vulnerable regions to climate change (Government of Ghana 2011). The country's second UNFCCC national communication estimates temperature increases in Ghana's northern savannah regions between 1.7°C and 2.04°C by the year 2030, with high temperatures peaking at 41°C (ibid). This, according to crop simulation models by MacCarthy et al. (2013), will precipitate declining maize yields between 19 and 41% in the Guinea Savannah Zone by 2050. Rainfall is expected to fall 1.1 to 3.1% across all regions in Ghana by 2020, and 13 to 21% by 2080 (Government of Ghana 2011). Impacts are already being felt, resulting in significant migration from Ghana's northern regions (Rademacher-Schulz et al. 2013). Wa is the regional capital of UWR and houses the Regional Coordinating Council (RCC), which serves as the political and administrative centre of the UWR and undertakes development planning and monitoring and evaluation. MoFA and EPA are responsible for promoting agricultural climate change adaptation at this operational level. Several NGOs and CSOs operate out of Wa, although significantly fewer in number than those operating out of Tamale, the Northern Regional capital to the East.

*Local and sub-local levels*

Locally, the Lawra District is located in the upper-most reaches of UWR along the border of Burkina Faso and is home to an estimated 100,000 people, the majority of which, 83%, are engaged in subsistence agriculture as the base activity for their livelihood. Agriculture accounts for 80% of the district's entire economic activity (Government of Ghana 2013). Farmers here typically plant rain-fed maize, rice, sorghum, millet, groundnut and vegetables (Dietz et al, 2004; Shepherd et al, 2005). The district lies in the Guinea Savannah zone of Western Africa, and as such, has one wet season from April to October, with rainfall levels varying over the last 40 years (Dietz et al 2004, Van De Geest, 2004). Climate Change is reported to be impacting on the arrival of the Tropical Maritime air mass that brings about the rainy season (Government of Ghana 2011). The District Assembly (DA) serves as Lawra District's political and administrative center. Decentralized agencies like the District Department of Agriculture, responsible for agricultural adaptation in the district, operate under the jurisdiction of the DA. The EPA also has an assigned desk officer in the DA. Simultaneously, a traditional ruling structure exists alongside these modern political administrative units in the district, and includes a network of village chiefs, sub-chiefs, and a Paramount chief for the ruling area.

Sub-locally, in the village of Orbili (6 km north of the town of Lawra), survey results[5] suggest that only 4% of local farmers are food secure for the entire year, with the majority (70%) food secure between seven and nine months. Crop production is relatively diversified (all of the survey respondents reported adopting more than three new crops (or varieties) and animal breeds within the past ten years), with most farmers in the area (82%) growing seven or more different crops (or products). Most Orbili farmers produce food crops for local, subsistence consumption, while only 6.7% sell what would be considered 'commercial crops'. Vegetable production is high among famers at 98.6% of households, as is the breeding of small ruminant livestock for market (91.9%). Meanwhile, bovine cattle production is low (20.7% of households) and there is no aquaculture in the Lawra area. Farmers in the area generally have access to over 5 ha of land, and most farmers rely solely on rainfall for watering crops, with only 4% using boreholes or small dams. Input usage (fertilizer and pesticide) in the Orbili and surrounding communities is at approximately 31% of farmers, and only 16.8% hired tractor services for their farm, with most relying on hired labor (69%). Most families (84%) reported receiving information regarding the weather, including 47% from the radio, and 46% from

[5] A CCAFS survey (Onyango et al. 2012) was conducted in Orbili and five surrounding communities in 2011. The survey aimed to produce data on baseline socio-economic and adaptive capacity within the study area.

their own observations or from family, friends or neighbors. Men are the primary recipients of climate and weather information. Women are the major on-farm labor group in 56% of instances (compared to 33.5% for men and 15.7% considered 'equally shared'). Less than 7% of households reported receiving formal credit for agriculture in the past year. Group membership is generally low among farmers in Orbili and surrounding villages, with 27.3% of families not members of any group, 21.7% involved in 'productivity enhancement' groups, and 23.7% in village savings and loan groups.

**Development planning in Ghana**

As the focus of this dissertation is primarily on the public sector response to climate change in Ghana, a brief look at the development planning process in the country is warranted. The Constitution of the Fourth Republic calls for decentralized planning, enforced through Local Government Act 462, which designates Metropolitan, Municipal and District Assemblies (MMDAs) as autonomous planning authorities in Ghana. The National Development Planning Commission— the country's apex planning authority— and Ministry of Finance produce planning and budgeting guidelines for MMDAs and Ministries, Departments and Agencies (MDAs) every four years based on a process of expert and community consultation and monitoring and evaluation from the previous National Medium Term Development Framework (i.e. GSGDA).

With the advent of the 2012 composite budget system—the realization of Ghana's continued decentralization efforts —one combined Annual Action Plan (AAP) and accompanied budget are produced at the MMDA level annually, derived from the MMDA's Medium Term Development Plan (MTDP) and community consultation. The MTDP and annual composite budget includes input from decentralized agencies now operating under the authority of the MMDA (since Legislative Instrument 1961). Regional Coordinating Councils in each of the country's ten regions monitor plan and budget development and implementation. Funds are distributed quarterly from the MoF to the MMDAs. This includes the District Assembly Common Fund (DACF)— a formula-based block grant from the central government for district development activities pegged at 7.5 percent of national revenue— and the operating budgets for decentralized line ministries, including the District Agricultural Development Office (DADO). Table 2.3 presents the entirety of Ghana's historical development plans and strategies.

**Table 2.3 History of development plans and strategies in Ghana**

| Plan | Years |
|---|---|
| The Guggisberg Plan (the First Ten-Year Plan) | 1920–30 |
| The Second Ten-Year Plan | 1930–40 |
| The Third Ten-Year Plan | 1946–56 |
| The Fourth Ten-Year Plan | 1951–61 |
| The Five-Year Plan | 1951–56 |
| The Consolidation Plan | 1958–59 |
| The Second Five-Year Plan | 1959–64 |
| The Seven-Year Plan (Work and Happiness) | 1963-70 |
| Two-Year Development Plan "The Stabilization Plan" | 1967-69 |
| The Rural Development Plan | 1971–72 |
| The Third Five-Year Plan | 1975-80 |
| The Fourth Five-Year Plan | 1981–86 |
| The Economic Recovery Programme/ Structural Adjustment Programme | 1983–89 |
| The National Development Policy Framework: Long-term development objectives (Ghana Vision 2020) | 1996–2020 |
| Ghana Vision 2020: The First Step | 1996–2000 |
| Ghana Poverty Reduction Strategy I (GPRS I) | 2003–05 |
| Growth and Poverty Reduction Strategy II (GPRS II) | 2006–09 |
| Ghana Shared Growth And Development Agenda (GSGDA) | 2010-13 |
| Ghana Shared Growth And Development Agenda II (GSGDA II) | 2014-17 |

Source: Author, adapted from NDPC Long Term National Development Plan (Draft, 2008)

Climate change adaptation is to be mainstreamed directly in to Ghana's existing development planning structure. The actions intended for each level and stage of the planning process is outlined in the document *Guidebook on Integrating Climate Change and Disaster Risk Reduction into National Development, Policies, and Planning in Ghana* (Nelson et al. 2010), produced by the EPA in collaboration with the NDPC, United Nations Development Programme (UNDP), and Ghana's National Disaster Management Organization (NADMO).

NDPC, then, leads a (adaptation) development planning process in Ghana that involves the following key agencies: (1) NDPC, (2) MOF, (3) RCC, (4) MMDAs and (5) MDAs. As these agencies will be referenced repeatedly throughout the journal articles, Table 2.4 has been developed to compare the duties of each institution against the three principal 'phases' of development planning in Ghana; planning, budgeting, and monitoring and evaluation (M&E).

**Table 2.4 Key institutions and roles for agricultural development and adaptation planning in Ghana**

| Institution | Development Planning Phase | | |
|---|---|---|---|
| | **a. Planning** | **b. Budgeting** | **c. M&E** |
| **National Development Planning Commission (NDPC)** | -The NDPC is the apex planning authority in Ghana.<br>-Coordinates with President, MDAs, regions and districts to develop a Medium Term Development Planning Framework for Ghana (every four years).<br>-Provides planning guidelines and guideline orientation for MMDAs and MDAs. | -Works with MoF to ensure that the Medium Term Expenditure Framework (MTEF) is informed by the MTDPF. | -Produces an annual progress report on the MTDPF.<br>-Coordinates evaluation of the implementation of MTDPF, sectoral policies, and District Medium Term Development Plans. |
| **Ministry of Finance (MoF)** | -MoF is NOT a planning authority.<br>-Previously the Ministry of Finance and Economic Planning (MoFEP), "Economic Planning" has been removed to reduce mandate conflicts between NDPC and MoF. | -Monitors and projects revenue (both domestic and donor).<br>-Provides budget ceilings for MMDA Annual Action Plans, District Assembly Common Fund, and MDAs spending. (i.e. "Produce and ensure that the budget Guidelines for the Financial Years 2014 to 2017 reflect only the priorities as indicated in the MTDP of the MDA").<br>-Prepares an annual Budget Statement for Parliament. | -Undertakes financial monitoring and tracking of government loans, grants.<br>-Provides information and data for the preparation of the annual progress report of MTDPF implementation produced by NDPC. |
| **Metropolitan, Municipal, District Assemblies (MMDA)** | -The MMDA is a planning authority.<br>-The MMDA planning officer "Initiates and coordinates the preparation of district development plans in the manner prescribed by NDPC and ensures that the plans are prepared with full participation of the local community (Unit, Area Councils)" (Act 480).<br>-Annual action plans (AAP) are produced by the district planning officer in coordination with the District Planning Coordinating Unit (DPCU), which includes the District Director of Agriculture and other decentralized agency heads.<br>-The Planning officer also works with development partners to identify common objectives for inclusion in the MTDP and AAP to avoid duplication. | -Prepares budget for MTDP and AAP, operating within DACF fund ceilings.<br>-Levies local taxes for Internally Generated Funds (IGF).<br>-District Chief Executive (DCE) approves spending. | -Produces a mid-year review of AAP.<br>-Coordinates annually with independent monitoring officials to produce Functional Organizational Assessment Tool (FOAT) score, which determines District Development Funds (DDF) allocation. |
| **Regional Coordinating Council (RCC)** | -The RCC is NOT a planning authority.<br>-The RCC collates MMDA MTDP plans and monitors planning activity: i.e. "the proposed district development plan in a format prescribed by the NDPC shall be submitted for consideration to the NDPC through the Regional Coordinating Council" (Act 480).<br>-Coordinates the DMTDP and programs of all MMDAs within the region and harmonizes these district plans and programs with the national development objectives and priorities. | -Tenders large contracts, and monitors DMTDP and AAP implementation. | -Monitors and evaluates the implementation of approved development plans, programs and projects of the MMDAs within the region.<br>-Submits monitoring and evaluation reports on districts in the region to the NDPC. |
| **Ministry of Food and Agriculture (MDA-MoFA)** | -District Department of Agriculture provides input to MMDA and AAP plan via the DPCU (i.e. "A ministry shall undertake development planning functions in consultation with the NDPC in accordance with the Civil Service Law, 1993").<br>-Develops a medium term agricultural sector plan (FASDEP II) and implementation schedule (METASIP)<br>-Regional Ministry of Food and provides input to the Regional Planning Coordinating Unit (RPCU). | -District Departments of Agriculture are provided a budget ceiling by MMDAs and MoF. | -District Management Information Systems (MIS) officer works with Area Extension Agents to produce monthly performance reports to the Regional M&E officer, in line with FASDEP II performance indicators. Quarterly and annual reports are also produced.<br>-The Regional M&E officer collates monthly reports and sends to MoFA Accra. |

Source: Author, adapted from Sova et al. 2014

**Political-economic history**

Ghana's political history, like many other facets of Ghanaian society, is considered a model of success throughout West and Sub-Saharan Africa. The country has enjoyed over 50 years of independence from colonial occupation, and over two decades of stable democracy and free and open elections. The relative tranquility of Ghana's political system has created an environment conducive to both domestic and foreign investment and the emergence of robust mineral, timber, cocoa and, most recently, oil industries. These events have bolstered Ghana's economy and secured its position among Africa's top economic and human development performers.

The country's political history is enshrined in its emblematic and recurrent portraits of five key individuals: Kwame Nkrumah, Jerry John Rawlings, John Kufuor, John Atta Mills and John Dramani Mahama. Nkrumah, together with five other leaders ("The Big Six") of the United Gold Coast Convention, led Ghana to independence from colonial rule in 1957. European occupation of modern-day Ghana began in the 15th century with the arrival of Portuguese traders to be followed by Dutch and, more prominently, British colonials. Britain would eventually establish its "Gold Coast" colony which persisted through the early 20th century.

Britain's model of 'indirect rule' (Crawford 2004; Ahwoi 2010; Abotchie et al. 2006; Guri 2006; Belden 2010; Asamoah 2012) utilized traditional authorities —"manipulation through traditional authorities" (Hoffman 2010 p. 2)— to rule over the colony. In this arrangement, loyal chiefs were selected by the British to rule over a particular population. This, in affect, 'deformed' the traditional chieftaincy model in the country (Lentz 2006), as no regard was given to natural customs and traditions for chief selection. Some authors suggest that the model impeded the development of modern centralized state institutions, establishing a system of decentralized despotism (Boone 1994; Mamdani 1996; Migdal 1994 in Lange 2004). Indirect rule in Ghana extended to nearly 65% of the country's territory, while the settler population amounted to only 0.1% of the total population (Lange 2004). This model continued through to 1948 when widespread unrest led to the key changes in in the governing model including more participation in local government (Boafo-Arthur 2001).

Ghana's pro-independence party, the Convention People's Party (CPP), won a parliamentary majority in 1957, paving the way for the establishment of Republican Constitution and the election of Nkrumah as Ghana's first President. Nkrumah is considered the father of African socialism (Rowley 2000, 1999), and among the first of Africa's so-called "Big Men". His ruling model relied on state-led important substitution, bolstered by mechanism for rent

extraction, import licensing and tax increases. Critically, Nkrumah is credited with mainstreaming the term 'neocolonialism' in response to Western intervention in Ghana during the early years of independence. Nkrumah's time in power is defined by economic turmoil:

> "By February 1966…Nkrumah had effectively exhausted the rents then available to his regime. The US$400 million of foreign reserves bequeathed to him by Britain had been converted into a foreign debt of US$858 million. Only three out of 64 state enterprises that he had created proved to be economically viable. His state farms barely produced enough food to feed their own workers, let alone the nation, and manufacturing output was running at less than 20% of available capacity. More fatal to his regime was the collapse in his principal sources of taxation. The cocoa tax base declined from 16% of GDP in 1958 to 7.7% in 1966 and the import tax base declined from 35% in 1961 to 20% in 1966. Without rents to disperse, the power base of his regime eroded" (Rowley 2000 pp. 147-148).

In this economic context, Ghana's early experience with democratic, independent governance was tumultuous. A series of military coups—initiated in 1966 following constitutional installation of a single party system and Nkrumah's confirmation as 'president for life' (1960 Republican Constitution)—would define the first two decades of Ghana's democratic experiment. It would also demonstrate they delicate relationship between the country's economy and politics. As a tool for rent seeking, the regime relied on the expansion of agriculture. Yet a drought lasting from 1981-1983 was responsible for devastating the agricultural-based economy (Ofori-Sarpong, 1986) leading to critical decisions to liberalize the economy through structural adjustment:

> "The performance of Ghana's agricultural sector was very poor during the 1960s and 1970s. The government of Ghana maintained a socialist policy and aimed at rapid industrialization, favoring grain production by public farms as a food import substitution crop. In 1962, the government established the State Farms Corporation and encouraged production of grains with a price support program through the Grains Marketing Board and the Food Distribution Corporation and subsidized irrigation water, farm mechanization and agricultural credit. From 1960 to 1962, 20 percent of total government capital expenditure on agriculture was invested in farm mechanization. With poor economic results and after a severe drought in 1982-1983, the government launched an Economic Recovery Plan under which trade was liberalized and foreign exchange controls lifted (Nweke 2003)" (Pratt and Yu 2008 p. 37).

Amidst this poor economic performance, Jerry John Rawlings would come to power in 1979 by way of military coup, momentarily handing power to an elected government, and then staging a second coup in 1981 to terminate the country's Third Republic Constitution. Rawlings would establish the Provision National Defence Council (PNDC) and later the National Democratic Congress (NDC) and lead the way to Ghana's Fourth—and current—Republican Constitution in 1992. The 1992 Constitution is built on both American-style presidential elections (executive) and British first-past-the-post unicameral parliament

(legislative branch). Ghana's political and leadership structure consists of a 275-member unicameral Parliament and a Presidential executive (the President is both head of government and state) at the national level. The President is guided by a 25 member Council of State (e.g. Council of Elders) and a Cabinet (10-19 members), 50% of which is derived from Parliament. The President appoints ten regional ministers and 216 District Chief Executives (DCE's) across the country, approved by district assemblies. The DCE oversees the MMDA activity, including a 25 member (approximate) District Assembly, and the District Planning and Coordinating Unit (DPCU).

Having re-established a multiparty electoral system in the Fourth Republic, Rawlings and the NDC, a party based on socialist ideologies, would go on to win both 1992 and 1996 election contests. John Agyekum Kufuor of the National Patriotic Party (NPP) would defeat Rawling's Vice President John Atta Mills in the 2000 elections, taking his free-market liberal conservative party to power in 2001. NPP would endure through to the 2008 elections where John Atta Mills (NDC), Ghana's fourth elected president, was instated. Atta Mills would die tragically in office in 2012 just prior to the next election cycle, with power transferring smoothly to then Vice President John Dramani Mahama. Mahama would later go on to win the 2012 elections (with 50.7% of the popular vote) for NDC, although the results were disputed and subject to judicial review in an election dispute case brought forward by the NPP opposition in which Mahama ultimately prevailed.

Ghana's modern political history, then, is one of independence and relative peace and prosperity, intimately linked to periods of economic growth and decline. The country has been described as a donor-darling (Cameron 2011) and a success story of structural adjustment (Konadu-Agyemang 2000), successfully transitioning to 'lower-middle income' status in 2010. This, however, has been accompanied by "dwindling donor inflows" (Government of Ghana 2014c p. xiv) in recent years, worsening the development disparity between the country's 'affluent' south and poor north. Still, despite these recent trends, bilateral and multilateral donors play a critical role in Ghana's political economy. In 2010, eleven 'development partners' alone provided over US $400 million to Ghana's budget. In 2014, grants from development partners constituted 4.4 percent of revenue in the country (Government of Ghana 2014a), and comprised more than 50% of Ghana's agricultural sector budget.

## 3. Conceptualizing Power in Complex Systems

*"If we think of powerlessness as an injustice, rather than as bad luck or misfortune, is that not because we believe that there are those in a position to reduce or remedy it?"*

Steven Lukes (2005)

This dissertation draws on several bodies of literature, including adaptation, development, and power in the social sciences more broadly. What follows is a short introduction to key concepts including political ecology and Critical System Thinking (CST), two communities of academic practice that shape the power-laden approach to this thesis. A brief discussion of the tension between local traditional and industrial agricultural knowledge is then offered, framing this debate as it reoccurs throughout the thesis. Power in social science literature is then presented, introducing the reader to common treatments of power across various disciplines. This is followed by a systematic review of power within adaptation literature. Finally, Steven Lukes' conceptual framework is presented, and the literature and conceptual gaps that this dissertation contributes to are identified.

**Political ecology**

The analysis of 'power' in this context contributes to the political ecological landscape of adaptation in Ghana. Political ecology can be broadly understood to address the condition and change of socio-ecological systems, with explicit consideration of relations of power (Robbins 2011). It is, effectively, the political economy of the environment. Samantha Jones offers among the most comprehensive definitions of PE as being "characterized by attention to the diversity of ecological environments; a sensitivity to the role of the state and the wider global economy in fashioning environmental change; contextual analysis of multiple scales of influence; emphasis on the diverse responses of decision-makers; and affirmation of the centrality of poverty, exploitation and inequality as causes of ecological deterioration" (2008 p. 672). Political ecology has emerged in response to cultural ecology's narrow perspective of environmental change focusing exclusively on direct human-environment interactions, neglecting importing socio-political dynamics (McCarthy 2005).

Political ecology accepts the notion that the costs and benefits from change in socio-ecological systems are distributed asymmetrically among actors, contributing to political and economic inequalities and altered power relations (Bryant and Bailer 1997; Bryant 1998). These power relations are multi-level in nature. PE provides a lens for viewing the micro-

politics (i.e. the politics of place) while at the same time looking upwards towards structures, contexts, interests and discourses that shape local conditions (Robbins 2002). That is to say, one need not adopt a 'progressive contextualization[6]' or a demonstrable event (event ecology) to study these political economic forces. They can, in themselves, be a starting point for analysis.

Political ecology has evolved from several of what Paul Robbins refers to as 'apolitical' theories of human environment interaction. This includes a shift among human and political geographers in the past few centuries from environmental determinism (Huntington 1915), through to critical social ecology (Kropotkin 1888; Humboldt 1811), cultural ecology (Steward 1972), and Marxist political economy (Marx 1990 [1867] ). The gradual movement towards what we consider modern day political ecology was paralleled by a growth in conceptual tools to analyze the broader political economy, including principles for common property management, 'peasant' studies, postcolonial studies, actor network theory, and postmodern/structural ideas of knowledge (including governmentality), among others (Robbins 2011).

Despite its growing popularity, political ecology is a field that has struggled to find its own identity given the diverse epistemological and theoretical foundations that have contributed to its development (Kepe et al. 2008). It is thus best described not as a theory—although it draws on many— but as a 'community of practice' (Robbins 2011). Some authors celebrate this diversity, suggesting that the political ecology mirrors the "messy, constrained world outside" (Walker 2006 p. 388), while others suggest the field neglects ecology while elevating politics (Vayda and Walters 1999). Vayda and Walters (1999) state that political ecologists have overcompensated for a perceived absence of politics in environmental studies. They offer that a singular focus on politics is a recipe for "question-begging research" where certain factors are assumed to be important in advance. Specifically, they state " our concerns with political ecology are not about whether political and political-economic events can be important causes of environmental change. Obviously they can be and are. Rather, our criticisms are directed at those political ecologists who choose to privilege such factors in certain ways. One way consists of always attributing special causal significance to these factors and not admitting that other factors are, or may be, more important sometimes" (p. 10). Robbins (2011) further admits that the weakest and least compelling accounts in political ecology emerge when scholars or investigators "go in search of concepts used in political ecology and subsequently 'discover' them in the field" (p. 151).

[6] This is sometimes referred to as "evenmentalism", a term introduced by Vayda and Walters (1999)

The shortcomings in the existing PE literature provide an opportunity. As Robbins (2011) posits, "it is no blasphemy to admit that the world is crafted by political forces…" and that "politics is inevitably ecological and that ecology is inherently political" (p. 3). This thesis aims to contribute a more rigorous framework for the empirical analysis of political forces (i.e. power) that assuages concerns over confirmation bias that can plague political ecology. The underlying features of PE—a focus on inequality and multi-level regimes, among others —lend themselves to the study of power in adaptation, which until recently has existed mainly in the realm of academic literature, only translating in to on-ground policies in recent years. Adaptation is implicit to the field of political ecology in that the adaptive capacity of individuals is "shaped and constrained by social, political and economic processes at higher scales" (Smit and Wandel 2006 p. 284). In this novice stage of policy development in Ghana these 'social, political and economic processes at higher scales' offer a wealth of material for the PE scholar. Political ecology is the first 'pillar' of this thesis.

**Critical systems thinking**

As Robbins suggests, "political ecology takes seriously the unfortunate but inevitable entanglement of knowledge and power" (2011 p. 152). It is this inherent 'entanglement' that lies at the foundation of critical systems thinking (CST). A foundational principle of this thesis is that when addressing complex, 'wicked problems' (Rittel and Webber 1973) like that of climate change, we are consistently making boundary decisions. How we choose to draw those boundaries around scope, scale and time frame of adaptation, which disturbances elicit the need to adapt, and the prevailing notions of desirability or improvement of the system often determine the conclusions and recommendations for action (Helfgott 2011). Something that appears to be an improvement in a system given a narrowly defined boundary may not be seen as an improvement at all if the boundaries are pushed out, revealing additional influencing factors upon the decision problem (Churchman 1968). How adaptation—and power itself for that matter— is defined is wholly dependent upon who is answering. Knowledge, in other words, is not value-neutral.

Critical Systems Thinking—despite not having a widely accepted definition (Midgley 1996)—was derived through an effort to explicitly challenge relations of power established and perpetuated through hard systems (and insufficiently 'radical' soft system) approaches that took as-a-given the structure of reality of the system under analysis —that is, approaches that did not acknowledge that power dynamics or system features may change according to

different perspectives (Midgley 1992, 2000; Matthews 2008; Churchman 1968; Churchman 1979; Churchman 1971, 1974; Oliga 1996; Flood and Romm 1996; Ulrich 2003, 1983, 1987; Midgley et al. 1998). CST constitutes a critical (i.e. explicit) standpoint from which to assess the inclusion or exclusion of factors that lead to problem identification and measures of success or improvement in a given system —Ghana's climate change adaptation regime, in this case—examining the taken-for-granted assumptions that give rise to an expert's judgment.

Capturing the essence of CST in agricultural adaptation policy, Lars Otto Naess suggests that "who leads policy processes determines which strategies are prioritized at national levels and ultimately who gains and who loses on the ground" (Næss 2014 p. 20). In other words, "decision making in climate change adaptation regimes are best described as incremental, complex and messy, involving actors with competing goals and interests, and where policy decisions are shaped by those who are able to mobilize coalitions and networks around particular solutions gaining political traction" (ibid p. 20). Climate change adaptation in agriculture draws on diverse epistemic communities each seeking to define what adaptation is, as well as plurality of actor groups involved in implementing adaptation. Boundary judgments— and who is in a position to make them—are of severe consequence to adaptation outcomes as "power determines what counts as knowledge, [and] what kind of interpretation attains authority as the dominant interpretation" (Flyvbjerg 1998, p. 97). Critical systems thinking is a key concept underlying the methodological (see Paper 1) and analytical choices taken in this thesis, and serves as the second 'pillar' of this study.

**Local and traditional knowledge**

The twin pillars of political ecology and critical systems thinking help to inform a defining assumption in this thesis: mainly, that farmers can contribute to, and indeed improve, adaptation decision making through the inclusion of local and traditional knowledge. This thesis ultimately argues for increased representation of farmers in adaptation decision making, since whose knowledge and value sets are brought to bear on decision making (i.e. who is in power) will ultimately determine the courses of action taken. This is especially complex in agricultural adaptation given long term planning requirements and uncertainty, and the inherent tension between the principles of public participation and the unique requirements of expert-led anticipatory decision-making (Few et al. 2007).

Studies of traditional knowledge systems and their impacts on adaptive capacity abound in adaption literature (Leonard et al. 2013; Reyes-García et al. 2014; Glasenapp and Thornton 2011; Nyong et al. 2007; Nyantakyi-Frimpong 2013a). The trend is captured, in part, in a

growing community-based adaptation body of work that seeks to encourage participation from local, vulnerable communities in adaptation planning and implementation (Dodman and Mitlin 2013; Huq and Reid 2007; Reid and Huq 2014; Schipper et al. 2014; Sova et al. 2012; Spires et al. 2014; Wright et al. 2014). Farmers, after all, have been adapting to changing climatic conditions since the very inception of plant and animal domestication some 10,000 years ago. Research suggests, for example, that local and traditional knowledge can be used to ground-truth climate models, and that knowledge of biophysical impacts and changes can contribute to more nuanced understandings of climate impacts (Reyes-García et al. 2016). Local and traditional knowledge has been used to improve climate forecasting by including indigenous knowledge of seasonal events like the migration of insects and animals and the budding or flowering of local flora for forecasting purposes (Gwenzi et al. 2016; Sarkar et al. 2015). Farmers are also repositories for important locally adapted crop and livestock varieties, each grounded in rich historical knowledge of plant phenology and local climatic conditions (Nyong et al. 2007). Ultimately, farmers' 'mental models' pertaining to new farming practices and technologies determine the acceptability of adaptation options and should thus be considered in adaptation planning processes (Leonard et al. 2013; Wheeler et al. 2013; Biggs et al. 2013; Chhetri et al. 2013; Halbrendt et al. 2014).

Despite widespread recognition of the value of local and indigenous knowledge in agricultural adaptation decision making, Chambers suggests that "indigenous agricultural knowledge…is the single largest knowledge resource not yet mobilized in the development enterprise" (Chambers 1983 in Scott 1998 p. 286). Furthermore, it is suggested by some authors that indigenous knowledge is given only superficial treatment in the most recent IPCC Fifth Assessment Report (5AR) (Ford et al. 2016). Meanwhile, "without explicit and continuing attention to how power structures knowledge", Agrawal states, "it will remain impossible to achieve the aim of working in the interests of indigenous or other marginal peoples" (2002 p. 295). Certainly there are limits to the utility of indigenous knowledge to climate change given the increased rate of change and novel climate impacts (Takakura 2015; Mapfumo et al. 2016), yet the wholesale exclusion of local and traditional knowledge is not supported in the literature.

Specific to this thesis, in Ghanaian agricultural policy, according to Amanor and Pabi (2007), simplified models of agricultural knowledge tend to dominate and "characterize indigenous farming systems as based on outmoded models of shifting cultivation which have failed to adapt to contemporary conditions and which promote deforestation and environmental degradation" (p. 52). "Simplified models of agriculture" might be best reflected in what Scott refers to as 'high modernism', 'industrial' or 'scientific' agriculture. That is, agriculture

"characterized by mono-cropping, mechanization, hybrids, the use of fertilizers and pesticides, and capital intensiveness" (1998 p. 266). This contrasts with organic, less capital-intensive agriculture strategies like agroecology and permaculture. Such strategies—traditionally and historically adopted in Western Africa— rely predominantly on complex polycultures, integrated crop-livestock systems and agroforestry/silviculture measures. In these indigenous systems, "the apparent surface disarray obscures a more profound logic", in the words of Scott (ibid p. 275). In what might be considered the competing rationalities between "visual order versus working order", such practices have been largely replaced by Western-style scientific agriculture, promoted during the Green Revolution that proliferated resource-intensive agriculture worldwide during the 1960s and 1970s (Moseley et al. 2015).

Prescribers to such high modernism encourage capital-intensive schemes that can be planned as technical interventions. That is to say "if the environment can be simplified down to the point where the rules do explain a great deal, those who formulate the rules and techniques have also greatly expanded their power. They have correspondingly, diminished the power of those who do not" (ibid p. 303). Calls for the sustainable transformation of the agricultural sector are facilitated by widespread discontent with this industrial agriculture model, perceived as a carbon-intensive, ecologically degrading, and altogether unsustainable (Weis 2007; Bahadur and Tanner 2014; Kates et al. 2012; Sinclair et al. 2014). The tension between indigenous and high modern agriculture is a reoccurring theme throughout this thesis and the impact of the Western agricultural development rationality on Ghana's agricultural adaptation regime is explored in depth in Paper 4.

**Power in social science literature**

Much ink has been spilled in the writing and debates around power in the social sciences. A full review of the concept of power is beyond the scope of this study—in fact, that undertaking would amount to a lifetime of study. Here, I simply provide common and diverse understandings of power so as to demonstrate both the concept's ubiquity and the multiplicity of use.

Power is a ubiquitous term and its various origins, ontological and epistemological foundations and manifestations difficult to identify. In the social sciences, power is often associated with the ability—or probability—of an 'agent' to obtain a desired outcome, with or without resistance (Weber 1978 [1922]). In most modern definitions, power is thought to be relational and personal, with agent 'A' acting on agent 'B' to achieve a certain end ('agent' as used here, may refer to an individual or an organization). Power, though, is derived not only through agency, but also through structure, and sometimes an indiscernible combination of

both structure and agency (Giddens 1979). That is to say that the context in which two or more actors interact are shaped by the collective outcomes of a host of other actors that serve to mediate the conditions at hand (i.e. social structures and events) (Elias 2012 [1970]; Merton 1938). This is sometimes referred to as 'defaced' power, owing to its hidden form (Hayward 1998). Consequently, theorists often distinguish between 'power to' (i.e. capability) and 'power-over' (i.e. domination) (Morriss 2002), the later referring to both agent-based and structural domination or entrenched inequalities.

Some common definitions of power are closely aligned with natural science concepts, linking power to 'energy' and 'force', recalling Russells' seminal statement that power should be as important to the social sciences as it is to physics (1938). One interpretation of Nietzsche's 'will to power' is a prime example of such framing. To Nietzsche, power was be considered as a metaphysical force underlying all human ambition (Nietzsche 1967). John Locke refers to power as the ability "to make or to receive, [and to] change" (1690), a conceptualization what may be likened to interpretations of 'resilience' or 'robustness' within the natural sciences. In international relations, realist constructs of power have dominated other theories, and the study of power in this field can be equated with the how one state uses its material resources or 'soft power' to advance its own interests over that of others (Nye 2004; Barnett and Duvall 2005b, a).

Inevitably, discussions of power cannot be divorced from the concepts of 'authority' and 'legitimacy'. Weber provides perhaps the most influential account of how dominance is secured through different 'ideal types' of authority. According to Weber, the exercise of power could be claimed legitimate on the basis of 'traditional authority', 'charismatic authority', and 'legal rational authority' (1978 [1922]). Legal-rational authority is considered dominant in modern industrial societies, characterized by large-scale, bureacratic organizations (Heywood 2005). In legal rational regime types we can distinguish between authority in law (de jure) and authority in practice (de facto). Put differently, there is a necessary distinction between being 'in authority' and being 'an authority'.

Similarly for Parsons, power depends on the institutionalization of authority for the achievement of collective goals. Power, then, is a system property, providing a sense of social identity, stability and reassurance (1967). It is the erosion of such authority that Hannah Arendt suggests brings about totalitarian rule. For Arendt, power is never the property of the individual; it belongs to the group. To be 'in power' means being empowered to act in the name of others. Power therefore requires legitimacy, which violence can never provide (1970). Liberal social contract theorists are responsible for providing a classical basis for

authority, arguing that legitimate bottom- up authority based on the consent of the governed is a necessary condition for the legitimate use of power (Hobbes 2008 [1651]; Rousseau 1968 [1762]; Locke 1980 [1690]).

Authority, legitimacy and power are also derived from discourse (Habermas 1981; Foucault 1982, 1980, 1991). This is an example of power that doesn't adhere to visible structure or agent. In his theory of communicative action, for example, Habermas suggest that norms within the system can 'colonize' the lifeworld (human actors) when we confuse system rationality and actor rationality and allow 'steering media' (e.g. money) to control society (1981). Argument, then, is key to achieving a 'rational' outcome and Habermas seeks to identify an ideal speech situation, "oriented to achieving, sustaining and reviewing consensus – and indeed a consensus that rests on the intersubjective recognition of criticisable validity claims" (ibid p. 17). Similarly, Foucault suggests power to be 'polymorphous' and can be created from a multitude of institutions and practices that can influence behavior without any visible coercion (1979). Governmentality, or the ways in which the state or hegemonic agent "shapes, guides, or affects the conduct of some person or persons" (Gordon 1991, p. 2) can be perpetuated through 'technologies of government' that elevate certain 'rationalities' above others (e.g. neoliberal rationality).

With such theoretical and disciplinary diversity, to assume all studies of power share epistemological and ontological foundations would be misleading. Multiple typologies and theories have developed in order to capture its essence. 'Bases', 'foundations', 'sources', 'species', 'manifestations' and 'faces' have all been used in describing power or its characteristics. Some theorists, for example, have aimed to explore the origins of power (i.e. Where is power derived from? What are the principal characteristics of power?) (Weber 1978 [1922]; Minson 1980; Hindness 1982; Oliga 1986; Clegg 1989; Flood and Romm 1996; Yukl 1998; Parsons 1967; Arendt 1970), others have aimed to identify the basic nature of power (i.e. Where does power lie? What are its sources?) (French and Raven 1959, Foucault 1972,1977,1980; Green and Elfrers 1999; Bourdieu) while others have sought to identify the manifestations of power (i.e. How do we know that power has been 'exercised'?) (Dahl 1961; Polsby 1980; Bachrach and Baratz 1962; Lukes 1974). Table 3.1 Outlines a variety of theories and typologies of power applied in social science research.

**Table 3.1 Select contemporary typologies and theories of power in social science literature**

| Theories/typologies concerning the origins of power ("Why") | Theories/typologies concerning the basic nature of power ("What, How") | Theories/typologies concerning the manifestations of power ("Where") |
|---|---|---|
| **Parsons (1967):** Power depends on the institutionalization of authority for the achievement of collective goals. Power is a system property.<br><br>**Arendt (1970):** Power is never the property of the individual, it belongs to the group. To be 'in power' means being empowered to act in the name of others. Power requires legitimacy, which violence can never provide.<br><br>**Weber (1978 [1922]):** Power is the ability (or probability) of an 'agent' to obtain a desired outcome, with or without resistance; defines the modes of legitimate domination as (1) charismatic, (2) traditional, (3) rational-legal.<br><br>**Minson (1980):** Power lacks any explanatory force or theoretical significance. At best, 'power' might be conceived as differential advantages (or disadvantages) regarding the possibility of social agents being successful in realizing certain objectives.<br><br>**Hindness (1982):** Asserts that power studies should focus not on an agent's capacity or attributes, but the "means of action" available in a given situation; dismisses the dimensional view of power for its overemphasis on securing 'outcomes' and neglect of 'means of action'.<br><br>**Clegg (1989):** Advances a 'Circuits of Power' view, which includes (1) dispositional (focuses on the structure of social rules and way they incorporate the capacity to mobilize bias), (2) episodic (view agency as paramount), and (3) facilitative (identifies possibilities for transformative action) circuits.<br><br>**Oliga (1996):** Differentiates between 'objectivist' (power as capacities located in social structures), 'subjectivist' (power possessed by agents), and 'relationist' (power as a property of interaction among social forces) views of power.<br><br>**Flood and Romm (1996):** Advance a typology of power around three areas of discourse, including (1) structuralism (intervention suggested by structural discourse is about setting up designs that facilitate the way in which collective goals can be served), (2) inter-subjective decision-making (the way that people make decisions in conjunction with other people or agents) and (3) might-right management (power relations brought about by the way the game of knowledge production is played in society).<br><br>**Wolf (2001, 1999)** Power is best thought of as a relational construct, existing in four modalities: capability, the ability for an 'ego' to impose its will, control of context, and structural power.<br><br>**Scott (2007):** Differentiates between 'corrective' and 'persuasive' influence, and power as 'domination' and 'stratification' in a first stream of mainstream power considering 'zero-sum' circumstances. Scotts' second stream of power focuses on an agent's capacity to exercise power, and is concerned with cultural and institutional structures and the individual identities through which capacities to command and obey are formed<br><br>**Ringen (2013)**: "Power is something someone has, full stop…Power is there or not, you have it or not, it does not present itself once you start behaving, but is prior" (p. 43). | **Marx (1990 [1867] ):** Power need not emanate from the state (as it is to wither away), and societal need can be met non-coercively through a robust civil society. Power manifests through the exploitative tension between labour (having no value, but creating all value) and capital.<br><br>**Gramsci (1973 [1947]):** Power manifests through Hegemony, or establishing moral, political and intellectual leadership in social life by "distributing one's own worldview throughout the fabric of society as a whole, thus equating one's own interest with the interests of society at large"<br><br>**French and Raven (1959; 2008; 1965):** Power can be separated in to separate and distinct forms or 'bases' including reward, coercion, legitimacy, referent, and expert (and information).<br><br>**Nietzsche (1967):** Power is considered as a metaphysical force underlying all human ambition.<br><br>**Foucault (1972,1977,1980)**: Power is 'polymorphous' and ever-present. It is vested in the concept of 'governmentality' that guides the conduct of 'subjects' and is perpetuated through 'technologies of government' that elevate certain 'rationalities' above others. Power is diffused throughout society and is intimately linked to knowledge. Power does not seek knowledge out of a Baconian imperative. Rather, power defines what counts as knowledge and rationality, and ultimately, what counts as reality.<br><br>**Bourdieu (1991, 1977):** Power is established by 'habitus', or the shared environment of a group of individuals created by broader material and social conditions. Habitus, and lower level 'fields', establish the conditions under which things come to be viewed as natural or inevitable and others unthinkable. This 'symbolic', invisible power (or 'doxa') gains the complicity of those who do not know that they are subject to it.<br><br>**Rowlands (1997):** Common distinction between 'power-to' and 'power-over' is further complemented by 'power with' ( collective action) and 'power-from-within' (individual consciousness) dimensions.<br><br>**Yukl (1998):** Defines three source groups of power: (1) 'position' power derived from statutory or organizational authority; (2) 'personal' power derived from human relationship influences or traits, including expertise, friendship, loyalty, and charisma; and (3) 'political' power derived from control over decision processes, coalitions, co-option, and institutionalization.<br><br>**Green and Elfrers (1999)**: Outline seven forms of power: coercive; connection; reward; legitimate; referent; information; and expert. | **Dahl (1961) and Polsby (1980):** Focus on behavior in the making of decisions on issues over which there is an observable conflict of (subjective) interests, seen as express policy preferences, revealed by political participation (cited from Lukes, 1974).<br><br>**Bachrach and Baratz (1962):** Allows for the consideration of the ways in which decisions are prevented from being taken on potential issues over which there is an observable conflict of (subjective) interests, seen as embodied in express policy preferences and sub-political grievances (cited from Lukes, 1974).<br><br>**Lukes (1974):** Third Dimension of power going beyond behavioral considerations, including social forces and institutional practices as sources of bias mobilization, control over political agenda through ideological process of preference shaping, and selective perceptions and articulation of what count as social problems and conflicts. Latent conflict s as a contradiction between the interests of those exercising power and the real interest of those they exclude. |

Source: Author

Adding to the typological complexity in Table 3.1 above, most theorists explore some combination of these approaches. As Ringen points out, some "definitions [of power] conflate the thing power and the outcome of its use. In methodological language, they do not separate the independent from dependent variables which is a recipe for confused analysis" (2013). It is this methodological and typological pluralism that led Gallie to suggest that power is an essentially contested topic (1956). Weber similarly refers to power as "sociologically amorphous" (1978 [1922] p. 53). It is, in other words, a boundary object, with different meaning to different groups and in different contexts.

**Power in adaptation literature: a systematic review**

Power is not widely addressed within climate change adaptation literature (Chaffin et al. 2014; Biermann et al. 2010; Fazey et al. 2016). When approached, it is often analyzed through proxy concepts like equity, justice, and fairness, both in process and resource distribution (i.e. procedural and distributive justice, respectively) (Adger et al. 2006; Paavola and Adger 2006; Thomas and Twyman 2005; Smit and Pilifosova 2001; Klinsky and Winkler 2013; Morgan and Waskow 2013; Derman 2013). When addressed directly, power is most commonly captured in passing, superficial references to 'underlying power dynamics between actors', 'inevitable power asymmetries', or 'local power structures', and similar allusions.

As such, this literature review subsection relies on a systematic review of 'power' within adaptation literature to determine the treatment of power to date, and to identify gaps in the literature. Systematic reviews, which aim to synthesize a large body of literature for emerging trends and themes, grow ever more common in climate change adaptation and food security fields (Vink et al. 2013; Candel 2014; Spires et al. 2014; Antwi-Agyei et al. 2014a). In this review, Scopus and Web of Science databases were queried in an initial search, inclusion/exclusion criteria were applied to the results, and classifications were assigned to the final body of literature. The two databases were queried for the years 2004- 2015 for articles containing 'climate change' AND 'adaptation' AND 'power' within the title, abstract and keywords. Only journal articles were included in the final analysis, with book chapters, reports, and other grey literature excluded. Full database search criteria are listed in Table 3.2.

**Table 3.2 Database queries and criteria for systematic review**

| |
|---|
| **Scopus** (Accessed August, 2015)<br><br>**Title, abstract, keyword search:** "climate change AND adapt* AND power*"<br><br>**Year:** >2003<br><br>**Excluded research themes:** ener, medi, bioc, engi, econ, busi, chem, comp, mult, deci, phys<br><br>**Results:** 168 |
| **Web of Science** (Accessed August, 2015)<br><br>**TOPIC (title, abstract, keyword) search:** "climate change AND adapt* AND power*"<br><br>**Year:** >2003<br><br>**Included research areas:** Environmental sciences ecology, geography, energy fuels, engineering, meteorology atmospheric sciences, business economics, government law, zoology, public administration, geology, evolutionary biology, water resources, plant sciences, agriculture, marine biology, biodiversity conservation, anthropology, life sciences biomedicine, urban studies, sociology, social science, physiology, forestry, science technology, public environmental health, social work, behavioral sciences, area studies, social issues, physical geography, international relations, geochemistry geophysics, fisheries, history philosophy of science, transportation, demography, communication, history, food science, developmental biology, cultural studies<br><br>**Results:** 307 |

Source: Author

Each of the database results was exported (bibliographic data + abstract) to EndNote X7, and duplicate entries eliminated. This initial scoping yielded 395 articles. The following inclusion and exclusion criteria were then applied to this literature body (Table 3.3).

**Table 3.3 Inclusion and exclusion criteria for peer reviewed journal articles in systematic review**

| |
|---|
| **Inclusion**<br>+ Peer reviewed journal article<br>+ Focus on climate change adaptation<br>+ Contains power as the explicit subject of analysis<br>+ OR contains reference to actor/actor group power in abstract<br>+ OR identifies increased awareness of power as a key paper outcome<br><br>**Exclusion**<br>- Grey literature, book chapters,<br>- Power as 'energy'<br>- Power as a descriptive term ("The power of this message is that it…"; "destructive power of monsoons…") |

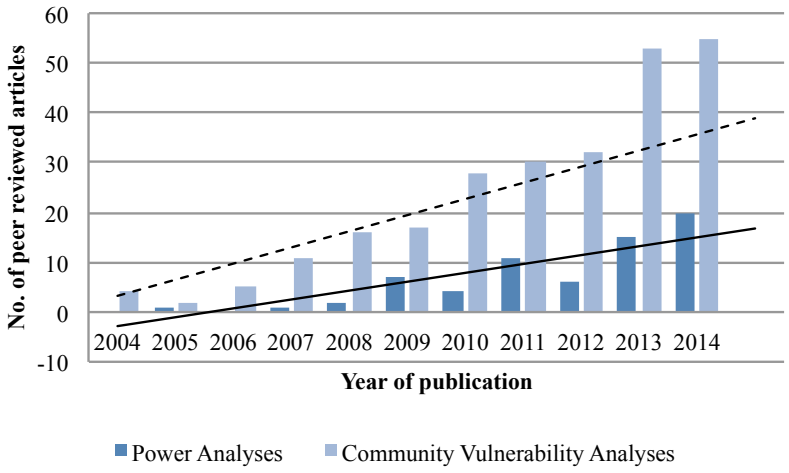
Source: Author

After the application of these criteria, 84 articles remained in the literature body for analysis. Select bibliographic data and the abstracts of these articles were exported to Excel for

additional analysis and sorting. Specifically, abstracts were reviewed and classifications were applied to each article as pertaining to (1) the "explicit/implicit" treatment of power (i.e. does the article address power as the topic of study or a by-product?); (2) the sector (e.g. water, agriculture etc.); (3) the specific power theme (e.g. social capital, institutions, international negotiations etc); and (4) country case study status (e.g. developed, developing, or global).

As indicated in Figure 3.1, the majority of articles examining or referencing power in adaptation have emerged in the past four years (after 2010), peaking in 2014 (*n*=20). While this marks a clear annual increase in articles, it represents growth consistent with other areas of climate change adaptation research. McDowell et al. (2016), for example, conduct a systematic review of community vulnerability analyses that can be used as a proxy for growth in adaptation research more generally. Growth rates for this type of adaptation research outpace that of power. It can be said, then, that while studies of power have become more common, this is generally reflective of the increasing prominence of adaptation literature of all types, more broadly.

**Figure 3.1 Distribution of climate change adaptation articles on 'power' and 'community vulnerability' analyses by year (2004-2015)**




*Note: Studies of power in climate change adaptation literature have increased in recent years. Growth in this thematic area, however, is not unique to power, but is reflective of the increasing prominence of adaptation literature of all types. Here, growth in community vulnerability analyses is used as a proxy for growth in adaptation research more broadly. We see that growth rates for community vulnerability analyses, in fact, outpace that of power.*

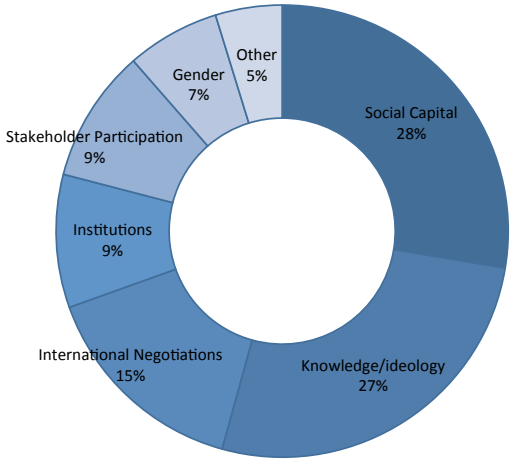
Source: Author, McDowell et al. (2016)

In this sample of power studies, only a handful of studies have taken on power in adaptation more-or-less explicitly, as the center of their analysis. This includes Eriksen and Lind (2009), McCright and Dunlap (2010), Pelling and Manuel-Navarrete (2010), Redclift et al. (2011), Tanner and Allouche (2011), Bee (2013), Gillared et al. (2013), Vink et al. (2013), Arnall (2014), Boyd et al. (2014), Coirolo and Rahman (2014), and Osborne (2015). Of these authors, only six present a conceptual or analytical framework to further the understanding of power. Vink et al. (2013), for example, examine adaptation governance literature across 1132 articles distinguishing between 'organized' and 'unorganized' power. They conclude that the number of articles not discussing power, or power in combination with knowledge, to be strikingly high. Osborne (2015), meanwhile, writing globally on urban adaptation, explores how the various factors that shape identity (race, class, gender, ethnicity, and sexuality) work in combination to affect how power is experienced. This 'intersectionality' is described by a theory of power called Kyriarchy. Also writing on cities, Boyd et al. (2014) explore urban governance through the lens of 'environmentality', highlighting how historical and institutional power relations shape adaptation in urban settlements in Mozambique and create so-called environmental 'subjects', perpetuating dominant economic and political interests. Agrawal, in his work for forest management in northern India, defines 'environmentality' as a "union of environment and the Foucauldian governmentality", taking in to account "power/knowledge, institutions and subjectivities" (2005 p. 8). In particular, Agrawal examines the ways in which political decentralization of natural resource management (i.e. new technologies of government) redefined political relationships between the state and its subjects in that context, shaping the 'conduct of conduct' (Faucualt 1978, 1991). Pelling and Manuel-Navarrete (2010), meanwhile, develop a framework combining the adaptive cycle heuristic with the theory of structuration (i.e. power manifesting jointly in both structure and agency) to demonstrate how status quo power regimes in two Mexican cities are reinforced and long term, adaptive governance diminished. Manuel-Navarrete et al. (2011) first introduced the idea of a 'power-sphere' within climate change literature, or "clusters of hierarchical roles, organizations, institutions, and persons invested with power/authority in opposition to the local people who grant them legitimacy from outside of the power-sphere" (p 3). The authors propose greater research emphasis on governance as a process, arguing these conditions are usually taken as given, with focus instead placed on 'quick fixes', and 'one-off" interventions amenable to adjustment like 'participation' and 'transparency'. Meanwhile, Redclift et al. (2011) make a case for focusing on the process of environmental governance itself rather than the collective outputs. In this process-based approach the authors provide a way to map local governance in to what they call 'spheres of power/authority' (this is most akin to what I explore in Paper 2). Finally, McCright and Dunalp (2010)—applying

Lukes' framework— explore second dimension non-decision making techniques used to undermine environmental regulation in the United States.

The remaining authors—those that neither propose an analytical framework of power nor seek to explicitly document power's manifestations— recognize power as either a key contributing factor within their analysis, or cite power (or the need for greater attention paid to power) in some way in their conclusions. Broadly speaking, these authors address power indirectly (i.e. implicitly) with respect to six key themes in adaptation policy: social capital, knowledge, international negotiations, stakeholder participation, institutions, and gender (see Figure 3.2). While there are countless other articles addressing these power-laden subjects, included in this literature review are only articles that describe these themes explicitly in terms of power.

**Figure 3.2 Distribution of 'power in adaptation' articles by thematic area**




*Note: Power in adaptation literature is rarely addressed explicitly, with especially few authors offering conceptual or analytical frameworks for its study. Instead, the concept tends to be referenced as it relates to several key thematic areas, or proxies, especially social capital and knowledge/ideology.*

Source: Author

*Social capital*

First, social capital is among the most widely cited sources or manifestations of power within adaptation literature (Adger 2003; Pelling and High 2005; O'Brien et al. 2008; Næss et al. 2005; Kuruppu 2009; Holman and Trawick 2011; Leys and Vanclay 2011; Tschakert and Dietrich 2010; McLaughlin 2011; Luthe et al. 2012; Osthorst and Maenz 2012; Yates 2012; Djoudi et al. 2013; Gabrielsson and Ramasar 2013; Löf 2013; Taylor 2013; Brottem 2014; Nagy et al. 2014; Ribot 2014; Wrathall et al. 2014; Barnett and Eakin 2015; Chapin et al.

2015; Ricci et al. 2015; Sayer et al. 2015; Simon and Schiemer 2015; Tan et al. 2015; Wainwright and Mann 2015; Wilbanks 2015). It serves as a catchall for power invested in local networks and alliances, so-called 'bargaining resources', generic references to actor 'influence', patron-client relations, and local 'balance of power' considerations. Social capital is commonly defined as "features of social life—networks, norms and trust—that enable participants to act together more effectively to pursue shared objectives" (Putnam 1995 pp. 664-5). In adaptation literature, social capital is considered alongside other key factors like values, norms, and perceptions, as a key to shaping adaptation outcomes through social relationships with specific considerations of trust and reciprocity. Yates (2012), for example, suggests that institutional analyses alone without reference to social capital considerations can fail to capture 'power-laden' elements of adaptation governance such as "the dangers of unequal, personalised, and continuous relationships (Yates and Gutberlet, 2011a,b); the ways in which adaptation can be used by powerful actors to achieve personal, political-economic gains (Adger and Barnett 2009); and the risks of institutional paralysis, clientelism, and deeper inequalities of wealth and power (Eakin et al. 2010; Jennings 2009; Wainwright 2010)" (p. 538), among other factors.

*Knowledge*

Second, power manifests in debates around what constitutes legitimate knowledge in adaptation regimes (Ayers et al. 2011; Berardi et al. 2011; Leys and Vanclay 2011; McLaughlin 2011; Harvey et al. 2012; Stocker et al. 2012; Yates 2012; Bond 2013; Cochran et al. 2013; Naess 2013; Whitehead 2013; Filippi et al. 2014; Grove 2014; Nagy et al. 2014; Nijbroek 2014; Stott and Huq 2014; Bowen et al. 2015; Chapin et al. 2015; Intemann 2015; Islam and Lim 2015; Lemos 2015; Sinevaara-Niskanen 2015; Manuel-Navarrete 2010; Vink et al. 2013). Among the most widely discussed 'power of knowledge' debates in adaptation theory relates to the inherent capacity of farmers to adapt to climate change with their existing knowledge base and the extent to which local traditional knowledge should be incorporated in to 'formal' adaptation planning. Importantly, in a second stream of 'power of knowledge', several authors allude to power as central to *shaping* the preferred rationalities of government, or what might be considered 'inevitable', unquestioned logics within adaptation regimes (McLaughlin 2011; Tanner and Allouche 2011; Sinevaara-Niskanen 2015). This phenomenon is captured in common 'categories' of adaptation regarding extent of change. Schulz and Siriwardane (2015), for example, suggest that a focus on 'adjustment' or incremental adaptation alone tends to perpetuate the status quo development regime, undermining 'reformist' (systemic) or transformational adaptations. As suggested by Granderson (2014), "different interpretations [of knowledge] implicitly empower some experts while excluding

other knowledges and practices" and that "responses to climate change risk by stakeholders at higher levels, including scientists, practitioners, and policymakers tend to overshadow or drive community residents' considerations" (p 56, 61). Agrawal (2002) suggests that even when indigenous knowledge is considered in development planning, "only the forms of indigenous knowledge that are potentially relevant to development, then, need addition and protection". This process, referred to as 'particularisation', assures that "outside of the potential role that indigenous knowledge can perform in the service of development, they have no claims to mobilize powerful resources in their favour" (p. 290). One prevailing rationality in the area of climate change adaptation in agriculture is that of neoliberalism, which has led to increased privatization of the environmental sphere, deregulation, and a preference for hard, infrastructure and market-based adaptation strategies (IPCC 2014a; Okereke 2008; Manuel-Navarrete 2010; McLaughlin 2011; Fieldman 2011).

*International negotiations (balance of power)*

Third, power in climate change adaptation regimes is often discussed as it manifests between countries in international negotiations (Polack 2008; Schliep et al. 2008; Boyd and Juhola 2009; McGee and Taplin 2009; Persson 2009; Grasso 2011; Parsons 2011; Cousins 2013; Gerst et al. 2013; Corneloup and Mol 2014; Maekawa 2014; Armitage et al. 2015; Bowen et al. 2015; Prys and Wojczewski 2015; Wainwright and Mann 2015; Manuel-Navarrete 2010). Questions of equity, justice, and fairness are inherent in the principals of the UNFCCC including 'common but differentiated responsibilities (CBDR)' (and burden sharing more broadly), and the 'polluter pays' principles (and compensatory justice more broadly). The convention distinguishes between Annex 1 and non-Annex 1 countries based on 'capability' and historical responsibility, both power-loaded concepts linked to the transfer of funds and technologies for adaptation from the 'developed' world to the 'developing' world. Power in this context is often considered from a realist perspective (Barnett and Duvall 2005a). It manifests in 'power politics' (Adger et al 2006) involving negotiation resources (Weiler 2012), and traditional 'balance of power' and geopolitical considerations in international climate regimes (Brenton 2013; Gomez-Echeverri 2013; Terhalle and Depledge 2013). Power within international negotiations is also characterized by a diffusion of authority to international and transnational authorities and away from traditional nation states (Pattberg and Widerberg 2015). Okereke et al. (2009), for example, apply neo-Gramscian framing to climate negotiations to demonstrate the way that non-state actors utilize expertise to achieve privileged status within such regimes. These interstate power dynamics inherent to the international adaptation regime are described in detail in Paper 3.

*Institutions*

Fourth, institution-focused studies of adaptation aim to discover appropriate institutional designs, rules, and decision-making procedures to improve the efficiency and equitability in the delivery of adaptation resources to vulnerable communities (Schipper et al. 2012; Agrawal 2010; Berman et al. 2012; Christoplos et al. 2009; Eakin and Lemos 2010; Gupta et al. 2010; Næss et al. 2005; Yates 2012; Naess 2013; Blackburn 2014; Chaffin et al. 2014; Sinclair et al. 2014; Barnett and Eakin 2015; Lemos 2015). Power-centered approaches are distinct from purely institutional analyses in that they place power—rather than rules, procedures and design principles—at the core of their analysis (Clement 2010). Yet the relationship between institutions and power operates in both directions as institutions directly affect power distribution and practices and vice versa (Giddens 1990; Pelling and High 2005). Searle, for example, suggests that power itself is a major purpose of institutional design: "the essential role of human institutions and the purpose of having institutions is not to constrain people as such, but, rather, to create new sorts of power relationships" (2005 p. 10).

The prevalence of the institutional view of power in adaptation is the result of broader trends in socio-ecological system research. SES research has made particularly strong advancements in in the area of institution-centered decentralization of natural resource management and collaborative (also 'adaptive' or 'cooperative') management of common pool resources. Ostroms' eight 'design principles' are widely cited example of this focus (1990). Institutional power studies of this sort draw attention to key power laden concepts like decentralization and devolution of authority in adaptation regimes (Brockhaus and Kambire 2009; Berkes 2010; Sharma et al. 2014), and adaptive, or collaborative management arrangements (Tompkins and Adger 2004). Institutional scholars in particular emphasize the multi-level, multi-scale characteristics of climate change adaptation (Adger et al. 2005a; Adger et al. 2005b; MacKinnon 2011; Ostrom 2010a; Ribot 2010; Vincent 2007; Urwin and Jordan 2008; Adger 2001). Adaptation regimes can be termed 'polycentric' systems characterized by multiple governing authorities at differing scales rather than one 'mono-centric' unit (Ostrom 2010b). Vertical interplay (Young 2006, 2013) between multi-level institutions in adaptation regimes are constrained by relationships of power (Tompkins and Adger 2004). Yates (2011) for example, adopts MacKinnon's scalar politics construct (2011) to analyse cross-level power dynamics in Nepal's adaptation regime. MacKinnon suggests that there is an important distinction to be made between 'politics of scale", or the idea that politics occur on a given, fixed level with defined boundaries and 'scalar politics'. Scalar politics refers to the 'strategic deployment of scale' or the purposeful utilization of multi-level structures to promote one's interests. Viewed in this way, power is seen not as a product of multi-level

structures and their hierarchies, but that those structures serve as an instrumental medium through which to channel power.

*Stakeholder Participation*

Fifth, perhaps best considered a sub-set of institution-focused power studies, several authors write on the topic of the strategic use of participatory forums and institutions as coercive tools (Few et al. 2007; Polack 2008; Kuruppu 2009; Rojas et al. 2009; Fortier 2010; Haalboom and Natcher 2012; Harvey et al. 2012; Cochran et al. 2013; Filippi et al. 2014; Nagy et al. 2014). Few et al. (2007), for example, discuss the micro-politics of stakeholder consultation and participation in adaptation regimes and the use of 'managerial containment' by powerful actors to guide participatory engagements towards predetermined goals. This work is reflective of a wider trend in critical stakeholder engagement literature (Sherman and Ford 2014; Cooke and Kothari 2001; Treby and Clark 2004; Rydin and Pennington 2000) that seeks to demonstrate how participatory processes can serve as in instrument of power and domination. These authors argue that empowerment—the common usage of power in this domain—through improved participation in decision making can improve equitability and can reduce stakeholder vulnerability (Skoufias 2003; Tompkins and Adger 2004), but the creation of a space of engagement alone does not equal success in this regard (Thomas and Twyman, 2005). Improved adaptation capacity relies on active participation by concerned parties (Smit and Pilifosova 2001). Ayers (2011) refers to the fact that climate change is a global risk that is experienced locally requiring deliberative and participatory decision making processes as the 'adaptation paradox'. Power in the context of stakeholder participation also addresses the labels that we assign to stakeholders, especially the label of 'vulnerable' (Polack 2008; Cameron 2012). As Haalboom and Natcher (2012) cite among indigenous artic communities, labelling these groups vulnerable undermines their efforts to gain autonomy over their own affairs.

*Gender*

Finally, a key derivative of power in stakeholder participation and social capital is the role of gender in adaptation, especially regarding the power and influence of women (Nelson and Stathers 2009; Djoudi and Brockhaus 2011; Edvardsson Björnberg and Hansson 2013; Caretta 2014; Sultana 2014; Sinevaara-Niskanen 2015). It has long been noted that women in Subsaharan Africa are often the primary agents invovled in decision making, management practices in agriculture, and are primary natural resources users (Bryson 1981). Glazebrook (2011) collects data in the Upper East Region of Ghana regarding the impacts of weather on

women subsistence farmers. Not only are women disproportionally impacted by climate impacts, but also the study identifies women as key sources of expertise and traditional knowledge, regarding intercropping (which species go well together), crop rotation, pest management, and organic fertilizer, among others. Yet women are often refered to as the invisible workers in the rural economy (Dixon 1982), and face considerable gender-specific barriers affecting their vulnerability and exposure to hazards (Patt et al. 2009) As of yet, there is little research that exists to improve the gender-sensitivty of adaptation approcahes in agriculture (Nelson and Stathers 2009), nor in vulnerability assessments (Djoudi et al. 2013). Perez et al. (2015) indicate that, in the West African context, women typically have limited access to common property resources, less control of quality land, and external agencies tend to provide agriculture and livestock support primarily to men. Power in agricultural adptation literatuture tends to draw from Feminist theory to elicit the ways in which gender affects differential access to resources and decision making forums, supported by gender-bound divisions of labour or other cultural patterns (Edvardsson Björnberg and Hansson 2013; Bee 2013).

*Toward the empirical study of power*

The sources and manifestations of power explored here in adaptation literature reflect the ubiquitous, esoteric nature of power in this and in other complex systems. While this body of literature offers key insight in to how power manifests in adaptation regimes, it collectively contributes little to our understanding of *how* to best study power empirically. Certainly, power in adaptation regimes is vested in institutions, gender dynamics, social capital and so on. Similarly, it manifests in both highly visible settings (e.g. forums for stakeholder participation, climate change departments and agencies etc.) and more-or-less invisible phenomenon that adhere neither to structure or agency (e.g. underlying gender norms, prevailing knowledge-sets and rationalities etc.). Yet, as we have discussed in common critiques of political ecology, pursuing any one of these topics alone virtually ensures that the analyst will 'find' it. It is by exploring power holistically that students can overcome the confirmation bias inherent to political ecology. How we might systematically capture and organize these myriad manifestations of power is the subject of the next section.

**Empirical study of power: Lukes' dimensional framework**

While a host of authors have aimed to determine the nature of power and its sources (see Table 3.1) it has not been until recent that theorist have thought to study power empirically.

This dissertation adopts an understanding of power as captured in Lukes' seminal work, "Power, A Radical View (PRV, PRV2)" (1974, 2005), which traces debates between 'elite' and 'pluralist' power theorists in the United States in the 1950's and 1960's and articulates three emerging 'dimensions' of power. Lukes' framework was among the first to facilitate the empirical study of power beyond its purely visible, behavioural manifestations. His 'radical' view— as opposed to liberal (e.g. Dahl 1961) or reformist (e.g. Bachrach and Baratz 1962)—"maintains that people's wants may themselves be a product of a system which works against their interests…" (Lukes 2005 p. 38). The origins of Lukes' dimensions are discussed here.

The first dimension of power has been historically advanced by 'pluralist' ideologies; the so-called neo-elitists (Dahl 1961; Polsby 1980; Wolfinger 1974). These authors suggest that research on power should "study actual [concrete] behaviour, either at first hand or by reconstructing behaviour from documents, informants, newspapers, and other appropriate sources" (Polsby 1980 p. 121). Robert Dahl is considered the preeminent scholar within this perspective, and his work "Who Governs" (1961) and "A Critique of the Ruling Elite Model" (1958) treats the analysis of power in an objective, quantifiable way (Merelman 1968). Dahl believed that studies of U.S. politics that suggested power to lie in the hands of a 'ruling elite' were flawed in that the analyses reflected reputation, not actual power[7]. The solution lied in studying the visible, intentional exercises of power in 'key' decision making settings and ascertaining the frequency of who wins and who loses in respect to the issues at hand (Lukes 1974). The 'pluralist' perspective owes its name to Dahl's findings that power in New Haven (his seminal case study) is distributed amongst a plurality of actors, not concentrated in the hands of a ruling elite. The pluralist view of power can be described such that 'A has power over B to the extent that he can get B to do something B would not otherwise do" (Dahl 1957 pg 202-3). This definition of power sees parallels in what Scott refers to as 'Weberian' or mainstream power (2007). Mainstream power research according to Scott focuses on the actual exercise of control in what can be considered 'zero-sum' circumstances. That is to say "making someone do something that they would not otherwise have chosen to do" (ibid p. 1). Scott refers to the concept of control portrayed in this 'mainstream' body of literature as 'corrective influence'.

[7] The analysis of 'ruling elite' models of power date back to Pareto (1901), who examined the aristocracy in Italian society. Yet it is Hunter's (1953) publication of "Community Power structure", and C. Wright Mill's (1956) "The Power Elite", which constitute the first contemporary attempts to study power through a systematic methodology. Both writers presumed that power in the United States in that period was concentrated within large organizations (corporations, corporate rich, political insiders and military warlords).

Lukes succinctly defines the first dimensional view of power as one that "focuses on behaviour in the making of decisions on issues over which there is an observable conflict of (subjective) interests, seen as express policy preferences, revealed by political participation" (2005 p 19). Lukes and other critics of the one-dimensional view of power note that this approach recognizes only one face of power, and in particular, ignores those situations in which decisions are prevented from happening or not taken. As such, the pluralist framework is charged with taking "over the bias of the political system under observation" (Lukes 2005 pg 58), simply reflecting the inherent biases as evidenced by actual, visual behaviour[8].

A second phase of empirical analysis of power (the second dimension) is captured in the work of Bachrach and Baratz (1962) in their critique of purely pluralistic, behavioral views of neo-elitist scholars. In articulating this second dimension of power, Barchrach and Baratz employ C. Wright Mills' seminal statement that "whether they [decision makers] do or do not make such decision is less important than the fact that they do occupy such pivotal positions" (Mills 1956 pg 4). Bachrach and Baratz criticize the pluralist's over-emphasis on behavior, and failure to take in to account non-decisions when considering power relations, or "confining the scope of decision making to relatively 'safe' issues. More often than not, the 'status quo defenders' are a minority or elite group within the population in question" (1970 pg 44). While Bachrach and Baratz 's second dimension' marked a welcome advance on the work of neo-elitist (pluralist) theorists, critics question whether 'non decisions' lend themselves to empirical study.

Power in the second dimension, then, can be described as the power to decide what is decided, or "a qualified critique of the behavioral focus on the first view and it allows for consideration of the ways in which decisions are prevented from being taken on potential issues over which there is an observable conflict of (subjective) interests, seen as embodied in express policy preferences and sub-political grievances" (Lukes 1974). In his critique, Lukes suggests that reformists Bachrach and Baratz remain too committed to the study of actually behaviour and concrete decisions (and non decisions). "In both cases (that of first and second dimension theorists), Lukes suggests, "the assumption is that interests are consciously articulated" (2005 p. 24).

[8] Moises Niam authors what might be considered a modern-day pluralist response to elite power in his book *The End of Power* (2013). There, Moises argues that due to modern communication and 'tools of war' in both politics and business settings, power as traditionally vested in autocrats, CEOs, and prolific institutions is decaying, replaced with 'micro-powers' of revolt and citizen action.

Common to the first two behavioural manifestations of power is the existence of an identifiable conflict of competing interests; conflict which is played out head-to-head or which is denied entry in to the political process. In the words of Bachrach and Baratz " if there is no conflict, overt or covert, the presumption must be that there is consensus on the prevailing allocation of values" (1970 p. 49). Steven Lukes, writing in 1974, rejects the view, claiming that, in fact, the " most effective and insidious use of power is to prevent such conflict from arising in the first place" (2005 p. 27). The third manifestation of power, then, is defined by a notable absence of an overt conflict of competing interests. It refers to the tendency for potential issues or conflicts to be successfully kept out of politics – in both formal and informal venues—by "shaping the perceptions, cognitions and preferences of subordinates in such a way that they accept their role in the existing order of things or imagine no alternative to it" (Lukes 2005 p. 28). This third manifestation is especially concerned with the topic of interests (i.e. what is important in peoples lives) and the ability of an agent to impact on the interests of a subject. Pursuing this dimension requires a sociological perspective that is missing from pluralist theorists.

What Lukes describes in what is referred to as his third dimension of power closely aligns with Gramsci's idea of cultural hegemony (Gramsci 1973 [1947]). To win hegemony " is to establish moral, political and intellectual leadership in social life by distributing one's own worldview throughout the fabric of society as a whole, thus equating one's own interest with the interests of society at large" (Eagleton 1991 p. 116 in Wolf 1999). The third dimension of power also resonates with Foucault's concept of 'governmentality'. Governmentality is defined by Foucault as "the totality of practices by which one can constitute, define, organize, instrumentalize the strategies which individuals in their liberty can have in regard to each other" (Foucault 1988 p. 20). Political ecologist Paul Robbins suggests that "the key to understanding the character of society is to explore how certain taken-for-granted notions of the world are formed through discourse (language stories, images and terminologies) and how certain social systems and practices (medicine, forestry, prisons, schools) makes them true" (Robbins 2011 p. 70), a post-structural perspective advanced by Foucault. "Some logics", Robbins suggests, "come to pervade a network of power relations so that people, groups, and institutions within that web come to naturalize and accept these logics as their own" (ibid p. 75). Finally, Bourdieu and his concept of "habitus" and "doxa" also evoke the third dimension of power. Habitus refers to the shared environment of a group of individuals created by broader material and social conditions (Bourdieu 1977). Webb, writing on Bourdieu, suggests that the "state partially orchestrates this collective 'habitus' by creating the conditions under which things come to be viewed as natural or inevitable (capitalist systems of economic organization, for instance) and others unthinkable (uncontrolled

immigration, for instance)"(Webb et al. 2002 p. 93). This 'symbolic', invisible power (or 'doxa') allows "the state [to] mold mental structures and impose common principles of vision and division" (Bourdieu et al. 1994 p. 7). Doxa, like Lukes' third dimension, is a power or force that gains the complicity of those who do not know that they are subject to it.

Lukes defines third dimensional power as "involving a thoroughgoing critique of the behavioural focus of the first two views as too individualistic and allows for consideration of the many ways in which potential issues are kept out of politics, whether through the operation of social forces and institutional practices or through individual's decisions. This can occur in the absence of actual, observable conflict, which may have been averted… [It is then]' a latent conflict, which consists in a contradiction between the interests of those exercising power, and the real interests of those they exclude (2005 p. 28)". Lukes' three dimensional framework of power is outlined in its entirety in Table 3.4.

**Table 3.4 Lukes' three dimensional framework of power**

| **One dimensional view of power [D1 -Decision making]** | **Two dimensional view of power [D2 -Agenda setting]** | **Three dimensional view of power [D3 -Preference shaping]** |
|---|---|---|
| Focus on:<br>(f) behavior<br>(g) Decision making<br>(h) (key) issues<br>(i) Observable (overt) conflict<br>(j) (Subjective) interests, seen as policy preferences revealed by political participation | (Qualified) critique of the behavioral focus. Focus on:<br>(e) decision-making and nondecison-making<br>(f) issues and potential issues<br>(g) observable (overt or covert) conflict<br>(h) (subjective) interests, seen as policy preferences or grievances | Critique of behavioral focus. Focus on:<br>(e) decision making and control over agenda (not necessarily through decisions)<br>(f) Issues and potential issues<br>(g) Observable (overt or covert), and latent conflict<br>(h) Subjective and real interests |

Source: Lukes (1974, 2005)

**In defense of the three dimensional view**

The three dimensional view of power, I argue, is an especially useful framework for addressing power in complex system regimes like that of climate change adaptation. While it is widely accepted that a third dimension of power exists (Plaw 2007), the framework is not without its detractors. Critics of the three dimensional view of power often cite three central criticisms: first, that Lukes' focus on 'power as domination' leads to the seeming neglect of 'power-to' constructs (Morriss 2006); second, that Lukes' framework fails to capture

important structural modes of domination (Hayward 2006); and third, whether 'real' interests can be distinguished from imposed interests (Goldman 1977, Shapiro 2006). To this list of common critiques I add two of my own: (1) Lukes' failure to evidence common sources of third dimension power, and (2) inconsistency in referring to his 'dimensions' as independent versus interrelated (combinatory) concepts. Using these critiques as a guide, here I seek to defend—and extend—the use of the three dimensional framework in the context of climate change adaptation.

*a. Neglect of 'power-to'*

A consistent dichotomy used by power theorists of particular interest here consists of distinguishing between 'power-to' and 'power-over' (Morriss 2002). This reflects the understanding that power is derivative of not only one's individual or collective agency (power-to) but also the relational, and asymmetrical interactions between the agencies of two or more individuals (power-over). Power-to refers to power as a capacity, whether or not that capacity is exercised. Meanwhile, power-over indicates the securing of compliance, or domination, by one group over another. Of course, these two framings cannot exist independently of one another, and power-over is considered by some authors to be a 'subspecies' of power-to (Lukes 2005).

Lukes treatment of power, in both first and second editions remains intentionally limited to the "problem of domination" (2005 p. 85). Lukes defines power as domination as "the ability to constrain the choices of other, coercing them or securing their compliance, by impeding them from living as their own nature and judgement dictate" (2007, p. 85). Morriss offers a sharp critique regarding Lukes' seemingly myopic focus on 'power-over' at the expense of 'power-to' framings (2006). Power, Morriss suggests, should not be limited to cases of one group acting on another. Rather it is best considered a dispositional, rather than a relational construct. It should, in other words, be considered as the ability to affect outcomes, not the ability to affect others (Morriss 2006). He writes further "that the whole force of the third dimension of power is not that some people could secure compliance (if they wanted): it is that they do secure compliance" (p. 134). Power, he suggests, should identify what might happen, while domination refers only to one mode of power's exercise. By committing his dimensional framework only to the study instances of domination, Morriss suggests Lukes' is a theory of domination, not power.

In response to power-to versus power-over critics, Lukes' makes a clear statement in the PRV second edition (2005): he admits, "it was a mistake to define power by 'saying that A exercises power over B when A affects B in a manner contrary to B's interests'. Power is a capacity not the exercise of that capacity (it may never be, and never need to be, exercised);

and you can be powerful by satisfying and advancing others' interests: PRVs topic, power as domination, is only one species of power" (Lukes 2005, p. 12). In other words, power-over is a subspecies of power-to.

Having acknowledged that power exists as a capacity, it does not then follow for Lukes (or for myself) that power-to should serve as the dominant framing of analysis. Nor should it follow that Lukes' 'power as domination' viewpoint excludes 'power to' framings altogether. The underlying premise of the second dimension, 'non-decision making', after all, is the deliberate abdication of decision making in a given circumstance, a clear instance of power-to. In fact, Lukes suggests that power-over, or relational and asymmetrical power framings are more widely used in common parlance and in the writing of "philosophers, historians and social scientists" (Lukes 2006 p. 165). This is because power-over constructs concentrate on what does happen in societies, rather than what might happen. Importantly, "it is the exercise of domination over others that most immediately concerns us in understanding and evaluating our own social condition" (Lukes 2005 in Plaw 2007).

In the context of climate change adaptation, smallholders will benefit from a shift in conceptual thinking towards power-over constructs. Adaptation theorists have written widely on the concept of adaptive capacity. Adaptive capacity can be defined as 'the ability or potential of a system to respond successfully to climate variability and change' (Adger et al. 2007). In the language of power theorists, adaptive capacity represents a clear power-to framing. Short-term coping strategies are perhaps even more indicative of a power-to framing. Coping in the agricultural literature is defined as short term measures making use of local assets in response to climatic stressors that cause crop failure and food shortages (Vincent et al. 2013; Ellis 1998). This focus on power-to, I argue, does not place sufficient emphasis on the subtle ways in which certain actors exercise power-over others within adaptation regimes. In fact, Granderson (2014) rightly suggests that response capacity (adaptive or coping) approaches "focus largely on the objective and easily quantifiable determinants of capacity for response, such as income, literacy, availability of natural resources, access to markets, information and technology, decision-making structures, and quality of infrastructure and public services. These efforts tell us little about the actual process of building capacity or translating it into action…" (p. 60). That is, they tell us little about the true capability of vulnerable actors to respond to climatic stressors and the external factors that intentionally or inadvertently shape adaptation outcomes. In socio-ecological systems literature more broadly it is similarly acknowledged that a relational view of power has been "relatively silent" (p. 17), with scholars in this area preferring to view power as 'ability' or 'capability'. Resilience and transformability, two central aspects of SES, for example, are often referred to as the "capacity to absorb disturbance" (p.10) and "the capacity to create

new stability domains for development"(p. 3), respectively (Folke et al. 2010).

The overwhelming focus on power-to in adaptation literature is further reflected in my systematic review of power. Power, it was determined, manifested primarily in social capital, knowledge/ideology, international negotiations (balance of power), institutions, stakeholder participation, and gender. Importantly, the predominant 'angle' adopted toward each of these themes was capacity-based. Social capital, for example, refers to "fundamental social attributes" (Pelling and High 2005) of a group and represents a source of power that is often considered inherent and intrinsic. Meanwhile, 'power as knowledge' as discussed in the context of local and indigenous expertise most often refers to the inherent utility of that knowledge set and the capacity of smallholders to adapt to climate change using it. Here again, power through knowledge is considered an intrinsic quality of the adaptation regime and its agents (farmers). Meanwhile, in power in international negotiations, while we do see what are clear power-over framings (e.g. realist 'balance of power'), these manifestations play out between countries, and not within. As Kates rightly suggests, the interests of poor people are not always the same as the interests of poor countries (2000), and power-over studies in domestic contexts are far less common yet equally important[9]. Concerning multilateral adaptation funding, for example, Person and Remling (2014) conclude that while equity concerns do tend to be the primary motivation for Adaptation Fund finance allocation, those decisions are made between states, not necessarily considering vulnerability or equity between communities at sub-national levels.

Ultimately, the predominant focus on power-to constructs in adaptation allows powerful actors to focus on the capacities of the poor and vulnerable rather than the features of the adaptation regime that create power inequities. For its ex-post explanatory power and the potential to shed light on taken for granted, inequality producing features of the regime, Lukes' 'power as domination' framing is appropriately adopted here.

*b. Neglect of structural power*

Lukes' perceived bias towards power-over framings is derived in part from his treatment of structure, agency and responsibility. This second critique centers on Lukes' motivation for studying power in the first place. Morriss, cited by Lukes as among the only authors to ask the

[9] Two notable exceptions to the predominant power-to framing in adaptation include (1) critical stakeholder engagement literature and (2) knowledge as it manifests in prevailing rationalities of government. Here, we see 'participatory' institutions that can be used to produce false consciousness among smallholders and promote managerial containment, and taken-for granted notions about development and the economy that render certain adaptation actions legitimate and others not. These are clear exercises of the power of one group *over* another and also happen to be prime examples of third dimension power.

question "why study power?" (2005 p. 65), offers three different contexts in which theorists would want to talk about power: for practical reasoning, for the moral allocation of responsibly, and for the evaluation of social systems (Morris 2002). Lukes, Morriss asserts, adopts and conflates the second and third contexts, and assumes that powerlessness always results from domination, and that we can 'pin responsibility' only on individual agents, and not social systems more broadly (Morriss 2006). Hayward furthers this critique, asserting that Lukes' tight linkage of power-over and the attribution of moral responsibility cause him to unnecessarily ignore and obscure these real effects of power as based in social structures and institutions which can also exercise power over us (Hayward in Avery 2007). That power dynamics are produced through both enduring social structures and individual agency is discussed by a host of power theorists (Oliga 1996; Clegg 1989; Scott 2007; Wolf 2001, 1999; Foucault 1982, among others). This is especially true of Foucault's contributions to power literature, what Lukes describes as an "ultra-radical view" aimed to create a 'microphysics' of power in which power is both repressive and productive and from which there is no liberation. Foucault, like Lukes, referred to the success of power as directly proportional to "its ability to hide its own mechanism" (Lukes 2007, p. 90). Foucault is widely considered to have dismantled the idea that agents are truly autonomous and rational.

Lukes rebukes this criticism by stating, "within a system characterized by total structural determinism, there would be no place for power" (2005 p. 57). Instead, he points to the ways in which individuals in strategic positions become complicit in domination through their inaction. He argues that the exercise of power does not require actual foresight and positive actions; it does not require "deliberate and strategic manipulation" (Lukes 2006 p. 171). An institutional or capacity-based focus alone, meanwhile, can effectively dismiss the assigning of responsibly due to perceived structural determinism or innate powerlessness. This is true of adaptation studies focused on so-called 'starting point' vulnerability. As Piya et al. state, "studies on climate change emphasize that vulnerability is not only defined by hazards, but also by the emergent property of human-environmental systems that enable people to cope with changes, thereby linking vulnerability to adaptive capacity (2015)." While these and other authors recognize that such 'social vulnerability' is the result of power inequities, these are usually thought to be structural in nature and thus not fixable by any agent in particular. As Lukes' suggests, "if we think of powerlessness as an injustice, rather than as bad luck or misfortune, is that not because we believe that there are those in a position to reduce or remedy it?" (2005 p. 68).

As highlighted by Boonstra (2016), the question of whether social structure should be considered as a form of power remains central and contested among scholars today. Can an

abstract system like 'capitalism' (or neoliberalism more broadly, as discussed in Paper 4), for example, be held responsible for outcomes when the causal links to individual actors are nearly impossible to determine? Conversely, if social structures are excluded from power analyses might this lead to "the mistaken theory that whatever happens in society […] is the result of direct design by some powerful individuals and groups?" (Popper 1962 [1945] p. 95, in Boonstra 2016).

A purely structural or institutionalized view of power, I submit, provides cover for the powerful and allows for the abdication of responsibility for adaptation outcomes. This concept has precedence in socio-ecological systems research more broadly. Mermet (2011), for example, cites the tendency for SES scholars to downplay important divisive and adversative tendencies between actors. He states that "achieving a directional change towards more environmentally sustainable social-ecological systems cannot rely solely on better coordination between stakeholders" (ibid p. 6). Instead, one must place emphasis on the important role of agency (and conflict), a focus that has been blunted from the mainstreaming of collective action approaches. The failure to detect the relational and power-laden elements of environmental governance regimes is echoed by other SES scholars (Yates 2012; Agrawal and Ostrom 2001; Sikor 2006).

Ultimately, Lukes is not easily persuaded by structural determinism and is motivated to study power for the attribution of responsibility *and* the evaluation of social systems—these two goals are not mutually exclusive, as Morriss (2006) would imply. In fact, both structure and agency together are required for power of any sort to exist (Boonstra 2016)[10]. The inevitable entanglement of structure and agency (Giddens 1979) ensures that a both of these objectives can be met through the dimensional view provided the analyst approaches 'context shaping' with analytical rigor (see 'd. insufficient examples of third dimensional power' below). I submit that any theory of power that yields all explanatory power to structure alone does a greater disservice to the vulnerable than one that seeks to hold the powerful accountable.

*c. Difficulty in identifying 'real' interests*

Interests are at the heart of Lukes' third dimension. The ability of an agent to impact on the interests of a subject in order to secure compliance is the essence of the 'radical view'. Yet,

[10] Seeking to avoid "agency-structure" dualism, Boonstra introduces two types of power, 'conduct shaping' and 'context shaping'. The former refers to what might be considered first and second dimension decision making and agenda setting in Lukes' framework, while the latter, 'context shaping' refers to "indirect, latent, and often unintended consequence of human behaviour" (p. 4), or third dimension power (2016).

the notion of interests is unwieldy, and is "an irreducibly evaluative notion" (Balbus, 1971; Connolly 1972). 'Real' or 'objective' interests (as opposed to subjective interests) of the variety purported to exist in Lukes' third dimension are thought by some to have been given insufficient treatment in Lukes' original text (Goldman 1977). Lukes extends his treatment of interests in PRV2, acknowledging that actors do not have "unitary or [even] dual, but multiple and conflicting interest which are of different kinds (p. 145)[11]. By accepting that real interests are complex and conflicting, Shapiro states, "the researcher [is] bereft of any baseline by reference to which…[he/she] can read off whether the third face of power is at work in a given case" (2006 p. 147). Whether real interests can be identified, and their manipulation attributable to acts of power is a core critique of the dimensional framework.

Two authors in particular offer alternatives to Lukes' third dimension, both of which, I argue, do not go far enough to dismiss Lukes' view. First, James Scott questions the hegemony of dominant values and 'false consciousness' of subjected people suggesting instead that subjected groups are in a constant state of rebellion—or 'everyday resistance'— against theses forces. He suggests that a 'hidden transcript' exists that runs counter to the public transcript that "almost always represents a confirmation of the status quo in hegemonic terms" (1990 p. 89). The hidden transcript highlights the ways in which the subjected "come to accept even legitimate, the arrangements that justify their subordination where there is a prospect or upward mobility or escape from low status" (ibid p. 82). Lukes argues rather persuasively, however, that Scott's analysis adopts situations where coercion is overt (slavery, caste system, colonialism etc), and does not account for the more subtle exercises of power in situations outwardly devoid of coercion. Moreover, as Lukes' elegantly states "[Scott] considers, only to dismiss it, the alternative claim that those obliged by domination to act a mask will eventually find that their faces have grown to fit the mask" (p 131). Scott's critique, in other words, does not fully appreciate the depth of preference shaping put forth by Lukes. Second, John Elster also provides a take on 'preference shaping' that runs counter to that of Lukes. In his 'adaptive preference formation' theory, Elster posits that what Lukes considers preference shaping is more likely the product of 'habituation and resignation' (1983). He cites the classic illustration from Aesop's fable where a fox comes across high hanging grapes with the desire eat them. When realizing he can't reach them, he justifies this by suggesting that the grapes are not ripe, and are in fact sour. This reduction of one's dissonance is a "purely causal process taking place behind the back of the person concerned, as opposed to the intentional shaping of desires" (1983 p. 117). Because this involves a conscious understanding and rationalization of the 'resources' available to the subject, I

[11] That human interests are multiple and irreducible is perhaps best captured in Amartya Sen's work *Identity and Violence: The Illusion of Destiny* (2006)

suggest that Lukes would not conclude that this is a product of preference shaping at all. Power, after all, "can be at work, inducing compliance by influencing desires and beliefs, without being 'intelligent and intentional' (p. 136).

Ultimately, to argue that preferences have been shaped relies on the identification of a relevant counterfactual. That is, in the words of Lukes, in the absence of visible conflict of interests "we need to justify our expectation that B would have acted differently" (2005 p. 44). Citing Crenson's work on three dimensional power, *The Un-politics of Air Pollution…* (1971), Lukes suggests that in some instances—even amidst myriad irreducible, conflicting, and confounding interests— the relevant counterfactual is hardly disputable. In this example, that "citizens, if they had the choice and fuller information, would prefer not to be poisoned [by air pollution]" (Lukes 2005 p. 49), is a reasonable hypothesis and evidence enough of third dimension power. In other cases, a counterfactual is not easily produced.

Given the acknowledged irreducibility of interests to singular motives, Lukes suggests that in these more challenging instances another way of conceiving interests is to consider them as the "necessary conditions of human welfare" (2005. p 81). Here, Lukes refers to what Rawls identifies as 'primary goods' (1971), Dworkin as 'primary resources' (1981), Sen as 'human capabilities' (1999, 1985, 1989), and Nussbaum as 'central capabilities' (1988). "These", Lukes' suggests, "are all various ways of specifying conditions that enable people to pursue their various purposes and conceptions of what makes life valuable, and without which that pursuit is frustrated or severely impeded" (p 81). Included in such 'basic goods' include health, nutrition, shelter, security, and a host of other factors. Rawls also points to factors like rights and liberties, opportunities and powers, and income and wealth (1972). In the absence of other empirically deduced objective interests, the development of core capabilities can serve to represent people's presumptive real interests, and "domination occurs where the power of some affects the interests of others by restricting their capabilities for truly human functioning" (Lukes 2005, p. 118). Both of these approaches to interest identification—the direct or the 'basic goods' approach—can be adopted here.

In the case of climate change adaptation we cannot hope to know farmers' true interests in the absence of outside intervention (i.e. "that B would have acted differently"). An attempt to do so would require tracing an unwieldy counterfactual back through time. How might agriculture in West Africa look without Norman Borlaug's Green Revolution, without the Tennessee Valley Authority and the export of the American industrial agriculture model—how might it look without colonization? It is fair to assume, however, that Ghanaian farmers, to paraphrase Lukes on Crenson, would prefer to be entirely food secure in the face of changing climates if they had the choice and fuller information. Should this simple

counterfactual not suffice, alternatively—consistent with Lukes' adopted concept of core capabilities— one could posit that smallholder farmers would, in the absence of outside intervention, choose for themselves access to the widest possible suite of determinants of adaptive capacity. We can, in other words, assume that in the context of climate change adaption, the determinants of adaptive capacity to be equivalent to 'basic goods' in a broader welfare setting.

Ultimately, this critique of interest identification in Lukes' framework is perhaps less relevant to climate change adaptation debates than to other contexts. As evidenced in Paper 3 and 5, whether or not we believe that interests can be intentionally (or unintentionally) manipulated, climate change adaptation offers a unique manifestation of third dimension preference shaping that is driven by uncertainty and the rending technical of adaptation planning. That is, a decisive lack of conflict (i.e. depoliticization[12]) over climate change adaption actions is driven by powerful actors that assume trusteeship over decision making, justified by their unique ability to forecast impacts and manage uncertainty. This expert-led, technocratic regime does not shape the preferences of smallholder farmers, but denies them altogether. This is facilitated by the 'anticipatory' nature of climate change policy that seeks to adapt to and mitigate forthcoming impacts, posing a unique public policy problem (DeLeo 2016). There is, in other words, ample evidence of third dimension power manifestations in climate change so as to avoid getting bogged down in a debate about the identification of 'true' interests[13].

*d. Insufficient examples third dimension power*

The inherent difficulty in identifying interest manipulation within Lukes' framework is reflective of a broader criticism concerning the third dimension. Quite simply, Lukes' work is deprived of examples of what a third dimension power manifestation might actually look like. Apart from positing the existence of a third dimension of power, Lukes provides admittedly

[12] The joint concepts of 'depoliticization' and 'rendering technical' are taken up in Paper 5 that applies Lukes' dimensional framework to Ghana's adaptation regime in a high resolution, multi-level study.
[13] I largely agree with critics of Lukes' framework that acknowledging interests to be multiple and sometimes conflicting makes baseline interests difficult to establish. I demonstrate this challenge in detail in 'Paper 4 Supplement: Identifying 'real' interests- hard vs. soft adaptation in northern Ghana'. There, I suggest that farming communities tend to prefer soft adaptation practices over the hard interventions promoted in adaptation literature. It is altogether unclear however, whether those observed trends constitute the actual preferred adaptations of smallholders, are the product of rebellion from a forced agenda, are derived from adaptive preference shaping (i.e. resource scarcity and justification), or are perhaps even an interpretation by farmers as to what the researchers had to offer or expected to hear from farmers.

little direction for analysts to determine what features of a system of interest contribute to the shaping of preferences.

Surely, the burden of this work is not left to Lukes alone, and efforts to derive explicit examples of third dimension power are captured in a growing body of literature. To date, sources of 'preference shaping' in subsequent literature have included the perpetuation of historical narratives to support a particular view, inducing, reinforcing and exploiting misconceptions (Gaventa 1980), flooding the media with a biased perspective (Graetz and Shapiro 2005), and exploiting assumptions regarding the anticipated response of powerful actors to a potential action (i.e. the rule of anticipated reactions) (Freidrich 1941, Crenson 1971), among others. These anecdotal expressions aside, the third dimension of power lacks an analytical framework that can provide direction for students of power.

Ultimately, the system features that enable one group to wield power over that of another are contextually dependent. I propose (explored in depth in Paper 3), however, that from the limited accounts of such factors that three sources of third dimension preference shaping can be universally explored: (1) the dominant narratives (discourses) that contribute to problem identification; (2) the prevailing 'rationalities' and technologies of government that have come to be accepted as inevitable in identifying solutions; (3) and the institutional design features and social norms that inadvertently limit an individual's choices or exclude certain groups from participating in decision making altogether. These sources are common to each of the aforementioned studies, and have particular relevance for climate change adaptation regimes. Collectively, they provide a lens with which to explore trends that lie outside of the explanatory scope of first and second dimension power. Table 3.5 defines the proposed sources of third dimension preference shaping explored in this thesis.

**Table 3.5 Potential sources of third dimension preference shaping**

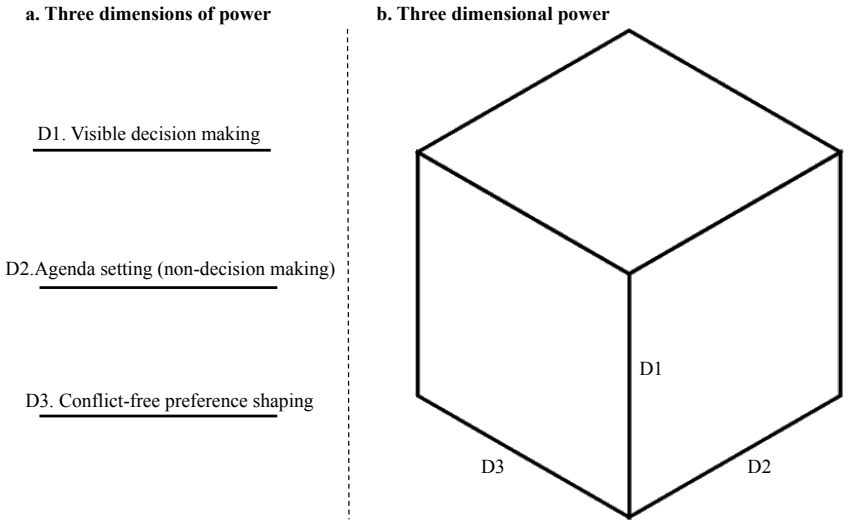
| **D3.a Dominant narratives and discourses** | **D3.b. Prevailing rationalities of government** | **D3.c Systemic Bias** |
|---|---|---|
| Preference shaping occurring through an ensemble of ideas, concepts, categories, and systems of thought through which meaning is given to social and physical phenomena and 'truths' established | Preference shaping occurring through the perpetuation of taken-for-granted notions and 'technologies' of government that predetermine system boundaries, bias problem identification, and make specific outcomes more possible than others, or seemingly inevitable. | Preference shaping occurring through the unintentional result of collective action and extensive webs of interaction and historical precedent beyond the capacity of an individual element, manifesting through systems of representation, multi-level and 'polycentric' governance through which meaning is negotiated and transformed. |

Source: Author (Paper 3)

*e. Ambiguity in three dimensions of power vs. three dimensional power*

A final critical note is one of semantics, but is of considerable interest in this study. Lukes' refers to the three manifestations of power within his framework as 'dimensions'. Yet, what Lukes' lays out in PRV and PRV2 is perhaps better described as an evolution of ways of looking at power, or what he himself refers to as "views", "faces", or "three conceptual maps" (p. 15). In other words, it is altogether unclear whether Lukes views his dimensions as independent or combinatory in nature. This distinction can be referred to as the (a.)'three dimensions of power' versus truly (b.)'three dimensional power', as illustrated in Figure 3.3.

**Figure 3.3 The 'three dimensions of power' versus 'three dimensional power'**




In several instances, Lukes describes his three dimensional view of power holistically, suggesting that the third dimension "incorporates and therefore goes further than the other two" (2005 p. 35). In this description, the dimensions are perceived as interdependent, with the third dimension not existing without the inclusion of the first two. This is also reflected in Lukes' summary of the distinctive features of the three views. Here, the "three dimensional view of power" (ibid p. 29) is described as focussing on decision making and agenda setting, issues and potential issues, overt and covert conflict, and subjective and real interests —that is, it absorbs the features of the preceding dimensions.

Yet Lukes does not always treat the dimensions of power in an interrelated manner, or what we might consider vectors in space[14]. In a later passage, for example, Lukes takes a more partitioned view, suggesting "it is important to understand that power in its more overt one- and two- dimensional forms has all kinds of three dimensional effects" (p. 122). Here the third dimension is not inherently inclusive of the first two dimensions, but is something that exists beyond them altogether. This inconsistency has led some critics to suggest that "generally, it seems fair to say that Lukes comes closer to offering a semantic analysis of the use of the term 'power' rather than offering a sociological analysis of the causal and structural reality of power" (Little 2010).

It is clear given Lukes' contradictory statements that his interpretation lies somewhere in the middle of this spectrum of understanding. Like any literary or theoretical body, the evolution of the dimensions of power happened over time with elite theorists like Mills ("The Power Elite") writing in the late 1950s, pluralists like Dahl ("Who Governs") in the early 1960s, and Lukes' three dimensions ("Power: A Radical View") emerging over a decade later in 1974. That the emerging dimensions might be both inclusive and exclusive of one another, I propose, is a product of the conceptual framework's history. My own interpretation of Lukes' dimensions is captured in the unique monikers that I have given to each dimension (decision making, agenda setting, and preference shaping[15]). I have, in other words, chosen to examine Lukes' dimensions individually or as 'faces'. Then, in Paper 5, I suggest considering power as it might exist in a truly three-dimensional, combinatory way.

**Conclusion**

In this literature review I have introduced the underlying conceptual pillars of 'political ecology' and 'critical systems thinking'. These two foundational concepts provide the basis for the methodological and analytical choices made in this thesis. Meanwhile, in a systematic review of power in adaptation literature, I have demonstrated that explicit studies of power in adaptation are limited, with even fewer offering overt methodologies for power's empirical study. Perhaps most importantly, for the myriad reasons explored in the latter half of this chapter, I have argued that Steven Lukes' three dimensional view of power is an appropriate framework for addressing power in complex system regimes like that of climate change adaptation.

[14] Vervoort et al. (2013) make explicit reference to power as a dimension underlying system 'scales' and 'levels'.
[15] The description of Lukes' dimensions as 'decision making', 'agenda setting', and 'preference shaping' was derived from Biermann et al. (2010). Other authors have denoted the dimensions as 'agenda setting', 'preference shaping' and 'thought control', for example (Heywood 2004)

Scholastically, the framework of 'power as domination' is highly compatible with political ecology, consistent with that community of practice's emphasis on inequality, multiplicity of competing agendas, and higher-level processes that impact socio-ecological systems. Similarly, Lukes' framework adopts a critical systems perspective when asserting that power is an "essentially contested" concept, evident in Lukes' emphasis on identifying manifestations of power rather than applying a single, inherently value-laden definition. Lukes' dimensional view, then, effectively provides a more rigorous framework for the empirical analysis of political forces (i.e. power) that assuages concerns over confirmation bias that can plague political ecology.

Academically, Lukes framework serves to shift our understanding of powerlessness in adaptation regimes from that of a lack of capacity (the primary 'angle' discussed in the adaptation power literature) to a relational construct by focusing on power-over, or 'power as domination'. In doing so, the framework does not yield to structural determinism and instead seeks to assign responsibility for adaptation outcomes, holding powerful stakeholders accountable for both their actions and the features of the adaptation regime that serve to create power inequities. With regard to the contended issue of 'interests identification', I've argued that climate change adaptation offers a unique uncertainty-driven manifestation of third dimension preference shaping that relies less on messy counterfactual identification. Finally, its merits notwithstanding, Lukes' framework is not without its limitations. I offer several amendments to the framework, including citing explicit, universal categories of third dimension preference shaping, and offering up a new conceptual view of Lukes' dimensions as truly combinatory in nature, composing what may be referred to as a three dimensional 'power space'.

# 4. Methodology

*"It is no blasphemy to admit that the world is crafted by political forces…politics is inevitably ecological and that ecology is inherently political."*

Paul Robbins (2011)

This dissertation is primarily informed by semi-structured interviews, although it utilizes an empirical power mapping tool, a survey, and policy analysis to set-up the theoretical underpinnings of the work and to further ground the results. The methodologies outlined below (Table 4.1) are presented in the order in which they contribute to the papers in this thesis. As each of these methodologies is explained in detail within the self-contained papers, this section provides only a brief introduction that serves to situate the reader.

Importantly, in a study of power the positioning of the analyst with respect to his or her research 'subjects' is of severe consequence. This is especially true in a study of third-dimension power focusing on prevailing knowledge systems and underlying biases, and where the research itself can contribute to the making of 'subjects'. To the extent possible, the methodologies used in this work were applied neutrally. I approached each interaction with respondents as a self-identified 'student'. However, to gain access to key individuals where my student credentials were insufficient, I made use of my CCAFS status and the organization's reputation and established network of partners in Ghana. Nevertheless, even in the best of cases, respondents were framed by the fact that I was a white DPhil researcher from a widely known, prestigious university (on several occasions I was greeted by staff assistants who remarked to their bosses with some urgency—the intended interviewees— that "there are some white folks here to see you"). It is fair to assume that this alone partially framed me as an adaptation 'expert', and served to bias respondents to elevate the perceived power of academics within the adaptation regime, and, in deference to my perceived expertise, facilitated the tendency to abdicate decision making to so-called 'experts' like myself.

**Table 4.1 Principal methods and rationale**

| Method | Paper | Rationale |
|---|---|---|
| Multi-level Stakeholder Influence Mapping (MSIM) | Paper 1, 2 | Determines where power is perceived to lie (i.e. with which actors/actor groups) across different operational levels in Ghana's agricultural climate change adaptation regime. |
| 'Likert scale' Survey | Paper 3 | Examines the utility of Lukes' three dimensional power framework among high-level decision makers involved in agricultural adaptation planning at the UNFCCC. |
| Policy Content Analysis | Paper 4 | Provides data regarding the outcomes of first dimension decision making, and explores third dimension preference-shaping through 'D3.b prevailing rationalities' within Ghana's key agriculture, development, and climate change policy documents. |
| Semi-structured Interviews | Paper 5 | Provides a holistic, nuanced view of the sources of power/power-laden features of Ghana's adaption regime. Lukes' three dimensional power framework is applied to interview data providing a-priori coding themes. Interviews are conducted across operational levels and with diverse actor groups in Ghana. |

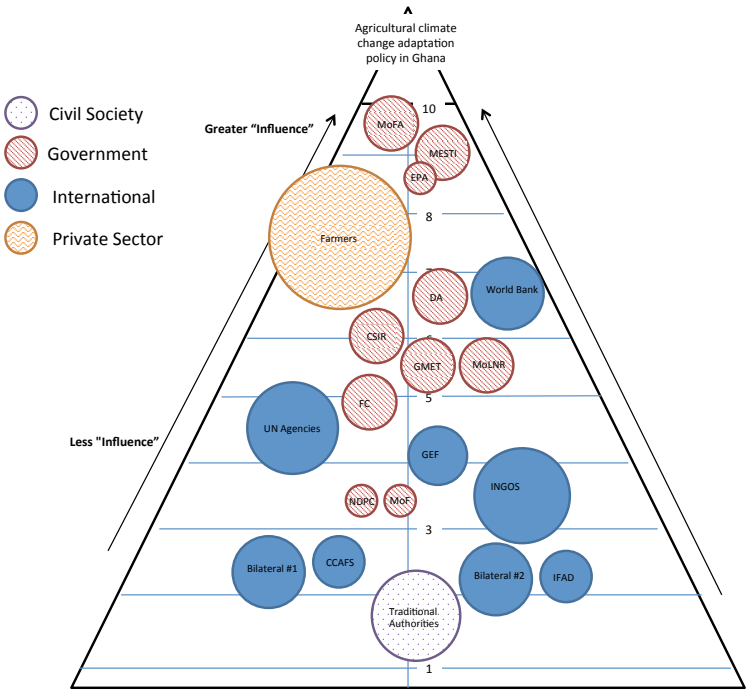
Source: Author

**a. Multilevel Stakeholder Influence Mapping**

Stakeholder influence mapping is a "simple visual tool to examine and display the relative influence that different individuals and groups have over decision-making and how influence and cooperation change over time" (Mayers and Vermuelen 2005 p. 2). The tool uses circles to represent different actor groups and individuals, placed within a pyramid where the policy/legislation (or broad scenario) in question serves as the pyramid cap or apex. Influence is shown in the relative closeness of the circles to the policy apex. Different color and size circles are used to represent stakeholder groups (e.g. individuals, government, civil society) and the analysis can be done for different time periods to track policy evolution over time. The exercise has been traditionally conducted in focus group format, with selected policy "movers and shakers". Stakeholder influence mapping has been amended for this multi-level context, and is the subject of Paper 1. Interviews were conducted with 30 diverse respondents in Ghana, and each map combined to produce a composite influence score for actors in the adaptation regime. MSIM[16] results are suggestive of who is perceived to be powerful and influential within the regime, and can be used to direct a more detailed analysis in to 'why' actors are powerful within the regime.

[16] The MSIM methodology advanced in Paper 1 and 2 has also since been applied to several climate change regimes in Central America (Castro Colina et al. 2016).

**Figure 4.1 Example MSIM map from Paper 2**




Similarly, to better direct semi-structured interviews (SSI) used in Paper 5, the completed influence maps served as the object of SSI elicitation questions, or a directive approach that uses a picture, video, text, or an object to prompt or elicit discussion (Tracy 2013). It has been suggested by some authors that the use of such an elicitation device can provide more realistic responses than would be collected through the use of words only (Prosser 2011). On a theoretical note, MSIM effectively responds to the gap identified by political ecological theorists of linking organizational attributes of various actors to their ability to act in political-ecological conflicts (Bryant 1998). MSIM analysis is used primarily in Paper 1 and 2.

**b. 'Likert-scale' survey**

A questionnaire containing 28 Likert-type questions (Likert 1932) completed by National Adaptation Plan workshop participants at COP 19 in Warsaw is the principal source of data used in Paper 3. The Likert scale is an effective tool for measuring both dimensions of attitude, direction and strength (Albaum 1997). A total of 14 representatives from Ghana, Mali, Niger, Burkina Faso, Kenya, Colombia, Guatemala, and India completed the questionnaire. The printed questionnaire consisted of two sections. The first asked

respondents "how important was/is the role of [actor/actor group X] in shaping the National Adaptation Plan for agriculture in your country?"[17] Respondents were provided five response options: 'very important', 'important', 'moderately important', 'of little importance' and 'unimportant'. The second section of the survey asked respondents to indicate their level of agreement with 20 questions concerning the sources of decision-making and knowledge in the country's agricultural adaptation regime. Five responses were provided: 'strongly agree', 'agree', 'undecided', 'disagree', and 'strongly disagree'. In both sections, respondents were asked to respond to each question and leave no response blank. Each survey was completed individually. The questionnaire was administered at the end of the two-day workshop. During the workshop, survey respondents discussed barriers to planning climate change adaptation in agriculture, vulnerability and risk assessment strategies, mainstreaming agricultural adaptation in to development planning, and economic assessments for prioritizing adaptation, among other NAP-related topics. Given the sample size (n=14) and the diverse combination of question themes (particularly in the second 'agreement' section of the questionnaire), the responses from each Likert 'range' were not summed for interval analysis, nor was the data analyzed against any respondent characteristic (e.g. Least Developed Country (LDC) versus Highly Indebted Poor Country (HIPC) status). Responses were treated as simply descriptive, ordinal data reflecting the subjective perceptions of adaptation 'planning agents'. In this broader study, the Likert scale survey data serves to evidence the utility of Steven Lukes' dimension view of power, and to shed light on the depoliticization of the regime and its origins in international settings.

**c. Policy content and discourse analysis**

Policy content and discourse analysis is used in this study to inform Paper 4. As suggested by Litfin (1994), discourse analysis within policy documents can be particularly useful in instances when the framing of information is decisive (i.e. exercising power through the imposition of a particular development framing– 'D3.b prevailing rationalities'). Analysis included key word frequencies and the extraction of key sections (e.g. goals and objectives, guiding principles, policy actions etc) for each of the documents listed below in Table 4.2. A document analysis protocol was applied to ensure that each document was 'approached' in the same manner. The documents chosen for analysis were derived from the semi-structured interviews, where respondents were asked about the policies that most impact their work. The results of the detailed policy analysis are found in Sova et al. (2014). Paper 4, meanwhile,

[17] In the absence of NAP development, respondents were invited to respond more generally with respect to 'agricultural adaptation plans' in their respective countries, for which a relevant policy existed in each country.

primarily examines the GSGDA, METASIP, FASDEP II, NCCAS, and NCCP for evidence of a neoliberal bias within the agricultural sector and adaptation policy outcomes.

**Table 4.2 Policies and projects selected for content analysis**

| **Governance and institutional policies** |
|---|
| The Constitution of the Republic of Ghana, 1992 |
| Growth and Poverty Reduction Strategy II (GPRS II), 2005 |
| Medium-term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA), 2010 |
| Decentralisation Policy Framework, 2010 |
| NDC 2012 Manifesto: Advancing the Better Ghana Agenda; Jobs. Stability. Development, 2012 |
| NPP 2012 Manifesto: Transforming Lives, Transforming Ghana; Building a Free, Fair and Prosperous Society, 2012 |
| **Agricultural policies** |
| Food and Agriculture Sector Development Policy (FASDEP), 2002 |
| Food and Agriculture Sector Development Policy II (FASDEP II), 2007 |
| ECOWAS Agricultural Policy (ECOWAP) and Comprehensive Africa Agriculture Development Programme (CAADP) Compact, 2009 |
| Medium-Term Agriculture Sector Investment Plan (METASIP), 2010 |
| G8 Cooperation Framework to Support the "New Alliance for Food Security and Nutrition" in Ghana, 2012 |
| Northern Rural Growth Programme (NRGP), 2007 |
| **Climate change policies** |
| Supporting Integrated and Comprehensive Approaches to Climate Change Adaptation in Africa (AfricaAdapt), 2009 |
| Integrating Climate Change and Disaster Risk Reduction into National Development, Policies and Planning in Ghana, 2010 |
| Ghana's Second Communication to the UNFCCC, 2011 |
| National Climate Change Adaptation Strategy (NCCAS), 2012 |
| National Climate Change Policy (NCCP), 2013 |

Source: Authors

### d. Semi-structured interviews

Semi-structured interviews with stakeholders across actor levels serve as the principal data collection method applied in this research. The interviews, directly or indirectly, inform each of the papers that form this thesis, and are used extensively in Paper 5. Semi-structured interviews allow for the collection of partial, perspective-based views from a variety of actors and is particularly appropriate and effective when intricate problems need to be unraveled, and when in-depth information cannot be expected from representative surveys of

respondents (Tremblay 1957). This study uses 80 semi-structured interviews (44 Interviews in Accra, 19 in Wa and 26 interviews in Lawra). I have personally transcribed 40 interviews (50 hours of audio), and the remaining interviews were outsourced. Transcripts were uploaded in to a central NVIVO qualitative data analysis software file. Respondent data was assigned to each transcript so that queries could be run for operational level (national, regional and local) and respondent type (i.e. government, civil society, multi/bi lateral donors). The complete interview schedule and respondent list can be found in Annex 4 (summarized in Figure 4.2 and 4.3 below) and Annex 5, respectively.

**Figure 4.2 Interview respondents by actor type**

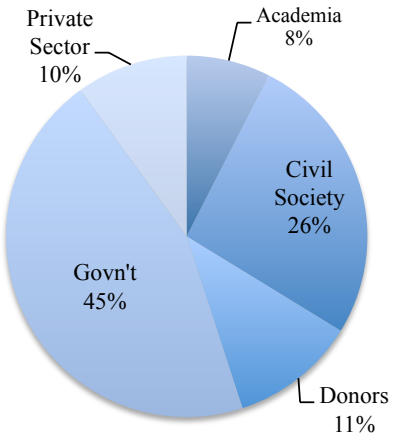
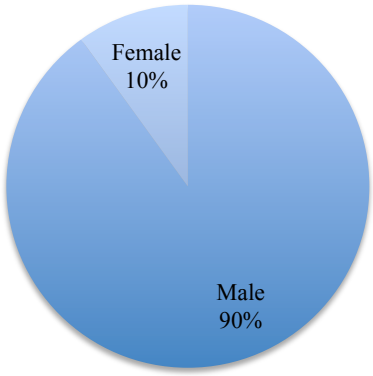



**Figure 4.3 Interview respondents by gender**




After an initial phase of stakeholder identfication and informational meetings (with the help of a graduate research assistant from the University of Ghana), interview respondents were identified through snowball sampling. Given the novel stage of agricultural adpatation policy development in Ghana, I am confident to a high degree that all major actors have been included in this analysis. In fact, by end of my time in Ghana there were few key players that I did not know personally, or by name. The actor group breakdown in figure 4.2, then, matches closely the actual relative particpation of government, civil society, donors, and so on, within the regime. Importantly, 45 % of the indivudals interviewed for this thesis represent the Government of Ghana. Similarly, as discussed in Paper 5 under 'D3.c cultural derivation of authority', the majority of respondents (and hence, actual decision makers) within the adaptation regime in Ghana are male (i.e. 90% of respondents).

Importantly, this thesis does not rely exclusively on interviews with farmers themselves. While it is my intention to explore the potential third dimension preference shaping forces that affect smallholders, this is best accomplished by interviewing actors across multiple operational levels. By its very definition, the third dimension of power acts in ways unknown to those under its influence. Furthermore, as noted in the writing of Mosse (2004), Cooke and Kothari (2004), Scott (1992), and Elster (1983), among others, the identification of true interests is inherently problematic and is shaped by the underlying power dynamics between the analyst (researcher, practitioner, development agent) and subject. This is further explored in 'Paper 4 Supplement: Identifying 'real' interests —hard vs. soft adaptation in northern Ghana'. It is, instead, my aim to identify actions and processes created and perpetuated by dominant actors within Ghana's agricultural adaptation regime that create the environment, enabling or otherwise, for farmers to adapt to a changing climate. This focus is reflected in my final respondent group.

*Methodological pluralism*

Collectively, these diverse, mixed methods contribute to the underlying CST principle of methodological pluralism (Ulrich 1987) to deliver on this thesis' objectives. Power as a subject of analysis, I argue, requires such pluralism. MSIM contributes to our understanding of where power is perceived to lie within Ghana's adaptation regime, and, in adopting CST ideas, avoids the pitfalls of traditional power mapping techniques that perpetuate the status quo regime and dominance of powerful agents. The Likert-scale survey, meanwhile, allows the analyst to capture common attitudes towards adaptation plan development at the international level, and demonstrates the utility of Lukes' dimensional framework as a political ecology tool for understanding power in complex system regimes. Policy analysis, then, serves to unearth the written, power-producing biases and prevailing rationalities that are 'inevitable' and taken for granted within Ghana's adaptation regime. Finally, semi-structured interviews serve to decode a complex web of interaction between actors in Ghana's multi-level adaptation regime, and provide nuanced understanding of the power trends revealed by other methodologies used here. Combined, these methods speak to where power lies, how power is sourced, and where power manifests within the regime.

*Published: Systemic Practice and Action Research*

# Paper 1. Multi-level Stakeholder Influence Mapping: Visualizing power relations across actor levels in Nepal's agricultural climate change adaptation regime

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**Abstract:** Where power lies and how it is conceived in studies of governance and institutions is often not discussed. This is due to the ubiquitous nature of the topic. Power is shaped by a variety of institutional factors, including the architecture of governing structures, questions of scale and level, and access to key resources including knowledge and capital, among other factors. To date, there are relatively few tools available that allow policy makers, researchers, and development practitioners to render these power dynamics explicit and thus take steps to mitigate the potentially deleterious effects of power orientations. This paper proposes a methodology, Multi-level Stakeholder Influence Mapping (MSIM), for elucidating power dynamics between actors in complex system regimes. MSIM departs from existing power mapping techniques in that it relies on individual interviews conducted across multiple actor levels and utilizes a participatory mapping process for shared system boundary critique. MSIM was piloted in Nepal's agricultural climate change adaptation regime with actors from the central, regional, and local operational levels. The results suggest that without proper consideration of the role of power in agricultural adaptation regimes, the resulting interventions will likely be insufficient in catalyzing adaptation pathways and moderating the negative impacts of climate change. Furthermore, power analyses produced from the perspective of a single actor level or respondent type can risk sub optimization of adaptation outcomes and can misdirect the lobbying efforts of those agencies utilizing mapping outputs.

**Keywords:** Climate change, adaptation, agriculture, Nepal, power, influence, mapping

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Syst Pract Action Res
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ORIGINAL PAPER

# Multi-level Stakeholder Influence Mapping: Visualizing Power Relations Across Actor Levels in Nepal's Agricultural Climate Change Adaptation Regime

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**Abstract** Where power lies and how it is conceived in studies of governance and institutions is often not discussed. This is due to the ubiquitous nature of the topic. Power is shaped by a variety of institutional factors, including the architecture of governing structures, questions of scale and level, and access to key resources including knowledge and capital, among other factors. To date, there are relatively few tools available that allow policy makers, researchers, and development practitioners to render these power dynamics explicit and thus take steps to mitigate the potentially deleterious effects of power orientations. This paper proposes a methodology, multi-level stakeholder influence mapping (MSIM), for elucidating power dynamics between actors in complex system regimes. MSIM departs from existing power mapping techniques in that it relies on individual interviews conducted across multiple actor levels and utilizes a participatory mapping process for shared system boundary critique. MSIM was piloted in Nepal's agricultural climate change adaptation regime with actors from the central, regional, and local operational levels. The results suggest that without proper consideration of the role of power in agricultural adaptation regimes, the resulting interventions will likely be insufficient in catalyzing adaptation pathways and moderating the negative impacts of climate change. Furthermore, power analyses produced from the perspective of a single actor level or

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respondent type can risk sub optimization of adaptation outcomes and can misdirect the lobbying efforts of those agencies utilizing mapping outputs.

**Keywords** Climate change · Adaptation · Agriculture · Nepal · Power · Influence · Mapping

## Introduction

How power is conceived in studies of governance and institutions is often not discussed (Biermann et al. 2010; Barnett and Duvall 2005; Lebel 2006). This is due to the ubiquitous nature of the topic. Power is shaped by a variety of institutional factors, including the architecture of governing structures, questions of scale and level, and access to key resources including knowledge and capital. Explicitly acknowledging the role of power in complex system regimes can improve our understanding of its origins and manifestations, and lead to improved policy and institutional design.

This paper asks the question: "How can we meaningfully visualize, and analyze empirically, the power of different actor groups with respect to a given policy process?" At present, there are relatively few tools available that allow policy makers, researchers, and development practitioners to render these power dynamics explicit and thus take steps to mitigate the potentially deleterious effects of power orientations. This is in part due to the sensitive nature of power, its often-subtle manifestations, and complex transformations across actor levels. Consequently the study of power and its impacts on decision-making requires equally subtle and cross-level techniques. This paper seeks to propose one such technique, multi-level stakeholder influence mapping (MSIM), that aims to visibly map and quantify the power or influence of diverse actor groups towards a stated policy. It is argued here that MSIM advances on existing power-elucidating techniques in that its individual interview style mitigates against group polarization (and group think), its use of an elicitation object more easily facilitates the sharing of sensitive information, it allows for power perspectives across multiple actor levels, and it serves as a useful technique in delineating system boundaries as perceived by different actor groups.

Through a case-study format, the proposed MSIM methodology is applied to demonstrate that without proper consideration of the role of power in agricultural climate change adaptation regimes that the resulting interventions will be: insufficient in moderating the negative impacts of climate change, highly contested, less equitable, and ultimately less sustainable. Who makes decisions regarding adaptation responses, the boundary judgments that are made concerning the system, or systems, in question, and the interests, norms, and values of those making decisions will all influence adaptation outcomes. Several authors in the area of critical systems thinking have advanced literature associating these boundary judgments and related concepts with the exercise of power (Churchman 1968; Midgley 2000; Ulrich 1983; van Gigch 2003; Matthews 2008; Flood and Romm 1996; Clegg 1989; Oliga 1996). A critical systems thinking framing of decision making processes in climate change adaptation regimes is thus provided here. Note that while the study uses climate change adaptation to demonstrate the viability of the proposed methodology, MSIM should be of interest to a wider audience of both academics and practitioners alike operating within complex system regimes of any type.

Following this brief introduction, Sect. 2 reviews existing methods for stakeholder power and influence mapping and identifies common methodological shortcomings.

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Stakeholder Influence Mapping, the MSIM predecessor methodology is addressed also in this section. Section 3 discusses two central decision making dilemmas relevant to power mapping methodologies, and introduces critical system thinking principles as a way to overcome these barriers. These critical system thinking principles then serve as the basis of Stakeholder Influence Mapping modifications in Sect. 4, and the step-by-step MSIM methodology is introduced. Section 5 discusses MSIM application in the Nepal case study, the results of which are found in Sect. 6. Discussion and conclusion sections then follow.

This paper is theoretical in nature and represents the foundations of a broader doctoral research project examining the role of power relations in shaping adaptation in agricultural systems. As such, the case study in this paper is utilized to advance the methodology outlined herein, and not intended to serve as the basis from policy recommendations regarding Nepal's climate change adaptation regime.

## Stakeholder Influence Mapping

The visual mapping of stakeholders is often associated with the field of "network analysis". Network analysis has broad application and diverse meaning for management, sociological, and psychological theorists. Predominantly in the area of sociology, Social Network Analysis (SNA) has gained prominence in the past decade (Knoke and Yang 2008). While SNA may be extended to include small groups and organizations (and even states), it is most frequently employed to analyze the relationships between individuals within a social network. Power within SNA is often associated with 'centrality', or the quantity of network links or exchanges associated with a given actor or actor group. While SNA does provide some tools for empirical analysis of cross-level dynamics (i.e. systemic action emerging from individual actions) (Coleman 1986), such tools are few in number (Emirbayer 1997).

In a related field, inter-organizational network theorists view networks from a management or institutional perspective. Here authors have sought to demonstrate the type and strength of connections between organizations and institutions in a given strategic network and the conditions under which linkages are established (Mattsson 1984; Paliwoda and Thomson 1986; Oliver 1990). Power is addressed explicitly by inter-organizational network theorists when dependence, conflict or cooperation, mutual expectations, and proximity (i.e. closeness or distance of a relationship) is identified between organizations (Håkansson 1982). Ultimately, multi-level analyses in inter-organizational networks are necessitated by the human composition of organizations and given that relationships and networks are the results of human activities and not the activities of the organization itself (Ritter and Gemünden 2003) .

In contrast to these network analyses, MSIM does not speak to the strength or type of connection between the actors discussed, nor does it seek to make any explicit reference to the structure of the network under study. It seeks only to elucidate an actor group's relationship towards a policy process or decision-making scenario, and only by extension, its relationship to other actors. Consequently, MSIM is more closely related to a suite of tools concerned with power dynamics in policy and stakeholder analysis realms. Several 'traditional' stakeholder analysis tools that have been widely adopted include: 'Power Versus Interest Grids' (Mendelow 1991), 'Stakeholder Influence Diagrams' (Bryson 2004), "Star Diagrams' (Eden and Ackermann 1998) 'Stakeholder Circles'(Bourne and Walker 2005), and 'Stakeholder Influence Mapping" (Mayers and Vermeulen 2005).

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Mendelow (1991), and later Eden and Ackerman (1998), have introduced perhaps the most widely adopted influence mapping tool, Power Versus Interest Grids. The two-by-two matrix used in Power Versus Interest Grids compares actor's political interests on one hand, and the stakeholder's power to affect the organization's or issue's future on the other. The stakeholder in question is placed into one of four categories produced by the matrix grid; "Players, who have both an interest and significant power; subjects, who have an interest, but little power; context setters who have power, but little direct interest; and the crowd, which consists of stakeholders with little interest or power".

Power Versus Interest Grids have helped to generate a series of additional tools building off the resulting matrices. Stakeholder influence diagrams, as described in Bryson (2004), for example, indicate how stakeholders on a Power Versus Interest Grid influence one another, using arrowed lines to indicate the direction and magnitude of the influence between stakeholders. The 'bases of power' approach, or star diagrams (Eden and Ackerman 1998), also utilize Power Versus Interest Grids, but explore in greater depth the 'sources' of power and the specific goals and interests the stakeholder aims to achieve.

More recently, Bourne and Walker (2005) put forward a "stakeholder circle" methodology for visualizing power and influence as it manifests in project management. The circle displays the distance of relevant stakeholders from the project delivery entity (indicating the potential scope and scale of the influence), the composition of the stakeholder groups exhibiting influence (applying different shades or patterns to reflect homogeneity or heterogeneity or the group), and the relative size/population of the block (the relative area it occupies on the circle), all working to indicate a potential degree of influence that a given stakeholder exerts on the project and project outcomes.

Finally, power mapping has been advanced in the area of socio-ecological systems research through the work of Mayers and Vermeulen (2005), whose "stakeholder influence mapping" tool was been applied in an assessment of Costa Rica's forest policy. The tool uses circles to represent different actor groups and individuals, drawn (or placed, if pre-cut circles are used) by the respondent within a pyramid where the policy/legislation (or broad scenario) in question serves as the pyramid cap or apex. Different color and size circles can be used to represent stakeholder groups (e.g., individuals, government, and civil society). Influence is shown in the relative closeness of the circles to the policy apex, while relationships (degree of cooperation/conflict, etc.) are indicated by relative proximity and overlap of the circles. The mapping exercise can be done for different time periods to track relationships in policy evolution over time. An example mapping board is displayed in Fig. 1.

It is Mayer's and Vermeulen's stakeholder influence mapping tool that serves as the basis for a modified influence mapping technique advanced here.

Each of the aforementioned power mapping techniques is intended to be conducted in a focus group or 'planning group' settings. It is argued here, however, that this methodological choice is constricting for two reasons. First, focus group settings can be dominated by actors representing the status quo power regime and, as a consequence, can suffer from intimidation-induced obedience as manifested through the '*hegemony of established norms*'. Secondly, the composition of such focus groups is often dominated by central-level policymakers, a group that represents only one part of the policy process and neglects the inherent multi-level nature of the system.

Given the sensitive nature of power, it is important that an environment is created where respondents feel comfortable sharing their perspectives regarding power dynamics and relationships. Focus groups containing "policy movers and shakers"—the suggested composition of Stakeholder Influence Mapping participant groups (Mayers and Vermeulen

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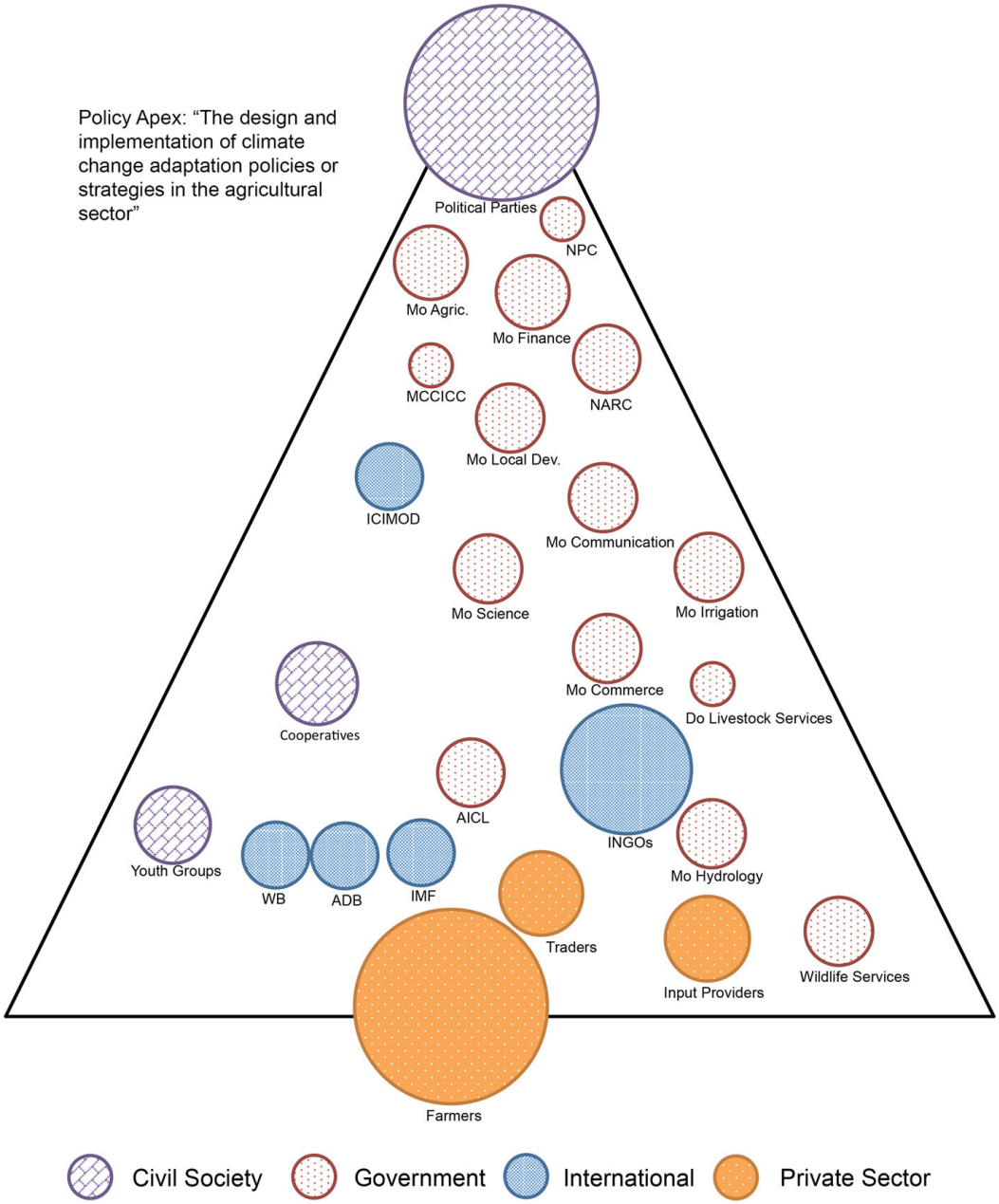



**Fig. 1** Completed stakeholder influence mapping/MSIM mapping board. *Note*: The policy object, or apex, is located at the *top* of the mapping pyramid. In this example map, the respondent was asked to rank actors for their influence regarding the design and implementation of climate change adaptation policies or strategies in the agricultural sector. Actors/actor groups in the form of *circles* that are placed closest to this 'apex' are deemed most influential from the perspective of the respondent (political parties, in this example). Actors near the bottom of the pyramid are deemed less influential (but not without influence). The least influential actor group in this example is Farmers. The actor groups have been divided by the analyst into four separate 'typologies' indicated by *color* (or *shade*), including civil society, government, international, and private sector actor/actor groups. *WB* World Bank , *ADB* Asian Development Bank, *IMF* International Monetary Fund, *Mo* Ministry of, *Do* Department of, *AICL* Agriculture Inputs Company Ltd, *ICIMOD* International Centre for Integrated Mountain Development, *MCCICC* Multi-sectoral Climate Change Initiatives Coordination Committee, *NPC* National Planning Commission

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2005), for example—will often contain representatives with vested interests in the status quo power regime whose authority (or perceived influence) generates obedience among other group members, thereby dictating the influence mapping outcomes. Obedience, according to Matthews, can be defined as a process by which an individual conforms (against their judgment) to the will of an authority figure (2008). Obedience can play out within a concept known as the 'hegemony of established norms', or in the social sciences more broadly as *'normalization'*. The hegemony of established norms suggests that even in situations where individuals and group are free to critique the status quo [power regime] the cognitive frames at work within the institution in question cause individuals to independently frame the problem in the same way (Matthews 2008). Power and influence mapping techniques can be conducted individually and collated to mitigate the potentially deceptive effect of normalization.

A second critique can be leveled concerning the typical actor composition of traditional power mapping focus groups. Focusing solely on "policy movers and shakers" often means the recruitment of central level actors, or 'policy wonks', typically chosen by the analyst with support from a key informant familiar with the policy context in question. The resulting group composition—reflecting both the analyst's and key informant' subjective decisions regarding group membership—can produce a biased understanding of powerful agents and reinforce existing inequalities between actors. Ultimately, political theorists concede that a multi-level approach to policy analysis is needed. This paper adopts a Cash et al. (2006) and Gibson et al. (2000) definition of "scale" as the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon, and "levels" as the units of analysis that are located at different positions on a scale. Adaptation policy in particular must take into account the multiple scales (jurisdictional, spatial, and institutional, for example) and levels (national, regional, local administrative units, for example) of the policy process (Adger 2001; Adger et al. 2005), commonly considered by the following "stage heuristic": (1) problem identification, (2) agenda setting, (3) formulation, (4) adoption and (5) evaluation (Sabatier and Jenkins-Smit 1993). Each of these stages implicates different actor sets, knowledge and information, and resources. As MacKinnon (2011) suggests, we must reject the idea that politics occurs on a given, fixed level with defined boundaries. More commonly, actors employ 'scalar politics' (referred to as the 'strategic deployment of scale') or the purposeful utilization of multi-level structures to promote one's interests. This dynamic is not easily captured in central level focus groups alone. Power and influence mapping techniques, then, must be able to capture these cross-level characteristics from the perspective of diverse actors that operate in each of the aforementioned policy 'stages' (i.e. the "multi-level" in Multi-level Stakeholder Influence Mapping).

A consequence of the 'normalization' tendency and inherent central level bias described above is that the resulting power and influence dynamics emerging from traditional mapping techniques are likely to be 'politically charged', or biased. Perhaps more importantly, however, is that the analyses are based on the groups' (sometimes arbitrarily formed) idea about who should be considered relevant 'stakeholders' to begin with. These tendencies reflect key differences in "boundary judgments" made by the analyst and group participants alike. It is suggested here that boundary critique, and the associated theory of research and practice, critical systems thinking, can provide a useful lens through which to view these challenges and offer strategies for eluding these traditional pitfalls.

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## Boundary Critique and Power

When addressing complex, "wicked problems" (Rittel and Webber 1973) like that of climate change, actors are consistently making decisions regarding to the scope the problem, impacts, and responses. How we choose to draw those boundaries around scope, scale and time frame of adaptation, which disturbances elicit the need to adapt (i.e. problem identification), and what drives the notions of desirability or improvement of the system often completely determines the conclusions and recommendations for action (Helfgott 2011). Because we each have different perspectives, interests, values and so on it is likely that we will make different 'boundary judgments' in the same situation. Group (or sample) representation, then, can be of severe consequence to the results of decision-making.

Boundary judgments, or where the 'line' is drawn between a system of interest and its surrounding environment, are by definition synthetic a priori judgments (Matthews 2008). The idea of critically engaging the normative presuppositions, or a priori knowledge that accompany decision-making can be traced to Kant's seminal work *The Critique of Pure Reason* (1781). In *Pure Reason*, Kant posits that many of the observed features of objects are explained by reference to traits of the observer rather than traits of the objects themselves. That is to say that 'objectification', or the creation of ontological objects, is a human affair rather than simply a natural phenomenon (Matthews 2008). The 'Copernican Shift' initiated by Kant and the concept of boundary critique endures today and is captured in the contemporary work of Churchman (1968, 1979), Ulrich (1983) and Midgley (1992), among others, in a theory of research and intervention referred to as critical systems thinking (CST).

Matthews (2008) chronicles the emergence of modern critical systems thinking by reflecting on two 'dilemmas' facing planning and decision making: the ontological dilemma and teleological dilemma. The ontological and teleological concepts offer a useful platform on which to introduce critical systems thinking principles and to discuss the importance of rendering explicit the boundary judgments in decision-making around climate change adaptation as explored in the case study.

The distortive effects of boundary judgments during the problem formation stage of decision making is referred to as the ontological dilemma (Matthews 2008). The ontological dilemma centres on the web of interconnectedness within a system of interest and the concept of improvement. That is, something that appears to be an improvement in a system given a narrowly defined boundary may not be seen as an improvement at all if the boundaries are pushed out, revealing additional influencing factors upon the decision problem (Churchman 1968). Moreover, sometimes the implementation of our solution the to problem turns out to have unintended (and deleterious) consequences on another, more important problem that is outside the scope of our study (Churchman 1968, 1971, 1974). This is referred to in systems theory as 'sub-optimization' (Hitch 1953). Because no single perspective can exhaust the richness of reality it is impossible to guarantee improvement in complex systems without making boundary judgments that are distortive to the broader context (Matthews 2008) (Box 1).

The teleological dilemma, the second decision-making dilemma, examines the inherently normative bases of decision-making. That is to say that even if we were able to overcome the ontological dilemma and view the system and its influencing factors holistically, ensuring improvement from the perspective of all system agents would still not be guaranteed. Different groups have different needs, interests, and perhaps more fundamentally, different values (Matthews 2008). This, Matthews suggests, introduces a

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**Box 1** Climate change adaptation and the ontological dilemma

Climate change adaptation regimes are affected by the complex interplay of both climate and non-climate factors (Adger 2003), and are thus highly vulnerable to the ontological dilemma. The dilemma manifests, for example, in the temporal considerations of short-term versus long-term adaptation, and the inherently complex relationship between climate change adaptation and development. Sub optimization (i.e. maladaptation) can occur in adaptation regimes when short-term adaptations leave individuals or communities vulnerable to long-term impacts of climate change (Adger and Vincent 2005) either by way of a changing stressor or an unfit 'solution'. This often manifests in the application of large-scale, technical (hard) adaptations that respond only to short-term circumstances and incentives while neglecting long-term imperatives. Thornton and Manasfi explore this tendency in detail, suggesting "adaptation is a blind, complex, dynamic, and contingent process. While politics emphasizes the short-term view, human adaptation must be judged from a long-term perspective" (2010). Thornton and Comberti discuss, then, the relationship between adaptation and development, in what they refer to as the "mitigation-adaptation disconnect" (2013). They suggest while [development] interventions may increase the potential for incremental adaptation along pathways already realized, commonly realized development interventions often do not support more radical, transformational adaptation [and] may ignore or even undermine other adaptation alternatives or institutions, thus potentially reducing overall adaptive capacity" (2013). Thus, climate change regimes, given the inherent temporal planning challenges and complex interactions with development initiatives, offer prime settings for decision makers to fall victim to the ontological dilemma and resulting sub optimization of adaptation pathways.

normative component to planning and decision making that is "beyond neutral, uninterested, supposedly value-free, objective, and empirically verifiable management science" (2008). The teleological dilemma suggests that the boundaries around the problem will often be driven by the limited imperatives of a client's organization as opposed to broader and potentially more important imperatives at of the system as a whole. This bias is referred to as advocacy analysis (Box 2).

Critical systems thinkers, such as Churchman (1968, 1971, 1979), Ulrich (1983, 1987) and Midgley (1992, 2000), understand the challenges posed by both dilemmas and the resulting sub-optimization and advocacy analysis, and suggest that boundary judgements themselves may be a product of power relations (Matthews 2008). Similarly, Midgely et al. discuss the inherently contested nature of these boundary judgments and power plays and discuss the nature of conflict over boundary disputes (1998).

In addressing the ontological dilemma, Churchman argues that the systems 'person' (analyst) has a responsibility to "sweep in as much information as possible about the broader system(s) in which the system of interest is situated". As suggested by Midgley et al., "prior to the work of Churchman many people assumed that the boundaries of a system are 'given' by the structure of reality", when, in fact, they are shaped by personal and social constructs (1998). When it comes to human systems, Churchman argued, pushing out the boundaries of the system and 'sweeping in' information means also pushing out the boundaries of who is considered a relevant decision maker (Midgley et al. 1998). 'Sweeping in' a wide variety of perspectives (including those that run counter to established norms) is thus an important step in overcoming the ontological dilemma, and an important adaptation of existing power mapping techniques.

The teleological dilemma is addressed most succinctly through the work of Werner Ulrich. Ulrich acknowledges that boundary judgments and value judgments are intimately linked (Midgley et al. 1998). Because we each mobilize different value sets in drawing boundaries, debating boundaries without questioning our own normative presuppositions and ethical stances or that of others can render discussions futile. As such, Ulrich developed a set of twelve 'questions' that both planners and ordinary people could use to think through and debate issues. Critical Systems Heuristics (CSH), as it is referred, offers a

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**Box 2** Climate change adaptation and the teleological dilemma

In climate change adaptation regimes, the teleological dilemma manifests through the complex web of actors interested in the adaptation interventions and outcomes, and the multi-level nature of the those interests and perspectives. Given the crosscutting nature of climate change adaptation, it inherently implicates a wide swath of actors. International agencies, state agencies, non-governmental organizations (NGOs), and the private sector (including farmers) each engage in climate change adaptation, and each with their own motivations for doing so. Private sector agents pursing profit maximization will value market-based adaptation interventions over state-managed direct payments to small-scale producers, for example. Farmers may tend to support just the opposite. Meanwhile, donor agencies may support government interventions that align with their own work plans over activities that support the work package and outcomes of another, competing agency. Ferguson (1990), for example, suggests that governance and development discourse used by certain actors can de-politicize the decision making process, favoring the vested interests of those perpetuating those discourses. This dynamic occurs across actor levels in any adaptation regime. As suggested by Cash et al. "knowledge is often held, stored, and perceived differently at different levels, resulting from differences across levels about what is perceived as salient, credible, and legitimate knowledge, or what is perceived as the important scale or level of the problem, i.e., the plurality challenge" (2006). This complex arena of competing interests and values makes climate change adaptation regimes susceptible to the teleological dilemma and to the underlying impacts of advocacy analysis.

systemic methodology for handling several key perspective-related issues, and is based on identifying sources of (1) Motivation, (2) Control, (3) Expertise, and (4) Legitimation (1983). CSH addresses both the way that the system *is* and the way that the system *ought to be*, from the perspective of those designing an 'improvement' in the system and those affected by it. Acknowledging how sources of motivation, control, expertise, and legitimation, are perceived by 'designers' and those affected is an important step in overcoming the teleological dilemma and constitutes a second important adaptation of existing power mapping techniques.

## Multi-level Stakeholder Influence Mapping

The risks of 'normalization' (the hegemony of established norms) and central-level biases which plague existing power mapping techniques demonstrate the need for a modified tool which can help to address the resulting ontological and teleological decision-making dilemmas that face system agents. Put differently, to more accurately capture power dynamics a method is required that allows individual perspectives on power to be captured, which represents diverse stakeholders (including designers and those affected), that operates at multiple 'policy levels', and that elucidates sources of motivation, control, expertise, and legitimation that underpin both established and dissenting norms. Such a technique is captured in an approach called Multi-level Stakeholder Influence Mapping (MSIM). MSIM is advanced here, building off of the stakeholder influence mapping tool discussed in Sect. 2 (Mayers and Vermeulen 2005).

Adapting the stakeholder influence mapping tool (Mayers and Vermeulen 2005) to meet the aforementioned criteria requires only minor adjustments to the existing methodology. The central methodological design, including the influence pyramid shape with the policy 'item' apex, circles representing actor and actor groups, and degree of influence indicated by position relative to the apex remain unchanged. What differs is that MSIM is conducted individually with local (i.e. community), regional (i.e. sub-national), and central level actors (i.e. multi-level actors) as opposed to a focus group of central-level policy 'movers and shakers'; it offers an additional step for the elucidation of boundary judgements

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underlying the mapping results, and it permits the collation of the multiple, individual perspectives into composite maps which reflect power dynamics within the entire 'system' or from the perspective of 'similar' groups. In MSIM, the completed influence maps serve as the 'object' of elicitation questions—a directive approach that uses a picture, video, text, or an object to prompt or elicit discussion (Tracy 2013)—aimed at drawing out the boundary critiques. It has been suggested that the use of such an elicitation device can provide more realistic responses than would be collected through the use of words only (Prosser 2011).

Table 1 compares the modified MSIM methodology (right column) with its predecessor Stakeholder Influence Mapping (left column).

The next section applies the MSIM methodology in a case study of Nepal's agricultural climate change adaptation regime. To develop a counterfactual argument, the mapping results from six central level respondents are combined to produce a single central-level MSIM map that serves as a proxy for traditional stakeholder influence mapping techniques. This serves to reflect what the findings may have been without the application of the multi-level adaptations of the approach.

## Nepal Case Study

Nepal is especially vulnerable to the impacts of climate change, and is among the most vulnerable countries in the world. Observed data across the country indicate a .04–.06 °C annual rise in maximum temperatures, a warming rate higher than the global average (Government of Nepal 2010). The country's agricultural sector, dominated by its southwest districts in the Terai plains bordering India, is inextricably linked to climatic trends, relying on monsoon rainfall and high mountain snow melt to source water for a system dominated by rain fed agriculture. The central government of Nepal, together with the country's development partners, have identified the need to adapt the country's agricultural systems to a changing climate. This priority has been met with the establishment of a Climate Change Policy (2011), National Adaptation Programme of Action (Government of Nepal 2010), and a scheme for the development of localized adaptation plans, Local Adaptation Plans of Action (2011). This policy environment has been matched by the creation of new institutional structures including a 25-member Climate Change Council (CCC) and Multi-stakeholder Climate Change Initiatives Coordination Committee (MCCICC), plus the implementation of donor-funded programs like the Pilot Program for Climate Resilience (PPCR) and the Poverty-Environment Initiative (PEI), to mention only a few.

The plurality of actors engaged in Nepal's adaptation regime reflects the influx of available funding for agencies operating in the area of climate change in the country. The funding surge, together with ongoing political instability have combined to create a power vacuum with regard to decision making and agenda setting within the country's adaptation regime. This has brought into question the ownership that Nepali citizens have over their own adaptation decisions, and has ignited debates about whether adaptation needs at the community level are being appropriately met (Dulal et al. 2010). Nepal's adaptation regime, then, offers a fruitful testing ground for the application of the MSIM methodology.

### Methodology

This section provides details around the application of the MSIM methodology in Nepal through the data collection phase. Data analysis will be covered in the next section.

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**Table 1** Comparing the Stakeholder influence mapping with MSIM

| Stakeholder Influence Mapping (Mayers and Vermeulen 2005) | Multi-level Stakeholder Influence Mapping (MSIM) |
|---|---|
| 1. Define policy focus | 1. Define policy focus. Influence mapping is applicable to almost any decision-making ('policy') scenario. As MSIM aims to draw power relations across different actor levels, the "policy focus" may need to be adjusted for different respondent groups. That is, given the diverse stages of the policy development process we will need to use different language and devices to capture different manifestations of the same policy process. In this case study (Sect. 5), 'agricultural climate change adaptation policy' (central level) is 'translated as 'the design and implementation of climate change adaptation initiatives or strategies in agriculture' at the regional level, and "the ability to produce food, earn income, or subsist when the weather changes' at the local level<br>Who: analyst<br>Time required: n/a |
| 2. Define one or more key time periods | 2. Define one or more key time periods. The methodology put forth here acknowledges the limited time availability of potential respondents, particularly at the central decision making level. As such, it is recommended that the 'actual' or 'current' power/influence regime be captured during the mapping exercise. Information regarding the historical evolution of the regime and emerging trends can be captured in "key moments and mechanisms" (Step 10) and "assessing system boundaries" (Step 11). For more normative analyses, respondents can be asked to rank how they *anticipate* power dynamics will look into the future (e.g. 2025 or 2050). Similarly, respondents could be requested to rank actors according to how they feel actors 'ought to be' positioned in terms of power. Both of these approaches offer more subjective, value-based perceptions of actor groups, and can be accommodated by the MSIM methodological framework<br>Who: analyst<br>Time required: n/a |
| – | 3. Identify influence-mapping respondents. A sampling strategy will need to be applied to select MSIM respondents at various actor levels. In the case of climate change adaptation, it is possible to capture responses from the entire relevant population at the central level (given the small number of central level institutions and actors currently engaged in climate change adaptation policy). A strategy is needed for lower administrative units (i.e. determining which districts/villages will be sampled). Again in the case of climate change adaptation, districts could be chosen on the basis of vulnerability to environment change, for example, should that information be available in the study country. Standard sampling techniques (i.e. simple random, systematic, or rational subgrouping) could also be applied here<br>Who: analyst with support from key informants<br>Time required: 1 week, but will vary depending on sampling strategy |
| 3. Identify policy stakeholders | 4. Identify policy stakeholders. A comprehensive stakeholder list should be created by conducting a institutional/stakeholder analysis prior to beginning MSIM interviews. This actor list should be created in spreadsheet format to facilitate printing and ease of use in an interview setting. It should provide a means by which the stakeholders can be easily marked by the respondent as "highly relevant" as required in step 6 (i.e. a tic box space)<br>Who: analyst with support from key informants<br>Time required: 1 week |

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**Table 1** continued

| Stakeholder Influence Mapping (Mayers and Vermeulen 2005) | Multi-level Stakeholder Influence Mapping (MSIM) |
|---|---|
| 4. Prepare materials | 5. Prepare materials. For each interview the practitioner will need (1) a printed version of the comprehensive actor list, (2) printed MSIM mapping board (A4 size), (3) pen/pencil and (4) recording device (audio or paper)<br>Who: analyst<br>Time required: 1 day |
| 5. Fine-tune the stakeholder list | 6. Fine-tune the stakeholder list. Present the respondent with the comprehensive actor list. Ask the respondent to place a checkmark ('tic') next to the actors that they feel are 'highly relevant' to the policy focus in question. The respondent is free to add new actors to the list, or suggest that others be removed if they feel strongly. In this case study example, there was no limit placed on the number of actors the respondent could 'tic' as relevant, however, the practitioner may choose to set an upper/lower limit (i.e. 20 actors, for example). The rationale for an initial prioritization of actors/actor groups is to bring the stakeholder list down to a more manageable size, given time constraints (i.e. it would not be practical, nor possible, to rank all 90 actors on the mapping board)<br>Who: respondent<br>Time required: 20 min (for each interview) |
| 6. Estimate stakeholder group size | 7. Estimate stakeholder group sizes. As suggested in the Stakeholder Influence Mapping methodology "Different sized stakeholder groups can be represented by different sized paper circles representing the number of people in the group (smallest = fewest, biggest = most)". As the circles will be drawn (in pen/pencil) on to the A4 mapping board in the MSIM methodology, the respondent should simply be reminded of to reflect this size/population factor in the drawing of circles. Ultimately, the circle size has no bearing on the calculation of an influence score, and is simply an aesthetic consideration to improve the legibility of map. The size of the circle is decided at the discretion of the analyst/respondent<br>Who: analyst, respondent and/or key informant<br>Time required: n/a |
| – | 8. Define "influence" and its relation to "power" as it is understood within your conceptual framework. Note that this will be different for every study. An example used here is "Power is the ability to influence the behaviour of others, with or without resistance". Or power could be defined to the respondent by referring to common power "bases" (i.e. Positional, Personality, Persuasion, Coercion, Force, Knowledge, Resources). It may also be worth distinguishing between power and influence (i.e. influence as the ability to exercise a particular type(s) of power). The practitioner could also inquire as to the respondents definition of power/influence<br>Who: analyst<br>Time required: 5–10 min (for each interview) |

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**Table 1** continued

| Stakeholder Influence Mapping (Mayers and Vermeulen 2005) | Multi-level Stakeholder Influence Mapping (MSIM) |
|---|---|
| 7. Map stakeholder influence and relationships | 9. Map stakeholder influence and relationships. Introduce the power-mapping board. State that the exercise you are going to do is designed to visualize the power and influence of actors as it relates to a certain policy or topic. Starting from our list of ticked, 'highly relevant' actors, circles will be drawn on the mapping board with the most influential actor/actor groups closest to the top of the pyramid and the least influential at the bottom. Influence can be legal and non-legal, legitimate and illegitimate. The respondent should be told that the objective is to define how things actually are, not the way that they are intended or 'ought' to be (unless normative analyses are being conducted as discussed in Step 2). Additional actors that come to mind that were not initially indicated in Step 6 by the respondent can now be added. Note: An example, unrelated influence map can be shown to the respondent to be sure that they understand the mapping concept<br>Who: respondent<br>Time required: 30 min (for each interview) |
| 8. Identify key moments and mechanisms | 10. Identify key moments and mechanisms. As each actor is placed on the map, ask (as used in this case study): (1) What type of power/influence is this actor/actor group exercising? (i.e. Positional, Party association, Personality (charisma), Persuasion, Coercion, Force, Knowledge, Resources); (2) What gives this actor/actor group the right to exercise power? (This is aimed at drawing out policy/legal frameworks); (3) Which are the main policies, laws, or constitutional mandates related to the environment, climate change, sustainable development (agriculture, livestock, and food security), or local governance in the study country that affect the relationships between these actors? Do policies from different sectors contradict or conflict one another? In what way? How about positive interplay (e.g., reinforcing one another in a beneficial way)?<br>Who: respondent<br>Time required: n/a, conducted simultaneously with Step 9 |
| – | 11. Assessing system boundaries. After the exercise has been completed, reflect on the map that has been produced. Ask the respondent critical system heuristics questions (Ulrich 1983) regarding control, motivation, knowledge, and legitimacy. This is an important step aimed at drawing out the way the system 'ought to be' (a key systems thinking concept) versus the actual state of affairs. Questions may include the following: Motivation—why would you want to be planning/intervening in this system in the first place? Control—who should have decision-making power? What should people have some say over, and what shouldn't they have a say over? Knowledge and expertise—what forms of knowledge are necessary and from what sources? Legitimacy—what are the values this is based on? Are you creating an oppressive system or one that benefits some and hinders others, and if so, what should you do about it? In addition to those suggested above, example CSH questions may include: [Asking the respondent to study the actors at the top of the newly created influence pyramid] Do you think that these top actors should be the ones making these decisions or have this much influence?; Where do these actors go for knowledge and expertise? Where would you go?; Who else should have a say? By what means/channels do they have a say?<br>Who: respondent<br>Time required: 15 min (for each interview) |

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**Table 1** continued

| Stakeholder Influence Mapping (Mayers and Vermeulen 2005) | Multi-level Stakeholder Influence Mapping (MSIM) |
|---|---|
| 9. Keep record of map for future reference | 12. Keep record of map for future reference. Digitize to facilitate analysis<br>Who: analyst<br>Time required: 1 day (for digitizing 30 maps) |
| – | 13. Calculate Influence Score. Determining an influence score from multiple, individual maps involves two principle variables: (1) frequency, or the percentage of respondents that find the stakeholder group 'highly relevant' to the policy focus in question; and (2) relative (or adjusted) ranking, or the average ranking level at which the stakeholder is placed on the map by respondents (the higher the ranking level, the higher the perceived influence). These two variables can be combined in several combinations to produce an composite influence score (See Sect. 5b for details)<br>Who: analyst<br>Time required: 2 days (for analyzing 30 maps) |

The 'steps' listed in here refer to the right column of Table 1 and are not necessarily in sequential order. Material preparation steps are not included here.

The policy focus (Step 1) chosen for the Nepal pilot was "agricultural climate change adaptation policy", and respondents were asked to consider only the current state of power dynamics (i.e. 2012) with regard to that policy focus (Step 2). A total of 14 separate respondents participated in the MSIM pilot, chosen for the diversity of actor group types that they represented (i.e. Government, NGO etc.). This included six national-level respondents, six district-level respondents, and two local village-level respondents (Step 3). Local-level components of this research were conducted in Nepal's Rupandehi District, Makrahar Village Development Committee (VDC), located in south central Nepal. District-level data collection occurred in the municipality of Bairahawa, Rupandehi's designated District Development Committee (DDC); while central-level data collection occurred in Nepal's capital city, Kathmandu. Interviews, conducted individually, lasted on average 1.5 h. Data were collected between May and September 2012.

Each participant in the influence-mapping exercise was first asked to study the detailed stakeholder list and indicate by 'tic' or check mark actors (individuals or organizations) 'highly relevant' to the policy apex "agricultural climate change adaptation policy" (Step 6). The stakeholder list used in Nepal's MSIM pilot contained approximately 90 actor groups, organized (and randomized within) the following groupings: public sector, private sector, NGOs and civil society, bi/multilateral donors, and Community Based Organizations (CBOs) (Step 4). Respondents were encouraged to write-in any actors/actor groups they perceived to be absent from the list. Table 2 shows the actors/actor groups most frequently identified as "highly relevant" to Nepal's climate change adaptation regime (in % of respondents) by the entire sample of 14 respondents.

The respondents then visually ranked each of the actors deemed "highly relevant" one-by-one on the influence mapping board, drawing—in the form or a circle—the 'most influential' actor/actor at the top, or apex of the pyramid, and the least influential at the bottom (Step 9). Power was defined to the respondent as "the ability to influence the behavior of others, with or without resistance, utilizing any of the listed power "bases" (i.e. position, personality, persuasion, coercion, force, knowledge, resources) (Step 8).

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**Table 2** Actors/actor groups most frequently identified as 'highly relevant' to Nepal's agricultural climate change adaptation regime by percentage of respondents

| Actor/actor group | Frequency (% of respondents) |
|---|---|
| Ministry of Agriculture Development (MoAD) | 81 |
| District Development Committee (DDC) | 75 |
| International Non-Governmental Organizations (INGOs) (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid, among others) | 69 |
| National Planning Commission (NPC) | 63 |
| Farmers | 63 |
| Village Development Committee (VDC) | 63 |
| Political Parties (NC, CPN-UML, UCPN-Maoist, CPN-Maoist, Madhesi Front, and so on) | 63 |
| Ministry of Irrigation | 56 |
| Agricultural Cooperatives | 56 |
| Indian Government | 56 |
| Traders | 56 |
| Ministry of Environment | 56 |

As each actor was placed on the map, key moments and mechanisms (Step 10) that contribute to power dynamics were identified and were recorded on paper (or audio recorder). The institutions identified in this process (e.g. fertilizer subsidy, Local Self-Governance Act, and Climate Change Policy, for example) were later studied systematically, serving as the basis of comprehensive policy review of Nepal's adaptation regime (Sova and Chaudhury 2013). After the mapping was completed, responses related to the assessment of system boundaries (Step 11) (i.e. motivation, control, expertise, and legitimation) were also recorded, providing insight into the sorts of information deemed legitimate by different actor groups, perceived motivation for the behavior of certain actor groups, and the identification of various informal means of political engagement (striking, crony relations etc.). This is explored in detail in results Sect. 6.

The paper mapping boards were then digitized (without modification of the actor circle locations) (Step 12). The four distinct colors (or shades) were used to represent actor/actor group categories including state agencies (red), civil society (purple), international/foreign agency (blue), and private sector (orange). Select influence maps created by individual actors from the local to national policy-making level can be found below in Fig. 2.

## Calculating Influence

The calculation of an influence score (Step 13) marks a key divergence from the original Stakeholder Influence Mapping tool. The scoring process is necessary in MSIM, however, as it allows for the individual maps to be combined to produce a single (or multiple) composite map(s).

To create an influence score derived from multiple interviews, the frequency that actors were deemed "highly relevant" by respondents was combined with their relative ranked position compared to other actors on each map. The relative ranking score was established by counting actors/actor groups upwards from the bottom of each influence map and assigning the counted value as a ranking score. That is, the actor placed lowest on the

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**Fig. 2** Example MSIM maps produced by pilot group respondents. *Note*: In this select group of maps (6 of the 14 total maps), the names of actor groups have been removed, simply for legibility given the small size of the figure. Specific respondent and organization names have also been removed

influence map received a ranking score of 1, the second lowest a score of 2, the third lowest a score of 3, and so on (See Fig. 3). Actors/actor groups placed on the same level as one another received the same ranking score (e.g. "farmers" and "rural poor" placed side by side at the bottom of an influence pyramid would both receive a ranking score of 1).

As there was no limit applied to the number of actors that the respondent could identify as "highly relevant" in Step 6 a different number of ranking levels could feasibly be identified by each respondent. As such, the number of ranked levels was identified for the entire sample yielding an average of 14 ranked actor levels. The relative ranking ('R' above) for each stakeholder on each respondent map was then adjusted to this 14-level equivalent by applying a ratio formula and solving for 'Ra'. After applying this function, the highest possible ranking score was 14 and lowest 1 across all influence maps.

The 'relative' and 'adjusted' ranking scores are then recorded in a spread sheet as demonstrated in Fig. 4. The left column of the spreadsheet contains the entire list of actors/actor group the respondent was first asked to 'tic' as highly relevant. In this case, the first column of the table would contained approximately 90 actors. The top row of the spreadsheet, then, contains the respondent information and the cumulative statistics regarding 'frequency ranked', 'average adjusted ranking', and an 'influence score'.

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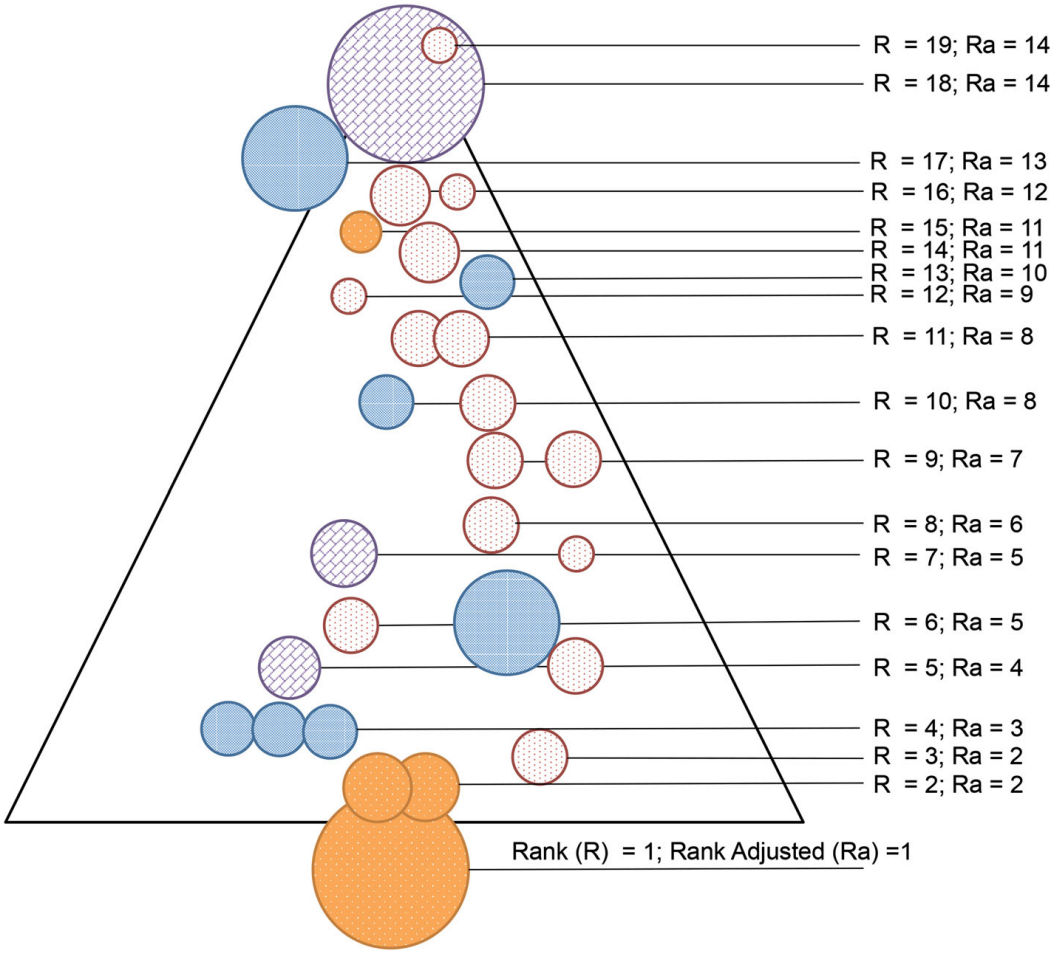



**Fig. 3** Depiction of relative and adjusted ranking scores for 'respondent A'. *Note*: Adjusting the ranking scores will be necessary in MSIM analyses given that respondents will likely place actor *group circles* on a *different number* of ranked levels. In this example, the respondent (respondent A) ranked actors groups on 19 separate levels. Another respondent (respondent B) may place actors on only 12 levels. If left unadjusted, the actor placed at the top of the mapping board by respondent A will have a score of 19, when the equivalent ranking by respondent B will score only 12. This must be adjusted so that the highest ranked actor groups on each map receive the same score. In the Nepal pilot the average number of levels ranked across all the respondents ($n = 14$) was 14. The scores for respondent A are adjusted in this figure to that 14 level equivalent

Combining the adjusted ranking score of each actor group with the frequency that the group was identified as "relevant" by the respondent (i.e. the frequency that it was ranked) is the final step in identifying a composite influence score. There are several approaches that the analyst could choose in producing this score. A weight, for example, could be applied (50 % frequency, 50 % adjusted ranking; 25 % frequency, 75 % adjusted ranking, and so on) to place equal or more/less importance a preferred variable.

The approach to producing a ranking score suggested in this example combines both ranking and frequency metrics into one composite score in such a way that reduces the impact of outliers in 'frequency' or 'average adjusted ranking' (i.e. imagine a case where a stakeholder group is identified as 'relevant' by only two of the 14 respondents in the sample. Yet when that stakeholder is placed on the mapping board, on both occasions it is ranked at the highest possible ranking level (i.e. 14). It could be argued that an equal

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| Actor/Actor Groups | Ranking Scores (Relative and Adjusted) by Respondent | | | | | | | | | a. | b. | c. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Respondent #1 | ADJUSTED (14) | Respondent #2 | ADJUSTED (14) | Respondent #3 | ADJUSTED (14) | Respondent #4 | ADJUSTED (14) | ETC... | Frequency Ranked (Sample Size 14) | Average Adjusted Ranking (Maximum 14) | Influence Score (Cumulative Adjusted Ranking / Sample Size) |
| Ministry of Agriculture Development (MoAD) | 9 | 10 | 12 | 14 | 17 | 13 | — | — | --> | **11** | **10.0** | **7.9** |
| INGOs (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid etc) | | | 8 | 10 | 7 | 5 | 4 | 6 | --> | **11** | **8.7** | **6.8** |
| Village Development Committee (VDC) | 3 | 3 | — | — | | | 9 | 13 | --> | **11** | **5.4** | **4.3** |
| District Development Committee (DDC) | 3 | 3 | — | — | | | | | --> | **10** | **5.5** | **3.9** |
| Ministry of Environment (MoE) | 7 | 8 | — | — | 16 | 12 | | | --> | **9** | **11.5** | **7.4** |
| Traders | 8 | 9 | 5 | 6 | 3 | 2 | 8 | 11 | --> | **9** | **7.0** | **4.5** |
| Agricultural Cooperatives | 6 | 7 | 4 | 5 | 8 | 6 | 1 | 1 | --> | **9** | **4.6** | **3.0** |
| National Planning Commission (NPC) | 5 | 5 | 12 | 14 | 18 | 14 | | | --> | **8** | **12.0** | **6.9** |
| Political Parties (NC, CPN-UML, UCPN-Maoist, CPN-Maoist, Madhesi Front etc) | 11 | 12 | — | — | 19 | 14 | 6 | 9 | --> | **8** | **8.0** | **4.5** |
| ETC... | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | ↓ | | | | |
| **# OF RANKING LEVELS (Average = 14)** | 13 | 14 | 12 | 14 | 19 | 14 | 10 | 14 | | | | |

**Fig. 4** Example spreadsheet segment for recording MSIM ranking scores

weighting of 'frequency' and 'adjusted ranking' in this case would produce an outcome that overestimates the relative influence of the stakeholder group in question given the low frequency at which this group is identified as 'relevant').

In the approach applied here, the adjusted rankings for each actor/actor group are summed and then divided by the maximum frequency score of 14 (i.e. supposing the actor was identified as relevant by all respondents in the sample). This, in effect, includes in the calculation the instances that an actor/actor group was not identified as relevant (i.e. has a mean adjusted ranking of zero).

$$I = \Sigma Ra\,(n1 - n14)/14,$$

where 'I' represents the composite influence score, 'Ra" the adjusted ranking, 'n' the respondent number, and 14 the maximum frequency score.

## Results

The results from the production of influence scores are presented in this section for central level respondents, the entire sample (most/least influential), local level respondents, and compared central and local level responses for the identification of 'bridging agents'.

### Central Level Respondents

To serve as a proxy for traditional Stakeholder Influence Mapping results, the individual maps from six central level respondents have been combined to produce the following list of perceived most highly influential actors (Table 3). This respondent sample contains the type of "movers and shakers" that compose typical policy focus groups in power analyses. This includes, for example, a member of the Climate Change Council, United Nations Development Programme, an International NGO, the Global Environment Facility, and two national media representatives.

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The central level mapping results suggest the Ministry of Environment to be the most influential agency with regard to agricultural climate change adaptation in Nepal. The Ministry of Environment is followed closely by the Climate Change Council and the Ministry of Agricultural Development (MoAD) in terms of influence. After these state agencies is a 'who's who' of donor and development groups, including the UK Department for International Development (DFID), the Asian Development Bank (ADB) and the World Bank, among others.

Justification for the placement of these actors as 'highly influential' commonly included "access to international climate change funds", "access to international policy expertise", and "explicit mandate relating to climate change". Specifically, perceived motivation for action in the realm of climate change for these actors was based largely on opportunity (i.e. increased funding availability). The policy and legislative mandates of the state agencies on this list constitutes the perceived form of control, while access to and control over funding channels constitute sources of control for the donor and funding agencies. Perceptions of relevant expertise are generated, according to respondents, through the closeness of these agencies to international research in best practices in the area of climate change adaptation, and monopolized access to climate data. Finally, the perceived legitimacy of these actors is achieved through institutional authority of the state agencies and 'brand-recognition' of the funding and development groups cited here. That is to say that the image of access to higher "levels" and diverse sources of funding and expertise resulted in higher "influence ranking" for these actors.

Unsurprisingly, the actors and actor-groups identified as highly influential by central level respondents reflect the agencies primarily responsible for policy *design and funding*. Structures of local governance, community-based organizations, traditional authorities—or in other words, those responsible for interpretation and implementation of, and those affected by central level policies, such as subsistence farming communities—are notably absent from this list of influential actors.

## Combined and Local Level Respondents

To emphasize the limited scope of power analyses produced by central level respondents alone, Table 4 demonstrates what happens to the power/influence outlook when additional perspectives are 'swept in' from across several levels of Nepal's adaptation regime. This respondent group includes both policy 'designers' and those affected at the district and community levels.

Immediately striking is the inclusion as 'influential actors' several group-types absent from the central-level respondent list; most notably the Indian Government, political parties, private sector actors in the form of traders (market agents), and several local-level institutions including the Village and District Development Committees, and the Ministry of Local Development. For a more detailed understanding of the drivers behind this combined, full sample list, we can extract and analyse only local level actor responses (Table 5). Local level respondents include a representative from the Village Development Committee, community members (farmers), agricultural input providers, local NGOs, and agriculture and livestock service centre representatives. As the local level list contains a more diverse set of actor 'types', CSH sources of motivation, control, expertise, and legitimacy in this section are discussed in a less holistic, and more actor-specific manner.

At the local level, traders top the list of perceived highly influential actors with regard to agricultural climate change policy. This is the case because at the community level, MSIM respondents associate policy success with market opportunity. Market opportunity, then, is controlled and invested metaphorically (and quite literally) in those agents that purchase and market the agricultural surplus provided by farmers operating at this level.

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**Table 3** Most influential actor/actor groups in Nepal's agricultural climate change adaptation regime (central level respondents, n = 6)

| Actor/actor group | Average adjusted ranking | Influence score |
|---|---|---|
| Ministry of Environment (MoE) | 11.7 | 11.7 |
| Climate Change Council (CCC) | 12.5 | 10.5 |
| Ministry of Agriculture Development (MoAD) | 9.0 | 9.0 |
| DfID | 11.4 | 7.6 |
| ADB | 12.7 | 6.3 |
| World Bank | 12.7 | 6.3 |
| USAID | 11.7 | 5.8 |
| National Planning Commission (NPC) | 11.4 | 5.7 |
| GtZ | 10.9 | 5.5 |
| Norwegian Government (NorAD) | 10.9 | 5.5 |
| INGOs (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid etc.) | 8.0 | 5.3 |
| Multi-Stakeholder climate change initial coordination committee (MCCICC) | 10.5 | 5.3 |

Traders are followed closely by International NGOs in terms of influence at this respondent level. INGOs are deemed highly influential because of their delivery of development services to rural communities in the absence of such service provision by the state. Their motivation for engaging in climate change adaptation initiatives is thought to be genuinely development-oriented (unlike central level actors who are perceived to be responding only to funding opportunities). It is also perceived that INGOs possess expertise superior to that of local state agencies.

The Indian Government's inclusion among the most influential agents at the community level is a reflection of local geopolitical factors. The local level respondents are situated in the southernmost limits of Nepal's Rupandehi district along the border of India. They cite the dumping of cheap agricultural produce from India in Nepali markets as the prime factor for the Indian Government's influential position. Indian subsidies on agricultural inputs for its producers are a central tenant of Indian agricultural policy. Perceived control over the impact of agricultural adaptation policies, then, is seen here not as derivative of decisions made in Kathmandu, but of those made in New Delhi. Consequently a system framing by central level decision makers that recognizes the environment within Nepal's international borders as the only realm of influencing factors would be insufficient arriving at solutions that suit the needs of these local level respondents; a classic case of sub-optimization.

Political parties are also present on the list of highly influential actors at this level. This reflects micro-political dimensions at work that contrast with perceptions at the central level. Nepal's Constituent Assembly (CA), a transitional Parliamentary body, was dissolved in May 2012 following a failed attempt to ratify a new constitution in Nepal. While this impacted the perceived influence of political figures (and damaged confidence in the political process) operating at the central level, local level respondents continue to cite the influence of political parties at the grass roots level. They cite, for example, political alignment as a key factor in success for securing funds for projects the Village Development Committee (VDC), the lowest unit of state administrative unit in Nepal.

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Finally, we also see on this list the inclusion of community leaders as highly influential actors with respect to agricultural climate change adaption policy. Traditional leaders make the list of highly influential actors at this level because traditional ruling structures have not been 'replaced' by modern democratic institutions to the extent that they have at the central level. Community leaders at this level derive their influence from possession of local knowledge and expertise, legitimized through ethnic tradition.

Ultimately, the actors deemed highly influential at this level are, by and large, the agencies that *implement* policy at the district and community levels in Nepal. The agencies that sources funding and develop climate change policies (mainly MoE) are not included in this local level list.

## Bridging Agents

Power is often maintained through networks of actors, reinforced through the formation of alliances between actors wielding various competing or complementary resource bases. The volatility (and strength) of these networks is dictated by several innate characteristics of complex, multi-level/scale systems. MSIM can play an important role in elucidating potential boundary or bridging agents (Guston 2001) who play intermediary roles in brokering relations in the co-production of knowledge. Consider, for example, actor/actor groups that are identified as "highly relevant" and highly influential by respondents that operate at different actor levels within Nepal's climate change adaptation regime. Table 6 shows the top twelve most influential actors as perceived by both central and local level respondents.

There are three actors that are common between both ranking levels: the Ministry of Agriculture Development (MoAD), the National Planning Commission, and INGOs. These three actor groups, because of their perceived influence, carry the potential to translate actions across actor levels. MoAD in particular has a widespread network of district agricultural development offices and agricultural service centers. INGOs, as referenced by local level actors, provide service delivery in the absence of state-led provision. INGOs in Nepal, however, operate with relative autonomy from the state, so their agendas are not always in line with that of the National Planning Commission or MoAD, for example. MSIM can assist in surfacing these key bridging actors and power-dynamics in simple, straightforward manner.

## Least Influential Actors

Finally, before discussing the implications of the above power dynamics it is worth exploring those actors/actor groups that are deemed least influential by respondents. Table 7 identifies the actors with the lowest influence scores among those actors/actor groups identified as "highly relevant" by six or more respondents.

Table 7 shows that 'farmers' are the least influential of the "highly relevant" stakeholders in the agricultural climate change adaptation policy development and implementation process. Farmers were identified by 8 of the 14 respondents as highly relevant, and received an average adjusted ranking of 1.9 (out of the maximum 14), which combined with this frequency produces an influence score of 1.1, the lowest of all highly relevant actor groups. The fact that 'farmers' were identified as 'highly relevant' to agricultural adaptation by only half of respondents is, in itself, descriptive as to where the perceived boundaries of adaptation responses lie. Nepal's Agricultural Inputs Company, responsible for subsidized fertilizer distribution in the country, received an influence score of 2.7 followed by input providers (2.7), and agricultural cooperatives (3.0).

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**Table 4** Most influential actor/actor groups in Nepal's agricultural climate change adaptation regime (entire sample, n = 14)

| Actor/actor group | Average adjusted ranking | Influence score |
|---|---|---|
| Ministry of Agriculture Development (MoAD) | 10 | 7.9 |
| Ministry of Environment (MoE) | 12 | 7.4 |
| National Planning Commission (NPC) | 12 | 6.9 |
| INGOs (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid, and so on) | 9 | 6.8 |
| Indian Government | 9 | 4.6 |
| Political parties (NC, CPN-UML, UCPN-Maoist, CPN-Maoist, Madhesi Front, and so on) | 8 | 4.5 |
| Traders | 7 | 4.5 |
| Climate Change Council (CCC) | 13 | 4.5 |
| Village Development Committee (VDC) | 5 | 4.3 |
| Nepal Agricultural Research Council (NARC) | 10 | 4.2 |
| Ministry of Local Development (MLD) | 9 | 4.0 |
| District Development Committee (DDC) | 6 | 3.9 |

**Table 5** Most influential actor/actor groups in Nepal's agricultural climate change adaptation regime (local level respondents, n = 5)

| Actor/actor group | Average adjusted ranking | Influence score |
|---|---|---|
| Traders | 8 | 6.7 |
| INGOs (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid, and so on) | 8 | 6.5 |
| Village Development Committee (VDC) | 10 | 6.1 |
| Local NGOs | 8 | 6 |
| Indian Government | 7 | 5.6 |
| Political parties (NC, CPN-UML, UCPN-Maoist, CPN-Maoist, Madhesi Front, and so on) | 6 | 5 |
| Ministry of Agriculture Development (MoAD) | 12 | 4.8 |
| Community leaders | 11 | 4.4 |
| District Agricultural Development Office (DADO) | 11 | 4.3 |
| Agricultural Service Center | 11 | 4.3 |
| Department of Livestock Services (DoLS) | 10 | 4.1 |
| National Planning Commission (NPC) | 10 | 4 |

## Discussion

The above analysis demonstrates that perceptions of power (and the resulting boundary judgments) made by central level actors alone in Nepal can miss out on the role of private sector and local actors (most notably 'traders') in converting agricultural climate change policy into market opportunities, the impact of localized geopolitics, the important role of co-governance structures vested in community leaders, and the persistence of micro-

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**Table 6** Bridging agents (in bold) between central and local/district actor levels

| Most influential actors (central level) | Most influential actors (local/district level) |
|---|---|
| Ministry of Environment (MoE) | Traders |
| Climate Change Council (CCC) | **INGOs (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid etc.)** |
| Ministry of Agriculture Development (MoAD) | Village Development Committee (VDC) |
| DfID | Local NGOs |
| ADB | Indian Government |
| World Bank | Political parties (NC, CPN-UML, UCPN-Maoist, CPN-Maoist, Madhesi Front, and so on) |
| USAID | **Ministry of Agriculture Development (MoAD)** |
| National Planning Commission (NPC) | Community leaders |
| GtZ | District Agricultural Development Office (DADO) |
| Norwegian Government (NorAD) | Agricultural Service Center |
| INGOs (World Vision, IDE, CARE, WWF, Practical Action, Oxfam, Action Aid etc.) | Department of Livestock Services (DoLS) |
| Multi-Stakeholder climate change initial coordination committee (MCCICC) | **National Planning Commission (NPC)** |

**Table 7** Least influential actor/actor groups in Nepal's agricultural climate change adaptation regime (entire sample, n = 14)

| Actor group | Frequency | Average adjusted ranking | Influence score |
|---|---|---|---|
| Farmers | 8 | 1.9 | 1.1 |
| Agricultural Inputs Company Ltd (AICL) | 7 | 5.4 | 2.7 |
| Input Providers | 6 | 6.3 | 2.7 |
| Agricultural cooperatives | 9 | 4.6 | 3 |
| Community leaders | 6 | 7.7 | 3.3 |
| Local NGOs | 8 | 6 | 3.4 |
| Ministry of Irrigation (MoIR) | 6 | 8 | 3.4 |
| District Development Committee (DDC) | 10 | 5.5 | 3.9 |
| Ministry of Local Development (MLD) | 6 | 9.4 | 4 |
| Nepal Agricultural Research Council (NARC) | 6 | 9.7 | 4.2 |
| Village Development Committee (VDC) | 11 | 5.4 | 4.3 |

politics that occur at the local level. As a consequence, policy interventions identified by central level actors alone are highly susceptible to the risks of sub-optimization when translated into on-ground actions at the local level. Similarly, decision makers at this level risk advocacy analysis stemming from the teleological dilemma as a result of the strong influence of international organizations that can circumvent state-led process to impose their own mandate and framing of adaptation policy. If power mapping users were to base their lobbying and resource allocation efforts on results from central level focus groups alone, there would be a marked tendency to frame adaptation policy challenges in terms of planning and funding, neglecting framings around policy implementation and impact.

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Conversely, boundary judgments and perceptions of power made by local level actors can fail to recognize critical funding and central-level planning agents. When local level priorities do not align with the macro conditions set by these agents there is a risk of sub-optimization, particularly if site and context specific actions are arbitrarily 'scaled-up' and applied in different places with different influencing factors. Advocacy analysis and the teleological dilemma also plague local level agents and the resulting adaptive responses. This is due principally to the pervasiveness of local micro-politics and the localized geopolitics from India that drive local level agendas.

MSIM provides the analyst with both central and local level power perspectives—a unique vantage point for the identification of critical disconnects between system actors. Extending the analysis across actor levels allows the analyst to identify bridging actors between institutional levels, and by interrogating sources of control, motivation, expertise and legitimacy explore how power 'moves' through different actor levels. Additionally, the analysis of least influential yet highly relevant actors directs the analyst towards actors/actor groups that are potentially marginalized in the policy development and implementation process. That is, those actors that are directly impacted or serve critical roles in adaptation or policy processes, but do not leverage influence in any meaningful way. Respondents could also be grouped by their 'actor-type' (e.g. state agencies, INGOs, private sector) to produce composite influence maps from the perspective of those like-minded groups.

## Limitations

There are several key methodological limitations worth discussing. First, MSIM provides the analyst with perceptions-based data regarding the relative power and influence of actors in the study regime. Perceptions are inherently normative and subject to bias. As such, they do not necessarily speak to actual influence or capability of actor groups to influence the policy process. As such, MSIM maps rely on triangulation between actor and actor groups operating at different user levels as a means of validation or results verification. It is also recommended that MSIM be used in concert with other complementary methods. Empirical evidence like budget allocations, results of decision-making processes (e.g., resulting policy objectives or priorities), participation in decision-making forums and so on can be used alongside MSIM maps to confirm or further clarify the sources or manifestations of power/influence.

Second, MSIM respondents are likely to be biased towards the identification of highly visible power bases (e.g., a Minister determined to be highly influential due to his or her position in government). Less-visible exercises of power including 'expertise' or 'coercion'—which can be most effective—may not be recognized (or hidden) by (to) the respondent. This can be remedied to a certain extent through a clear discussion and shared understanding of what is meant by 'power' and 'influence' before mapping begins.

Finally, as discussed in Sect. 2 above, MSIM does not directly address the strength or type of connection between the actors ranked or the structure of the network under study. MSIM focuses primarily on the individual significance or influence of a group, rather than the relationships between groups. Relational information is captured to a certain extent in Step 10 "Identify key moments and mechanisms" and Step 11 "Assessing system boundaries", but could benefit from integration with SNA and IOR network analysis tools, an area for potential future research.

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## Conclusion

There are relatively few tools or methodologies allow analysts and decision makers to render explicit the power and relational dynamics present within a multi-scale, multi-level system of interest. Those that do exist collect perspectives regarding power dynamics in a focus group or decision group setting, making them susceptible to distortion due to obedience and intimidation from status-quo defenders and group composition biased towards central level actors. These characteristics of influence mapping techniques exacerbate two central dilemmas in decision-making; the ontological dilemma and the teleological dilemma. The ontological dilemma suggests that distortive boundary judgments in the problem formation stages of decision making can lead to the neglect of key factors influencing the system and ultimately lead to sub-optimization. The teleological dilemma refers to the normative bases of decision-making and recognizes that the different needs, interests and values of groups shape courses of action and definitions of system improvement, risking advocacy analysis. Both dilemmas center on the concept of boundary critique. The decision making dilemmas can be assuaged to a certain extent by 'sweeping in' as many perspectives as possible regarding the broader system and by engaging both system designers and those impacted regarding their perceptions of sources of motivation, control, expertise and legitimacy by actors within the system. The Stakeholder Influence Mapping methodology can be adapted to incorporate these principles.

The application of Multi-level Stakeholder Influence Mapping (MSIM) in Nepal's agricultural climate change adaptation regime demonstrates that analysis with central level respondents alone risks both sub-optimization and advocacy analysis, and tends to focus discourse towards adaptation planning and financing and away from implementation. Using 'traditional' power mapping strategies, then, to identify key entry points or agents to lobby could risk adoption of sub-optimal on-ground adaptation responses, and be biased toward the interests of status-quo, central level interests. Yet local level power analyses alone do not offer a solution to the ontological and teleological dilemmas. Local level analyses can ignore important macro-structures that ensure access to central level funding, and that allow for the organized scaling-up of appropriate adaptation options. Advocacy analysis also emerges at local actor levels, with micro-political and geopolitical considerations emerging in this case study.

MSIM advances on existing power-elucidating techniques in that its individual interview style mitigates against group normalization and status-quo bias, its use of an elicitation object facilitates the sharing of sensitive information, and it serves as a useful technique in delineating system boundaries as perceived by different actor groups. MSIM offers a variety of 'lenses' through which to analyze power mapping data. It holds the potential to identify powerful but 'marginalized' actors and bridging agents, such as local traders or officials, who may be facilitating key adaptation processes, but who are not recognized by central level actors and institutions. Ultimately, it is argued here, without proper consideration of the role of power in agricultural climate change adaptation regimes, that the resulting interventions will be insufficient and potentially contradictory in moderating the negative impacts of climate change, as well as highly contested, less equitable, and ultimately less sustainable and effective. It is likely that the insights emerging from MSIM analyses can improve adaptive capacity of agricultural and other systems by highlighting the "disconnect" between levels of actors in carrying out adaptation and thereby facilitating the selection of more appropriate, resilient, and sustainable adaptation interventions according to genuine local needs and adaptation processes.

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## References

Adger WN (2001) Scales of governance and environmental justice for adaptation and mitigation of climate change. Int Dev 13(7):921

Adger WN (2003) Social capital, collective action, and adaptation to climate change. Econ Geogr 79(4):387–404

Adger WN, Vincent K (2005) Uncertainty in adaptive capacity. Comptes Rendus Geosci 337(4):399–410. doi:10.1016/j.crte.2004.11.004

Adger WN, Arnell NW, Tompkins EL, Dessai S, Lu X, Risbey JS, Conway D, Thomas DSG, Twyman C, Noess LO, Bang G, Eriksen S, Vevatne J, Brooks N, Kelly PM, Haddad BM (2005) Adaptation to climate change: perspectives across scales. Glob Environ Change 15(2):77–176

Barnett MN, Duvall R (2005) Power in international politics. Int Org 59:39–75

Biermann F, Betsill MM, Gupta J, Kanie N, Lebel L, Liverman D, Schroeder H, Siebenhüner B, Zondervan R (2010) Earth system governance: a research framework. Int Environ Agreem 10(4):277–298

Bourne L, Walker DHT (2005) Visualising and mapping stakeholder influence. Manag Decis 43(5/6):649–660

Bryson JM (2004) What to do when stakeholders matter: a guide to stakeholder identification and analysis techniques. Public Manag Rev 6(1):21–53

Cash D, Adger WN, Berkes F, Garden P, Lebel L, Olsson P, Pritchard L, Young OR (2006) Scale and cross-scale dynamics: governance and information in a multilevel world. Ecol Soc 11(2):8

Churchman CW (1968) The systems approach. Dell, New York

Churchman CW (1971) The design of inquiring systems: basic concepts of systems and organisation. Basic Books, New York

Churchman CW (1974) Philosophical speculations on systems design. Int J Manag Sci 2:451–465

Churchman CW (1979) The systems approach and its enemies. Basic Books, New York

Clegg SR (1989) Frameworks of power. Sage, London

Coleman JS (1986) Social theory, social research, and a theory of action. Am J Sociol 91(6):1309–1335. doi:10.2307/2779798

Dulal HB, Brodnig G, Thakur HK, Green-Onoriose C (2010) Do the poor have what they need to adapt to climate change? A case study of Nepal. Local Environ 15(7):621–635

Eden C, Ackermann F (1998) Making strategy: the journey of strategic management. Sage Publications, London

Emirbayer M (1997) Manifesto for a relational sociology. Am J Sociol 103(2):281–317. doi:10.1086/231209

Ferguson J (1990) The anti-politics machine: development, depoliticization, and bureaucratic power in Lesotho. Cambridge University Press, Cambridge, New York

Flood RL, Romm NRA (1996) A typology of power supporting intervention. Systems Practice 9(4):339–355

Gibson C, Ostrom E, Ahn TK (2000) The concept of scale and the human dimensions of global change: a survey. Ecol Econ 32(2):217–239

Government of Nepal (2010) National adaptation programme of action (NAPA). Kathmandu, Nepal

Guston DH (2001) Boundary organizations in environmental policy and science: an introduction. Sci Technol Human Values 26:399–408

Håkansson H (ed) (1982) International marketing and purchasing of industrial goods: an interaction approach. Wiley, Chichester

Helfgott A (2011) Resilience, adaptation and development. University of Oxford, Oxford

Hitch C (1953) Suboptimisation in operations problems. Oper Res 1:87–99

Kant I (1781) Critique of pure reason (trans: Kemp SN). Macmillan, London

Knoke D, Yang S (2008) Social network analysis, quantitative applications in the social sciences, 2nd edn. Sage Publications, Thousand Oaks, CA

Lebel L (2006) Reflections on power. USER breifing BN-2006-10. Unit for Social and Environmental Research, Chiang Mai

MacKinnon D (2011) Reconstructing scale: towards a new scalar politics. Prog Hum Geogr 35(1):21–36

Matthews D (2008) Metadecision making: rehabilitating interdisciplinarity in the decision sciences. Syst Res Behav Sci 25:157–179

Author's personal copy



Mattsson L-G (1984) An application of a network approach to marketing: defending and changing market positions. In: Dholakia N, Arndt J (eds) Changing the course of marketing: alternative paradigms for widening marketing theory. JAI Press, Greenwich, CT, pp 263–288
Mayers J, Vermeulen S (2005) Stakeholder influence mapping. Power tools. International Institute for Environment and Development (IIED), London
Mendelow A (1991) Stakeholder mapping. In: Proceedings of the 2nd international conference on information systems, Cambridge, MA
Midgley G (1992) The sacred and profane in critical systems thinking. Systems Practice 5:5–16
Midgley G (2000) Systemic intervention: philosophy, methodology. Practice Kluwer Academic, New York
Midgley G, Munlo I, Brown M (1998) The theory and practice of boundary critique: developing housing services for older people. J Oper Res Soc 49(5):467–478. doi:10.2307/3009885
Oliga J (1996) Power, ideology, and control. Plenum, New York
Oliver C (1990) Determinants of interorganizational relationships: integration and future directions. Acad Manag Rev 15(2):241–265. doi:10.2307/258156
Paliwoda SJ, Thomson P (1986) Industrial product class and market behavior: a study in the French packaging market. In: Turnbull PW, Paliwoda SJ (eds) Research in international marketing. Croom Helm, London, pp 326–354
Prosser J (2011) Visual methodology: toward more seeing in research. In: Denzin NK, Lincoln YS (eds) Handbook of qualitative research, 4th edn. Sage, Thousand Oaks, CA, pp 479–495
Rittel HWJ, Webber MM (1973) Dilemmas in a general theory of planning. Policy Sci 4:155–169
Ritter T, Gemünden HG (2003) Interorganizational relationships and networks: an overview. J Bus Res 56(9):691–697. doi:10.1016/S0148-2963(01)00254-5
Sabatier PA, Jenkins-Smit H (1993) Policy change and learning: an advocacy coalition approach. Westview, Boulder, CO
Sova CA, Chaudhury AS (2013) State of agricultural climate change adaptation policy in Nepal. CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS), Working Paper No. 44. Copenhagen, Denmark
Thornton TF, Comberti C (2013) Synergies and trade-offs between adaptation, mitigation and development. Clim Change 2013:1–14
Thornton TF, Manasfi N (2010) Adaptation—genuine and spurious: demystifying adaptation processes in relation to climate change. Environ Soc 1(1):132–155. doi:10.3167/ares.2010.010107
Tracy SJ (2013) Qualitative research methods: collecting evidence, crafting analysis, communicating impact. Wiley-Blackwell, Hoboken
Ulrich W (1983) Critical heuristics of social planning: a new approach to practical philosophy. Paul Haupt, Bern, Switzerland
Ulrich W (1987) Critical heuristics of social systems design. Eur J Oper Res 31:276–283
van Gigch JP (2003) Metadecisions: rehabilitating epistemology. Kluwer, New York

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# Paper 2. Power and influence mapping in Ghana's agricultural adaptation policy regime

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**Abstract:** Debates around the design and content of climate change adaptation policies are shaped, in part, by the power and influence of actors within an adaptation regime. This paper applies a power-mapping technique, Multilevel Stakeholder Influence Mapping (MSIM), to stakeholders in Ghana's agricultural adaptation policy regime. The method provides a quantitative influence score and visual map for actor groups active-in or affected-by the policy process, from the differentiated perspectives of national, regional and local level respondents. MSIM, as applied here, seeks to determine the underlying power structure of the adaptation regime and provides insight in to two key power-laden themes: stakeholder participation and multi-level institutional design. Results indicate that when taken collectively (the views of national, regional and local respondents *combined*) Ghana's adaptation regime is considered bi-polar and elite-centred in its power distribution. A distinguishable 'adaptation establishment' or dominant group of power holders made up of technical government and international agencies can be identified. Meanwhile, political groups, the private sector, civil society, and universities are considered to wield substantially less power in the regime. Differentiated perspectives (i.e. national, regional or local respondents *alone*) reveal that several potential cross-level bridging institutions are not considered influential at all operational levels. Farmers, traditional authorities, and the District Assembly, for example, are all considered highly influential from the perspective of local level respondents, but their counterpart agencies at the national level are not considered influential by policymakers there. Contrary to the hyper-politicized nature of climate change adaptation at international levels, Ghana's policy regime would benefit from increased participation from political agents, as well as from traditional authorities and farmers. These actor groups can help reverse the a-political nature of the adaptation regime, improve power pluralism across actor groups and levels, and facilitate cross level cooperation between formal and informal institutions crucial to adaptation success.

**Keywords:** Power, influence, climate change, agriculture, adaptation, policy, Ghana

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# Power and influence mapping in Ghana's agricultural adaptation policy regime

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AQ2 Debates around the design and content of climate change adaptation policies are shaped, in part, by the power and influence of actors within an adaptation regime. This paper applies a power-mapping technique, Multilevel Stakeholder Influence Mapping (MSIM), to stakeholders in Ghana's agricultural adaptation policy regime. The method provides a quantitative influence score and visual map for actor groups active-in or affected-by the policy process, from the differentiated perspectives of national, regional, and local-level respondents. MSIM, as applied here, seeks to determine the underlying power structure of the adaptation regime and provides insight in to two key power-laden themes: stakeholder participation and multilevel institutional design. Results indicate that when taken collectively (the views of national, regional and local respondents *combined*) Ghana's adaptation regime is considered bipolar and elite-centred in its power distribution. A distinguishable 'adaptation establishment' or dominant group of power holders made up of technical government and international agencies can be identified. Meanwhile, political groups, the private sector, civil society, and universities are considered to wield substantially less power in the regime. Differentiated perspectives (i.e. national, regional or local respondents *alone*) reveal that several potential cross-level bridging institutions are not considered influential at all operational levels. Farmers, traditional authorities, and the District Assembly, for example, are all considered highly influential from the perspective of local-level respondents, but their counterpart agencies at the national level are not considered influential by policymakers there. Contrary to the hyper-politicized nature of climate change adaptation at international levels, Ghana's policy regime would benefit from increased participation from political agents, as well as from traditional authorities and farmers. These actor groups can help reverse the a-political nature of the adaptation regime, improve power pluralism across actor groups and levels, and facilitate cross-level cooperation between formal and informal institutions crucial to adaptation success. AQ3

**Keywords:** power; influence; climate change; agriculture; adaptation; policy; Ghana

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## AQ4 1. Introduction

Agriculture is a mainstay of the Ghanaian economy contributing to nearly 25% of the country's gross domestic product (Government of Ghana, 2014b). Relying heavily on rain-fed systems with limited irrigation infrastructure, the sector is particularly vulnerable to the impacts of climate change. In the northern regions, where the bulk of Ghana's cereal crops are produced, already harsh median temperatures are expected to further increase by the year 2030 (Jalloh, Nelson, Thomas, Zougmore, & Roy-Macauley, 2013). The Government of Ghana has taken policy steps to mitigate the negative effects of climate change across a variety of sectors, including agriculture. This includes the development of a National Climate Change Adaptation Strategy (NCCAS) in 2012, and a National Climate Change Policy (NCCP) in 2014. Climate change has also been addressed in the country's Medium-term National Development Policy Framework ~~(2010, 2014),~~ and the Food and Agriculture Sector Development Policy II ~~(2007)~~. Despite such progress, Ghana remains in the early stages of adaptation regime formation. AQ5 AQ6

The development of the above-mentioned policies necessarily involves participation from diverse stakeholder groups, each with their own interests and objectives. What is included or excluded from adaptation policy is widely discussed and very often contested. Agricultural adaptation in Ghana draws on an especially wide network of stakeholders (and interests) given the diverse agro-ecological zones and the correspondingly context-specific adaptation requirements across the country. Power relations between actors determine how adaptation is defined, who or what is considered 'vulnerable', and what adaptive measures are ultimately prioritized. Indeed, how the debates around policy design and content are resolved is dependent upon

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a variety of factors including stakeholders' access to (and quality of) decision-making forums (Few, Brown, & Tompkins, 2007; Sherman & Ford, 2014), legitimation of certain forms of knowledge over others (Adler & Bernstein, 2005; Jennings, 2009; Nyong, Adesina, & Elasha, 2007), prevailing norms and values (Adger et al., 2009), institutional design (Agrawal, 2008; Dovers & Hezri, 2010), and perceptions of climate impacts and vulnerability, among other considerations. These factors, in turn, are shaped by the interests and power of actor groups within the adaptation regime (Adger, Arnell, & Tompkins, 2005a; Sova et al., 2015).

The Earth Systems Governance (ESG) project research framework promotes the debate around power in socio-ecological systems research. ESG recognizes power as a key cross-cutting theme that affects five central analytical problems (architecture, agency, adaptiveness, accountability and legitimacy, and allocation and access) facing the governance of socio-ecological systems (Biermann et al., 2010). The authors note the ubiquitous nature of power and the challenges in its conceptualization. They suggest that despite its centrality, 'how power is conceived in studies of governance and institutions is not often discussed' (Biermann et al., 2010, p. 289). Adaptation governance offers no exception.

Yet addressing power in any complex system is important for practical reasoning (i.e. navigating a world of agents and their powers), for the moral allocation of responsibility, and for the evaluation of social systems (Morriss, 2002). This is especially important in early regime formation – as is the case with climate change adaptation in Ghana – in that a clear baseline analysis of power can assist in developing appropriate success measures for procedural and/or distributional justice that contribute to the improved adaptive capacity of vulnerable populations. Understanding which actor groups are influential or powerful within a given adaptation regime is thus of considerable consequence, and can lead to improved policy and institutional design (Sherman & Ford, 2014).

This study applies a recently developed methodology, Multilevel Stakeholder Influence Mapping (MSIM) (Sova et al., 2014), to visually map the level of influence of actors within Ghana's agricultural climate change adaptation policy regime, using a district in the Upper West Region as a case study. The study constitutes among the first efforts to empirically map power and influence in adaptation regimes. It asks the questions 'which actor groups currently possess the greatest influence across various "operational" levels (i.e. national, regional, and local) with respect to the design and implementation of agricultural climate change policy?', and 'what can be said about the resulting power structure (i.e. is the resulting regime elite-centred or pluralistic in nature)?' This paper does *not* seek to provide a comprehensive review of the treatment of power within the social sciences (for such analyses, see Lukes, 1974, 2005; Morriss, 2002, among others). Nor does it seek to identify and typify common sources or 'bases' of power (see French & Raven, 1959; Greene & Elfrers 1999, among others). Rather, the main purpose of the study is to map the power and influence of actor groups in relation to adaptation policy formation and implementation. As such, the results of this analysis are likely to be of immediate interest to academics and practitioners working in the area of stakeholder participation and multilevel system design around climate adaptation.

What follows in Section 2 is a review of common power orientations in governance literature and an assessment of the current treatment of power within two key climate change adaptation themes: stakeholder engagement and multilevel institutional design. The MSIM methodology is then introduced in Section 3, followed by an introduction of the Ghana case study context in Section 4. Section 5 provides objective MSIM results, while Section 6 discusses the implications of MSIM results as they relate to existing governance and adaptation literature in West Africa. The limitations of the study are outlined in Section 7, and concluding remarks are given in Section 8.

## 2. Power in adaptation literature

Power dynamics between actors influences regime formation. Power is defined here in the Weberian sense as the ability to influence the behaviour of others, with or without resistance (Weber, 1978). 'Power' and 'influence' are used interchangeably in this study. Regime formation implicitly assigns roles to participants, determining who decides what is considered 'desirable' and 'undesirable', and dictating the legitimacy of the resulting structure (i.e. the classic question 'who governs?'). 'At the most general level governance is a social function centred on efforts to steer or guide the actions of human groups … towards the achievement of desired ends and away from outcomes regarded as undesirable' (Young, ~~2012~~, p. 3). Who governs matters in adaptation planning because how we choose to draw the boundaries around scope, scale, and time frame of adaptation, which disturbances elicit the need to adapt, and what are the notions of desirability or improvement of the governance system often completely determines the conclusions and recommendations for action (Helfgott, 2011).

Regime power structures often fall on a spectrum between 'elite-centred' and 'pluralistic' orientations (Dahl, 1958; Liu, Lindquist, Vedlitz, & Vincent, 2010; Merelman, 1968; Mills, 1956; Vergara, 2013; Wong, 2010). Pluralist theory presumes that power is dispersed among several groups that compete equally for resources. Meanwhile, elite theory posits that power is concentrated in the hands of a few individuals or organizations that exert disproportionate influence over decision-making.

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'Elites may be defined as persons who, by virtue of their strategic locations in large or otherwise pivotal organizations and movements, are able to affect political outcomes regularly and substantially' (Higley, 2008, p. 3). Elite-centred regimes often lack transparency, devalue representation of non-elites (or 'non-experts'), and – particularly important for multilevel systems – undermine the principle of subsidiarity (i.e. that affairs should be handled by the lowest, least centralized competent administrative or political unit). Meanwhile, regimes that are truly pluralistic are driven by public opinion, and tend to be more egalitarian and participatory in nature, and thus exhibit greater transparency, responsiveness, and legitimacy in the eyes of 'constituents'.

Whether an adaptation regime is elite-centred or pluralistic (or somewhere in between) is determined in part by two central power-laden factors commonly discussed by adaptation theorists: institutional design (especially the multilevel nature of adaptation governance structures), and participation in adaptation decision-making.

### 2.1. *Institutional design*

Institution-focused studies of adaptation aim to discover appropriate institutional designs, rules, and decision-making procedures to improve the efficiency and equitability in the delivery of adaptation resources to vulnerable communities (Agrawal, 2010; Berman, Quinn, & Paavola, 2012; Christoplos et al., 2009; Eakin & Lemos, 2010; Gupta et al., 2010; Næss, Bang, Eriksen, & Vevatne, 2005; Schipper, Fencl, Hoffmaister, & Osbeck, 2012). Studies of this sort draw attention to key power-laden concepts like decentralization and devolution of authority in adaptation regimes, and adaptive/collaborative management arrangements (Berkes, 2010; Brockhaus & Kambire, 2009; Tompkins & Adger, 2004). Institutional scholars emphasize the importance of multilevel, multi-scale characteristics of climate change adaptation (Adger, 2001; Adger et al., 2005a, 2005b; MacKinnon, 2011; Ostrom, 2010a; Ribot, 2010; Urwin & Jordan, 2008; Vincent, 2007). Vertical interplay in particular between multilevel, 'polycentric' (Ostrom, 2010b) institutions in adaptation regimes are constrained by relationships of power (Tompkins & Adger, 2004; Young, 2012, 2002). AQ7 Yates ~~(2011)~~ for example, adopts MacKinnon's (2011) 'scalar politics' construct to analyse cross-level power dynamics in Nepal's adaptation regime. MacKinnon suggests that there is an important distinction to be made between 'politics of scale', or the idea that politics occur on a given, fixed level with defined boundaries and 'scalar politics'. Scalar politics refers to the 'strategic deployment of scale' or the purposeful utilization of multilevel structures to promote one's interests. Viewed in this way, power is seen not as a product of multilevel structures and their hierarchies, but that those structures serve as an instrumental medium through which to channel power.

### 2.2. *Participation*

Another prevalent theme for the study of power in adaptation regimes is stakeholder participation. Few et al. (2007) discuss the micro-politics of stakeholder consultation and participation in adaptation regimes and the use of 'managerial containment' by powerful actors to guide participatory engagements towards predetermined goals. This work is reflective of a wider trend in critical stakeholder engagement literature that seeks to demonstrate how participatory processes can serve as in instrument of power and domination (Cooke & Kothari, 2001; Rydin & Pennington, 2000; Sherman & Ford, 2014; Treby & Clark, 2004). These authors argue that 'empowerment' – the common usage of power in this domain – through improved participation in decision-making can improve equitability and can reduce stakeholder vulnerability, but the creation of a space of engagement alone does not equal success in this regard (Skoufias, 2003; Thomas & Twyman, 2005; Tompkins & Adger, 2004). Improved adaptive capacity, rather, relies on *active participation* by concerned parties (Smit & Pilifosova, 2001).

Ultimately, understanding who is perceived to be powerful or influential in adaptation regimes is an important first step in paving the way for more robust analyses of the sources of power addressed above. As suggested by Few et al, 'any participatory process will only gain legitimacy if the relevant stakeholders are included and if effort is invested in finding out who is "important" in policy, meaning both who is most influential and also who is most likely to be affected by decisions and actions' (Few et al., 2007, p. 56). Achieving this through MSIM analysis, as we will see, can provide important insight in to participatory arrangements and multilevel institutional design.

## 3. MSIM in Ghana

MSIM is a simple visual tool to examine and display the relative influence that different individuals and groups have over decision-making (Mayers & Vermeulen, 2005). The original methodology, Stakeholder Influence Mapping, was developed by James Mayers and Sonja Vermeulen (2005) at the International Institute for Environment and Development and was adapted by Sova et al. (2014) to serve in multilevel analyses.

MSIM uses circles to represent different stakeholder groups, placed by an individual respondent within a pyramid where the policy/legislation (or broad scenario) in question serves as the pyramid cap or 'apex'. The perceived influence of each actor group is shown in the relative closeness of the circles to the policy apex. Different colour

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and size circles can be used to represent stakeholder groups during the mapping activity (e.g. government, non-governmental organization (NGOs), civil society, etc.). The average location of a group relative to other stakeholders on each individual MSIM map is used to produce a composite influence score for each stakeholder group. A composite map that visualizes power from the combined perspective of the entire sample – or from other meaningful subsets of respondents – can also be produced. As suggested by Sova et al. (2014),

> MSIM builds on existing power-elucidating techniques in that its individual interview style mitigates against group polarization (and group think), its use of an elicitation object more easily facilitates the sharing of sensitive information, it allows power perspectives across multiple actor levels, and it serves as a useful technique in delineating system[redacted]daries as perceived by different actor groups. (p. 2)

MSIM utilizes perception-based data and relies on triangulation between actor groups to determine an influence score. Perceptions, while imperfect, are particularly important in early regime formation where power structures have yet to be full institutionalized. It is, after all, 'the world as it is perceived is the world that is behaviourally important' (Jain, 2005, p. 47). Perception is at the heart of bias formation. Bias formation in adaptation regimes, in turn, determines which adaption pathways are considered more or less viable ~~within an adaptation regime~~.

MSIM differs from Social Network Analysis and inter-organizational network analysis in that 'MSIM does not speak to the strength or type of connection between the actors discussed … it seeks only to elucidate an actor group's relationship towards a policy process or decision-making scenario, and only by extension, its relationship to other actors' (Sova et al., 2014, p. ~~3~~). A generic example map is found in Figure 1 below.

The MSIM methodology contains 13 steps, outlined in detail in Sova et al. (2014), and summarized in Table 1 below. Here the MSIM steps have been grouped according to three stages of implementation: preparation, mapping, and analysis. The 'mapping' stage is conducted with the respondents, while 'preparation' and 'analysis' are conducted separately by the analyst.

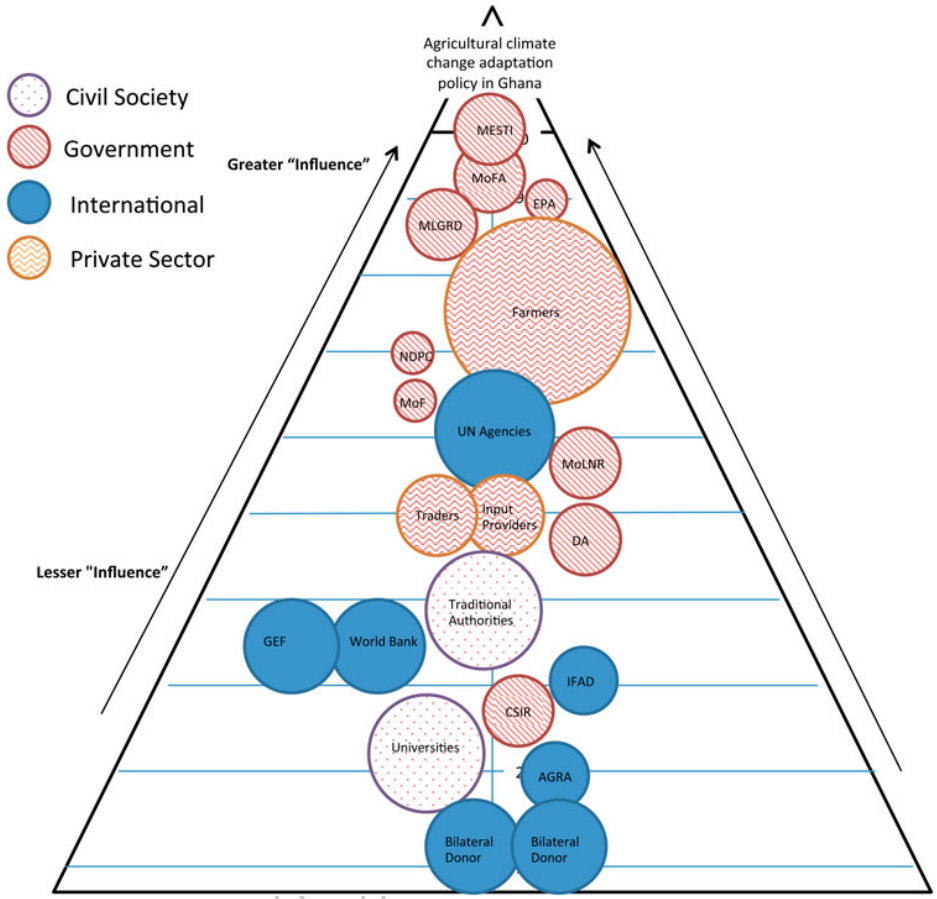
### 3.1. *Preparation*

The MSIM exercise in Ghana focused on the policy apex 'the design and implementation of agricultural climate change adaptation policy' (step 1), and focused on the current state of power dynamics as of 2013 (step 2). MSIM mapping was conducted with 30 separate respondents using rational subgrouping sampling and representing a cross-section of actors within Ghana's agricultural adaptation regime including government actors, civil society, donors, and farmers. These actors were chosen from a larger sample of 100 respondents participating in semi-structured interviews for a broader PhD study. Comprising principally of senior professionals within their organization, this subset was chosen for the respondents' intimate knowledge of climate change and agricultural policy at their particular operational level, and to ensure appropriate representation from diverse actor group types. Given the slow progress in decentralizing adaptation planning in Ghana, a limited number of knowledgeable individuals were identified at regional and local operational levels. As outlined in Table 2 below, a total of 15 respondents were chosen from the national level, 7 from the regional level, and 8 from the local level (step 3). Regional and district locations were selected on the basis of agricultural climate change vulnerability (temperature, rainfall, and pest and disease risk) as identified through Ghana's UNFCCC 2nd communication (see Section '4' below). Before MSIM mapping was conducted, the authors assembled a comprehensive list of 73 policy stakeholders with support from a key informant from the University of Ghana, Legon (step 4). This list included actor groups related to agriculture and climate change in any capacity in Ghana. The stakeholders on the comprehensive list were grouped in to the following categories: 'national government', 'regional/local government', 'civil society', 'NGOs/INGOs', 'bilateral and multilateral donors', and 'private sector'. The list included specific organizations and agencies where possible (e.g. Ministry of Food and Agriculture (MoFA), the World Bank, and University of Ghana), and generic stakeholder groups when necessary (e.g. traditional authorities, women's groups, and input providers). The order of the stakeholders under each category was randomized so as to reduce the potential bias of the analysts in ordering the actor groups. The final comprehensive stakeholder list and a blank MSIM mapping board (A4 size) were printed and brought to each interview (step 5).

### 3.2. *Mapping*

MSIM mapping interviews were conducted with respondents in May of 2013. At each interview, the respondent was first presented with the comprehensive stakeholder list. They were asked to place a checkmark ('tic') next to the 20 actor groups that they felt to be most 'highly relevant' to the policy focus in question (i.e. those actor groups active-in or affected-by agricultural adaptation policy). The respondent was free to add new relevant actors to the list (step 6). The rationale for an initial prioritization of actors/actor groups was to bring the stakeholder list down to a more manageable size for mapping. Note was taken of the relative size of each stakeholder group identified in this step to be used later in the digitization of the maps (step 7).

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Colour online, B/W in print

Figure 1. Example MSIM map.
Note: This is a generic stakeholder influence mapping/MSIM mapping board intended as an example, not as a paper result. The policy object, or apex, is located at the top of the mapping pyramid. Actor groups in the form of circles placed closest to this 'apex' are deemed most influential from the perspective of the respondent. Actors near the bottom of the pyramid are deemed less influential, but not without influence entirely. Different actor types are indicated by colour (or shade), including civil society, government, international, and private sector. The size of the circle approximates the relative population of that actor group, though this has no bearing on the final influence score.

PROOF

The respondent then placed each of the actors groups deemed 'highly relevant' one-by-one on the influence mapping board, drawing, in the form of a circle, the most powerful/influential actor group at the top, or apex of the pyramid, and the least (less) influential at the bottom (step 9). Power was defined to the respondent as 'the ability to influence the behaviour of others, with or without resistance' (step 8).

As each actor was placed on the map, the respondent was asked what type of power/influence the actor/actor group was exercising (i.e. position, personality, persuasion, coercion, force, knowledge, and resource), and was prompted to indicate whether that influence resulted from any policy or legal framework (step 10). As this study focused on current state of power dynamics, questions as proposed in step 11 of Sova et al. (2014), 'assessing system boundaries', were not asked to respondents. Assessing system boundaries is intended to reveal the way the system 'ought to be' by focusing on sources of control, motivation, knowledge, and legitimacy. It is a normative form of assessment not applicable here given that this study limited its scope to how the system 'is' at present.

### 3.3. *Analysis*

Following the interviews, each of the 30 MSIM maps was digitized to facilitate the production of an influence score for the 73 stakeholder groups on the comprehensive list. Determining an influence score from multiple, individual maps involved two principle variables: (1) the frequency, or the number of respondents that found the stakeholder group 'highly relevant' to the policy focus in question (step 6); and (2) the adjusted ranking, or the average ranking level at which the stakeholder was placed on the map by respondents (the higher the ranking level, the higher the perceived influence) (step 9).

Table 1. MSIM 13-step methodology.

| Stage | MSIM step |
|---|---|
| Preparation | 1. Define policy focus |
| | 2. Define one or more key time periods |
| | 3. Identify influence-mapping respondents |
| | 4. Identify policy stakeholders |
| | 5. Prepare materials |
| Mapping (with respondents) | 6. Fine-tune the stakeholder list |
| | 7. Estimate stakeholder group sizes |
| | 8. Define 'influence' and its relation to 'power' as it is understood within your conceptual framework |
| | 9. Map stakeholder influence and relationships |
| | 10. Identify key moments and mechanisms |
| | 11. Assess system boundaries |
| Analysis | 12. Keep record of map for future reference |
| | 13. Calculate influence score |

Source: Adapted from Sova et al. (2014).

As suggested by Sova et al. (2014), a relative ranking score (*R*) was first established by the analyst by counting each actor groups upwards from the bottom of each influence map and assigning the counted value as the ranking score. That is, the actor placed lowest on an influence map receives a ranking score of 1, the second lowest a score of 2, the third lowest a score of 3, and so on. Actor groups placed on the same level as one another receive the same ranking score (e.g. 'farmers' and 'rural poor' placed side by side at the bottom of an influence pyramid would both receive a ranking score of 1). Ranking scores for each actor group were recorded in a spreadsheet.

It should be noted that this counting strategy allows for a different number of ranking levels to be identified by each respondent. To ensure that the highest and lowest ranked

Table 2. MSIM respondents by actor level.

| Respondent organization | Organization type | Level of operation |
|---|---|---|
| National Patriotic Party (NPP) | Civil society (political group) | National (Accra) |
| GEF | Multilateral donor | National (Accra) |
| MoFA (×2) | Government | National (Accra) |
| Ghana Environmental Conventions Coordinating Agency (GECCA) | Government | National (Accra) |
| Forum for Agricultural Research in Africa (FARA) | Academia | National (Accra) |
| NDPC | Government | National (Accra) |
| University of Ghana, East Legon (×2) | Academia | National (Accra) |
| CSIR, Science and Technology Policy Research Institute (STEPRI) | Academia | National (Accra) |
| Agricultural Development Bank (ADB) | Private sector | National (Accra) |
| Ghana Climate Action Network (G-CAN) | Civil society | National (Accra) |
| CSIR, Animal Research Institute (ARI) | Academia | National (Accra) |
| Climate Action Network (CAN) | INGO | National (Accra) |
| Development Institute | NGO | National (Accra) |
| MoFA | Government | Region (Wa) |
| Ghana Social Opportunities Project (GSOP) | NGO | Region (Wa) |
| EPA | Government | Region (Wa) |
| RCC | Government | Region (Wa) |
| Council of Scientific and Industrial Research (Savannah Agricultural Research Institute (SARI)) | Academia | Region (Wa) |
| Plan Ghana | INGO | Region (Wa) |
| Savannah Accelerated Development Authority (SADA) | Government/private sector | Region (Wa) |
| Farmer (×2) | Private sector | Local (Lawra) |
| District Agricultural Development Office | Government | Local (Lawra) |
| Local agricultural development NGO | NGO | Local (Lawra) |
| DA (×2) | Government | Local (Lawra) |
| Village chief | Traditional Authority | Local (Lawra) |
| Religious body | Civil Society | Local (Lawra) |

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actor groups on each map received the same score, the relative ranking was adjusted to a normalized value. As such, the number of ranked levels was identified for the entire sample ($n = 30$) yielding an average of 13 ranked actor levels. The relative ranking for each stakeholder on each respondent map was then adjusted to this 13-level equivalent by applying a normalization formula. After applying this function, the highest possible ranking score for an actor group was 13 and lowest 1 across all influence maps. For a detailed description of 'relative' versus 'adjusted' rankings, see Sova et al. (2014).

$$\text{Adjusted ranking} = \left(\frac{\text{Ranking score}}{13}\right) \times \text{number of ranking levels for respondent } 'n'$$

Once normalized, the adjusted rankings for each actor group were summed and then divided by the maximum frequency score of 30 (i.e. supposing the actor was identified as 'highly relevant' by all respondents in the sample) to produce the composite influence score. This method of calculation reduces biased mapping outcomes by including in the calculation the instances that an actor/actor group was not identified as relevant (i.e. has a mean adjusted ranking of zero) (Sova et al., 2014).

$$\text{Composite influence score} = \sum \text{adjusted ranking for } \frac{n1 - n30}{30}$$

## 4. Context

The MSIM methodology was applied with stakeholders in Ghana's agricultural climate change adaptation regime from national, regional, and local operational levels. This paper adopts a definition of 'levels' from Cash et al. (2006) and Gibson, Ostrom, and Ahn (2000) as the units of analysis that are located at different positions on a scale. Accra, the nations' capital, serves as the site for national-level analysis, Wa, the municipal capital of Ghana's Upper West Region (UWR) the site of regional-level analysis, and Lawra District, UWR, the site of local-level analysis. Detailed respondent information is included in Table 2 above.

Nationally, it is estimated that over 50% of the working population in Ghana is engaged directly in agriculture (Government of Ghana, 2007). The bulk of agricultural production remains concentrated in the hands of smallholder farmers, with approximately 2.75 million households engaged in the sector and 90% of landholdings less than 2 hectares in size (Government of Ghana, 2010b). The MoFA, Ministry of Environment, Science, Technology and Innovation (MESTI), and the Environmental Protection Agency (EPA) (MESTI's implementing agency) are the three principle government bodies charged with promoting adaptation to climate change for the agricultural sector nationally. The National Development Planning Commission (NDPC) and Ministry of Finance (MoF), meanwhile, work with these agencies to integrate climate change in to national development plans. These government agencies are supported in this endeavour by a host of NGOs, bilateral and multilateral donors, and other civil society actors.

The national legislative and policy environment is dense, with agricultural climate change objectives introduced across a number of documents. This includes but is not limited to the National Climate Change Adaptation Strategy (Government of Ghana, 2012b), the National Climate Change Policy (Government of Ghana, 2014a), the Medium-term national development policy framework: Ghana Shared Growth and Development Agenda (Government of Ghana, 2010c, 2014b), the Food and Agricultural Sector Development Policy II (Government of Ghana, 2007), and the Medium-Term Agricultural Sector Investment Plan (Government of Ghana, 2010b). Ghana is currently undertaking a process of political, fiscal, and administrative decentralization (Government of Ghana, 2010a), led by the Ministry of Local Government and Rural Development (MoLGRD), which is placing more budgetary and planning responsibility on local administrative and technical units (Amankwah et al., 2014; Lentz, 2006). AQ8

Regionally, the Upper West Region of Ghana is located some 12-hour journey by bus from Accra and is sparsely populated with less than 2.8% of the country's population (Government of Ghana, 2012a) of which 70.7% are considered 'poor', and 45.1% 'extremely poor' – the highest incidences of poverty in Ghana's 10 regions (Government of Ghana, 2014c). Given the high levels of poverty and deteriorating environmental conditions, the UWR is considered among Ghana's most vulnerable regions to climate change (Government of Ghana, 2011). The country's second UNFCCC national communication estimates temperature increases in Ghana's northern savannah regions between 1.7°C and 2.04°C by the year 2030, with high temperatures peaking at 41°C (Government of Ghana, 2011). This, according to crop simulation models by MacCarthy, Adiku, and Yangyuoru (2013), will precipitate declining maize yields between 19% and 41% in the Guinea Savannah zone by 2050. Rainfall is expected to fall 1.1% to 3.1% across all regions in Ghana by 2020, and 13% to 21% by 2080. (Government of Ghana, 2011). Impacts are already being felt, resulting in significant migration from Ghana's northern regions (Rademacher-Schulz, Schraven, & Mahama, 2013). Wa is the regional capital of UWR and houses the Regional Coordinating Council (RCC), which serves as the political and administrative centre of the UWR and undertakes development

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planning and monitoring and evaluation. MoFA and EPA are responsible for promoting agricultural climate change adaptation at this operational level. Several NGOs and civil society groups operate out of Wa, although significantly fewer in number than those operating out of Tamale, the Northern Regional capital to the East.

Locally, the Lawra District is located in the upper-most reaches of UWR along the border of Burkina Faso and is home to an estimated 100,000 people, the majority of which, 83%, are engaged in subsistence agriculture as the base activity for their livelihood. Agriculture accounts for 80% of the district's entire economic activity (Government of Ghana, 2013). The district lies in the Guinea Savannah zone of Western Africa, and as such, has one wet season from April to October. Climate Change is reported to be impacting on the arrival of the Tropical Maritime air mass that brings about the rainy season (Government of Ghana, 2011). The District Assembly (DA) serves as Lawra District's political and administrative centre. Decentralized agencies like the District Department of Agriculture, responsible for agricultural adaptation in the district, operate under the jurisdiction of the DA. The EPA also has an assigned desk officer in the DA. Simultaneously, a traditional ruling structure exists alongside these modern political administrative units in the district, and includes a network of village chiefs, sub-chiefs, and a Paramount chief for the ruling area.

## 5. Results

This section provides the results of the MSIM analysis in Ghana's agricultural adaptation regime. Actors with the highest composite influence scores for the entire sample are discussed, followed by the actors with the lowest influence scores. The highest composite influence scores are then presented for actors groups from the perspective of national, regional, and local respondents separately, demonstrating how perceived influence of actor groups changes across operational levels.

### 5.1. *Highly influential actor groups*

Table 3 contains the list of the 20 actor groups with the highest composite influence scores (frequency combined with the average ranking position on the MSIM maps) from the perceptions of the entire 30 respondent sample.

The MoFA is deemed most influential with regards to agricultural climate change adaptation policy development and implementation in Ghana. MSIM respondents cite the agency's mandate for agricultural development and its extensive network of Regional and District offices as the key factors in MoFA's influence in this regard. The ministry's perceived expertise is also a source of power, especially among area extension agents who are tasked with supporting local farmers with technical innovation. The MESTI and its implementing agency, the EPA, are deemed nearly as influential as MoFA, given MESTI's mandate in steering national climate change initiatives in Ghana, as well as both agencies' connections to international agencies for the mobilization of climate change resources. Farmers are also considered highly influential in Ghana's adaptation regime, although this influence is mainly derived from respondents at the regional and local levels ranking farmers as highly influential (as seen in Table 4 below). Farmers are described as the 'front lines' of adaptation policy and 'the implementers' without which there is no action. Farmers are also influential because of their possession of local and traditional knowledge, a valuable resource to development agencies, driven by a growing preference among practitioners for community based adaptation approaches. Below farmers we see a host of government agents including the District Assemblies, Council for Scientific and Industrial Research (CSIR), Ghana Meteorological Agency (GMET), Ministry of Lands and Natural Resources (MoLNR), and the Forestry Commission (FC), all ranked for their domestic authority and mandates on climate change related issues. Still highly influential, but less so than those aforementioned government agencies, is group of International organizations including UN Agencies, Global Environment Facility (GEF), and the CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS), among others. The World Bank ranks considerably higher in Table 3 than other multilateral and bilateral groups. These international agencies are frequently cited as having access to significant financial resources, well-trained staff, and maintain autonomy in their programming from the central government. Placed within the international agencies are the NDPC and the MoF. NDPC and MoF are deemed influential by respondents because of their central role in development planning and budget allocation in Ghana. They exhibit substantial reward power through the plan and budget approval process. Finally, traditional authorities (Chiefs and Paramount Chiefs, for example) are the last to be included in Table 3. This highly influential group is cited for their custodianship of lands, and their ability to enact traditional decrees (against bush-burning for example). Figure 2 visualizes these 20 influential actors groups in a MSIM composite map.

### 5.2. *Less influential actor groups*

Equally informative are those actors deemed 'less influential' with regard to agricultural climate change adaptation policy in Ghana by MSIM respondents. Table 4 contains a list of actors deemed 'highly relevant' by at least 10 respondents (33% of respondents) but with the lowest composite influence scores when using data from the complete sample, $n = 30$. The '33% of respondents' qualifier is designed to eliminate from the analysis the actor groups

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Table 3. Most influential actors groups with regard to agricultural climate change adaptation policy in Ghana, entire sample ($n = 30$).

| Actor/actor group | Frequency identified as 'highly relevant' by respondents | Average adjusted ranking score ($1 \leq Ra \leq 13$) | Composite influence score |
|---|---|---|---|
| MoFA | 28 | 10.6 | 9.9 |
| MESTI | 26 | 10.0 | 8.6 |
| EPA | 23 | 9.9 | 7.6 |
| Farmers | 27 | 7.3 | 6.5 |
| World Bank | 22 | 8.4 | 6.2 |
| DA | 24 | 7.6 | 6.1 |
| CSIR | 21 | 8.2 | 5.8 |
| GMET | 19 | 8.5 | 5.4 |
| MoLNR | 19 | 8.4 | 5.3 |
| [redacted] | 18 | 8.1 | 4.9 |
| [redacted]gencies (FAO, UNDP, UNEP) | 18 | 7.6 | 4.6 |
| GEF | 15 | 8.4 | 4.2 |
| NDPC | 15 | 8.0 | 4.0 |
| MoF | 14 | 8.6 | 4.0 |
| INGO's (undifferentiated) | 20 | 5.9 | 4.0 |
| CGIAR research program on CCAFS | 17 | 6.8 | 3.9 |
| Bilateral agency #1 | 19 | 6.0 | 3.8 |
| International Fund for Agricultural Development (IFAD) | 17 | 6.7 | 3.8 |
| Bilateral Agency #2 | 16 | 7.1 | 3.8 |
| Traditional authorities (paramount chief, sub-chief, and chiefs) | 15 | 7.3 | 3.6 |

never identified as 'highly relevant' by respondents (i.e. a frequency and average adjusted ranking of 0), or only identified by a handful of respondents. As suggested by Sova et al. (2014), less influential rankings with MSIM, as found in Table 4, can lead the analyst to 'those actors that are directly impacted by or serve critical roles in adaptation or policy processes, but do not leverage influence in any meaningful way' (p. 24).

The results of 'less influential' rankings suggest that many private sector actors (input providers, agro-industries, and rural banks, for example) are frequently identified by respondents as highly relevant, yet do not appear to be active or influential in decision-making and implementation around climate change adaptation. Respondents reference the importance of these groups by citing the challenges in distributing new and improved seed varieties without the support of Ghana's network of input providers, and a similar inability to develop new varieties without research and academia, also included on this list of less influential groups. Similar difficulties in reducing post-harvest losses and improving market access for smallholder farmers are cited in the absence of engagement from agro-industries. The presence of MoLGRD in this table is reflective of Ghana's slow-moving advance[redacted]scal and administrative decentralization. Respondents cite obstruction on the part of national-level actors, and limited capacity of

Table 4. Less influential actors groups with regard to agricultural climate change adaptation policy in Ghana, entire sample ($n = 30$).

| Actor/actor group | Frequency identified as 'highly relevant' by respondents | Average adjusted ranking score ($1 \leq Ra \leq 13$) | Composite influence score |
|---|---|---|---|
| National Disaster Management Organization (NADMO) | 11 | 3.3 | 1.2 |
| Agro-industries | 12 | 4.3 | 1.7 |
| Banks | 13 | 4.9 | 2.1 |
| Civil society group #1 | 12 | 5.5 | 2.2 |
| Universities | 13 | 5.5 | 2.4 |
| NGOs | 14 | 5.1 | 2.4 |
| Bilateral #3 | 11 | 6.6 | 2.4 |
| Bilateral #4 | 10 | 7.3 | 2.4 |
| Bilateral #5 | 12 | 6.3 | 2.5 |
| Input providers | 14 | 5.6 | 2.6 |
| MoLGRD | 11 | 7.3 | 2.7 |

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staff at the district level as key factors in MoLGRD's minimal influence at present.

### 5.3. *Influence across levels*

Research in adaptation policy must take into account the multilevel features of the policy process (Adger, 2001; Adger et al., 2005b), including policy development, implementation, and evaluation. Each of these stages implicates different actor sets, knowledge and information, and resources. As such, MSIM results that reflect perceived influence from each of these unique levels of operation can be instructive. Table 5 provides a comparison of the most influential actors from the perspective of each ~~principle~~ operational level. There were considerable variations in perceived stakeholder influence according to respondents operating at different levels (national, regional, and local).

Calculating a composite influence score from the perspective of a distinct operational level follows the same protocol as used for the entire sample. The sum of average adjusted ranking scores for each stakeholder groups is produced from the maps pertaining to the operational level in question and is divided by the maximum possible frequency score of 15, 7, and 8, for national, regional, and local operational levels, respectively.

These multilevel results offer insights in to which actor groups can serve as bridging agents between operational levels, and highlight key gaps in the multilevel adaptation planning and implementation process.

## 6. Discussion and implications

Several key trends emerge from MSIM analysis in Ghana with regard to the underlying power structure of the adaptation regime. These trends provide insight in to the

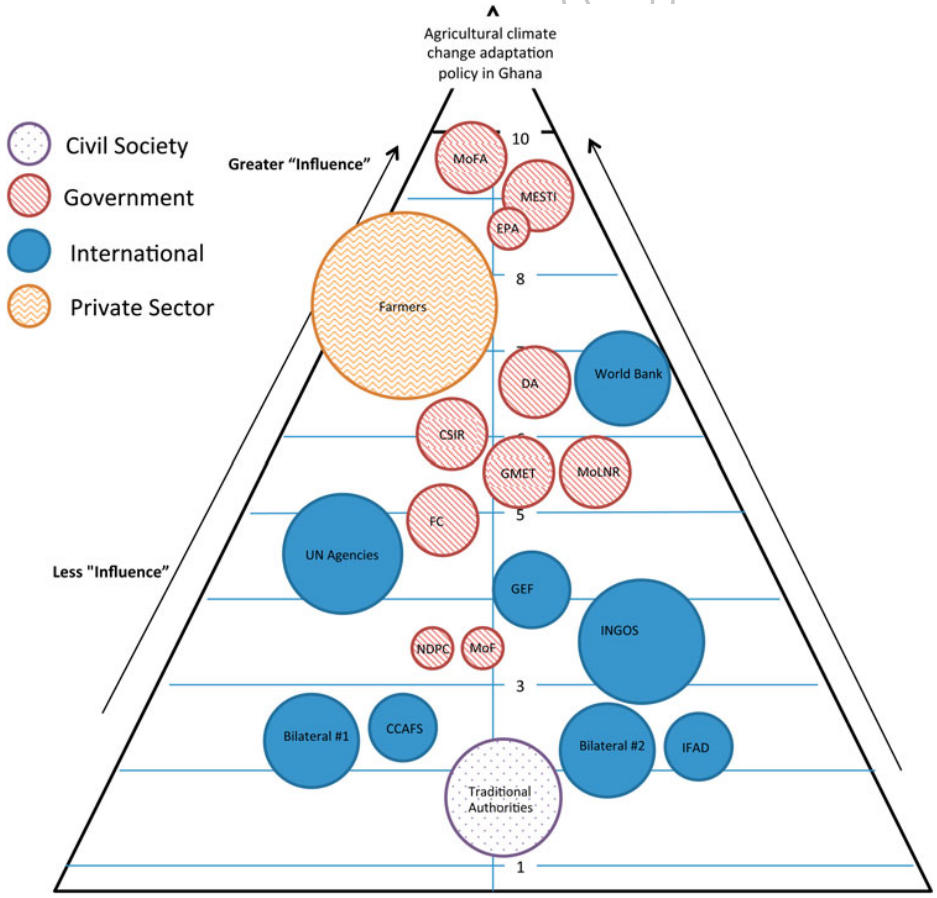



Figure 2. Combined MSIM map of highly influential actors for Ghana's agricultural adaptation regime ($N = 30$).
Note: This results map visualizes the most influential actor groups as perceived by the combined MSIM sample of 30 respondents. Respondents were asked to rank actors for their influence with regard to 'agricultural climate change adaptation policy in Ghana', which includes both policy development and implementation. The most influential actor group is deemed to be the MoFA. The least influential (although not without considerable influence) is traditional authorities. The size of the circles in this figure reflects the relative size of the actors groups, albeit not proportionally. The circle colour (or gradient) represents the actor group type, as indicated in the key to the left of the pyramid.

Colour online, B/W in print

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Table 5. Most influential actors with regard to agricultural climate change adaptation policy in Ghana as perceived by respondents at the national, regional, and local levels.

| (a). National level ($n = 15$) | (b). Regional level ($n = 7$) | (c). Local level ($n = 8$) |
|---|---|---|
| MESTI | MoFA | CSIR |
| MoFA | MESTI | MoFA |
| World Bank | EPA | EPA |
| NDPC | Farmers | Farmers |
| UN agencies | FC | DA |
| EPA | CSIR | Traditional authorities (paramount chief, sub-chief, and chiefs) |
| GEF | DA | NGOs (undifferentiated) |
| Bilateral #6 | District Department of Agriculture | FC |
| MoLNR | GMET | MESTI |
| GMET | GEF | MoLNR |

technical, a-political nature of the adaptation regime, the distinct lack of pluralism among highly influential actors, and the cross-level interaction of formal and informal institutions.

Regarding stakeholder participation, in this analysis government and international agencies are most frequently ranked as highly influential in Ghana's agricultural climate change adaptation regime. Of the top 20 most influential actors (Table 3) using data from the entire respondent sample, 10 (50%) are government agencies and 7 (35%) are internationally based. These groups are perceived as especially influential among national-level respondents, a sample which most closely reflects the views of traditional 'policymakers'. Influence, then, in Ghana's adaptation policy regime is perceived as bipolar. Technical government agencies (MESTI and MoFA), INGOs, bilateral and multilateral donors form what can be referred to as the 'adaptation establishment', or the dominant group of power holders (elites) within the adaptation regime.

While the adaptation regime can be safely considered 'elite-centered', it does not exhibit elitism common to traditional power structures in Ghana – and West Africa more broadly – that elevate 'big men' politicians and powerful executive branch players for their positional power and clientalistic tendencies (Fukuyama, 2014; Rowley, 2000). In fact, political parties, the President, and the District Chief Executive (DCE) are not cited by respondents in this study as highly influential in agricultural climate change adaptation. These findings are consistent with that of Cameron (2011) who suggests 'there is not a broad demand from constituents for politicians to own the response agenda to climate change, and thus little or no domestic accountability pressure for achievement' (p. 20). Meanwhile, adaptation literature increasingly evidences the importance of political considerations in determining adaptation policy outcomes by ensuring popular participation, improving downward accountability, and allocating appropriate discretionary power to local actors through democratic processes (Dodman & Mitlin. 2013; Granderson, 2014; Ribot, 2003).

In addition to the exclusion of politically oriented groups (a-politicization), the private sector and civil society are also notably absent from the power rankings, and even appear among 'less influential' actors in MSIM results. The private sector's limited engagement in adaptation policy development to-date is widely documented and has important implications (Agrawala et al., 2011; Biagini & Miller, 2013; Pauw & Pegels, 2013). That a large, diverse swath of actor group types – the private sector among them – are not considered influential within Ghana's adaptation regime challenges calls for system-wide approaches to adaptation in food systems to facilitate truly transformational adaptation (Ingram, 2011; O'Brien, 2012).

With respect to multilevel institutional design, MSIM results confirm that respondents tend to attribute the highest influence to actor groups within their own level of operation, what we term 'proximal level bias'. As such, several organizations embedded in multilevel institutional structures are not included as highly influential by respondents across operational levels. Traditional authorities, for example, manifest as chiefs, sub-chiefs, and Paramount chiefs at the local level in the Lawra District, but are represented by the National House of Chiefs and the Ministry of Chieftaincy and Traditional Affairs (MCTA) in Accra. Similarly, the DA operates semi-autonomously at the local level but is guided by the MoLGRD at the national level. Both of these groups, tradit[illegible] leade[illegible] and the DA, are deemed highly influential b[illegible]-lev[illegible] respondents but their national-level counterparts, the House of Chiefs, MCTA, and MoLGRD, are not perceived as influential by national-level respondents.

This dichotomy in power attributed to traditional authorities is reflective of a popular debate in Ghana over the role and legitimacy of traditional ruling structures (Abotchie, Awedoba, & Odotei, 2006; Ahwoi, 2010; Asamoah, 2012; Belden, 2010; Crawford, 2004; Guri, 2006; Lentz, 2006). At present, traditional authorities are considered locally as custodians of the land and natural resources, they determine land ownership, and decide

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over local conflicts in traditional courts (Crook, Asante, & Brobbey, 2010). Chiefs are often trusted sources of local and traditional knowledge, and are responsible for the framing of climate change in customary religious terms, among other influential socio-cultural roles (Eguavoen, 2013; Nyantakyi-Frimpong, 2013). Yet from the central perspective, there is a sense of competition between modern and traditional governing structures. In fact, 'since the era of colonization, Ghanaian governments have struggled with how to use traditional authorities to achieve their own objectives without making chiefs more powerful than themselves' (Hoffman, 2010, p. 5). This is consistent with adaptation literature on formal and informal rural institutions and the need for improved institutional collaboration between these entities (Agrawal, 2010; Berman et al., 2012; Schipper et al., 2012; Yaro, Teye, & Bawakyillenuo, 2014). Increased collaboration between the DA and traditional authorities, in particular, can assuage concerns posed by some institutional theorists that increasing the power of so-called non-representative authorities (e.g. chiefs) can slow democratic transition in decentralized regimes (Ribot, 1996).

Finally, farmers are deemed both 'highly relevant' and highly influential from the combined perspective of the entire MSIM sample, yet they are not ranked among the most influential actor groups by national-level respondents. This reflects a common challenge in national adaptation planning resulting from proximal level bias; wherein the physical distance between policymakers and those farming communities affected by climate change impacts limits the integration of these marginalized groups in decision-making, contributing to the bipolar, elite-centered structure of the regime. MSIM thus provides empirical evidence of the 'adaptation paradox' at work – those most affected by climate impacts may be most distanced from adaptation intervention decisions (Ayers, 2011). This finding highlights the important nexus between participatory processes and institutional design. If 'highly relevant' stakeholders operate within an institutional environment where they are merely consulted on predetermined policy then pre-existing power relations between actor groups may be reinforced and perpetuated. In the words of Arnstein, 'participation without redistribution of power is an empty and frustrating process for the powerless' (1969, p. 216).

## 7. Limitations

The multilevel trends in power dynamics identified in this study reflect perceptions and experiences of stakeholders in the Lawra District and the Upper West Region of Ghana. The findings are not necessarily reflective of other districts and regions in the country. Traditional ruling structures, for example, differ dramatically across the country, some wielding more or less power than is characteristic of chiefs in the UWR. Similarly, the perceived influence of NGOs and INGOs is also geographically dependent. Second, it should be noted that MSIM respondents are most likely to perceive influence as it is derived from highly visible sources of power. Actor groups deriving power from positions of authority, of prestige, or that have ready access to resources and capital are more likely to be perceived as highly influential by respondents. Actor groups that exercise less visible or less deliberate forms of power, such as the media, are less likely to appear among 'highly influential actors'. Finally, organizing respondent data according to operational level (national, regional, and local) is only one such grouping available to the MSIM analyst. Operational levels are not perfect delineations. Some of the respondents in this exercise frequently move between Accra (national) and Wa (regional), or Wa and Lawra (local). Defining their predominant level of operation ultimately requires some subjectivity.

## 8. Conclusion

Rendering underlying power and influence dynamics visible among adaptation actors is an important step in improving the delivery of resources to those most vulnerable and assigning responsibility for outcomes in adaptation regimes. MSIM is applied here to Ghana's agricultural adaptation policy regime with diverse respondents from Accra, the Upper West Region, and the Lawra District. The study constitutes among the first efforts to empirically map power and influence in adaptation regimes. Through this analysis, MSIM provides insight in to the underlying power structure of the regime (i.e. elite-centred versus pluralistic orientations), and contributes to two key power-laden themes in adaptation: stakeholder participation and multilevel institutional design.

Respondents in this study consider power in the adaptation policy regime in Ghana as bipolar, or elite-centred. A distinguishable 'adaptation establishment' or dominant group of power elites made up of technical government and international agencies can be identified. This power orientation effectively renders adaptation planning technical and a-political, contrasting with traditional power structures in Ghana that elevate powerful executives and political parties. In fact, contrary to the hyper-politicized nature of climate change adaption at international levels, agricultural adaptation policy in Ghana would benefit from increased political engagement from the President, MPs, DCEs, and other party leaders to facilitate improved decentralization, popular participation, and downward accountability. This would reduce bipolarity and cross-level disconnect in the regime and make the policy process more adaptive to genuine needs.

Achieving increased pluralism more broadly in the adaptation regime (including power distribution towards the

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private sector, civil society, academia, and farmers themselves) should also be a priority and will allow for system-wide, transformational adaption that the current homogenous, elite-centered power structure cannot accommodate. A more pluralized power structure would offer increased transparency, responsiveness, and legitimacy within the regime, widening the portfolio of potential adaptation responses.

MSIM results also reflect the challenges in multilevel institutional design of adaptation regimes. In particular, the disparity in power attributed to the DA, traditional authorities, and farmers between local and national-level actors is especially detrimental to the cross-level performance of the regime. Potential bridging actors with high local-level influence could be better engaged at higher levels of operation to improve understanding of and responses to adaptation needs, capacities, and delivery. This – in the case of traditional authorities – will require increased coordination between formal and informal institutions in which 'modern' and traditional governing structures are seen not as competing but complimentary institutions. Increased emphasis on developing informal farmer-based organizations and national farmer associations will also help to assuage the effects of the 'adaptation paradox' and improve farmer representation across levels.

While the results of this analysis are reflective of only one region in Ghana and do not trace the full scope of power networks or their dynamics, this study marks an important advancement in understanding which actor groups are considered influential within a given adaptation regime. The results highlight existing patterns of influence and bias in adaptation policy-making, evidencing the concentration of power among technical agencies and the need for adaptive, agile, multilevel institutional networks. Achieving true 'polycentric', responsive multilevel governance cannot evolve through simple decentralization or scale linkage, but must build on a thorough understanding of power and influence dynamics among key players in the adaptation policy process, as identified here. Further research in to the underlying sources of these power dynamics can provide a basis for generating more inclusive, pluralistic adaptation policy regimes.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

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**References**

Abotchie, C., Awedoba, A., & Odotei, I. (2006). Perceptions on chieftaincy. In K. Irene, I. Odotei, & K. Awedoba (Eds.), *Chieftaincy in Ghana* (pp. 103–144). Accra: Sub-Saharan.

Adger, W. N. (2001). Scales of governance and environmental justice for adaptation and mitigation of climate change. *International Development*, *13*(7), 921–921.

Adger, W. N., Arnell, N. W., & Tompkins, E. L. (2005a). Successful adaptation to climate change across scales. *Global Environmental Change*, *15*(2), 77–77.

Adger, W. N., Arnell, N. W., Tompkins, E. L., Dessai, S., Lu, X., Risbey, J. S., … Haddad, B. M. (2005b). Adaptation to climate change: Perspectives across scales. *Global Environmental Change*, *15*(2), 77–176.

Adger, W. N., Dessai, S., Goulden, M., Hulme, M., Lorenzoni, I., Nelson, D. R., … Wreford, A. (2009). Are there social limits to adaptation to climate change? *Climatic Change*, *93*(3–4), 335–354. http://dx.doi.org/10.1007/s10584-008-9520-z

Adler, E., & Bernstein, S. (2005). Knowledge in power: The epistemic construction of global governance. In M. N. Barnett & R. Duvall (Eds.), *Power in global governance*. New York, NY: Cambridge University Press.

Agrawal, A. (2008). *The role of local institutions in adaptation to climate change*. Paper presented at the Social Dimensions of Climate Change, Washington, DC, March 5–6.

Agrawal, A. (2010). *Local institutions and adaptation to climate change*. Social dimensions of climate change: equity and vulnerability in a warming world Washington DC, World Bank, 173–198.

Agrawala, S., Carraro, M., Kingsmill, N., Lanzi, E., Mullan, M., & Purdant-Richard, G. (2011). *Private sector engagement in adaptation to climate change: Approaches to managing climate risks*. Environment Working Papers.

Ahwoi, K. (2010). *Local government and decentralization in Ghana*. Accra: Unimax Macmillan.

Amankwah, K., Klerkx, L., Sakyi-Dawson, O., Karbo, N., Oosting, S. J., Leeuwis, C., & van der Zijpp, A. J. (2014). Institutional dimensions of veterinary services reforms: responses to structural adjustment in Northern Ghana. *International Journal of Agricultural Sustainability*, *12*(3), 296–315. doi:10.1080/14735903.2014.909635

Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of Planners*, *35*, 216–224.

Asamoah, K. (2012). A qualitative study of chieftaincy and local government in Ghana. *Journal of African Studies and Development*, *4*(3), 90–95.

Ayers, J. (2011). Resolving the adaptation paradox: Exploring the potential for deliberative adaptation policy making in Bangladesh. *Global Environmental Politics*, *11*(1), 62–88.

Belden, C. (2010). *IFPRI discussion paper 01030: Examining relationships between customary and state institutions in Ghana's decentralized system*. International Food Policy Research Institute (IFPRI), Washington, DC.

Berkes, F. (2010). Devolution of environment and resources governance: trends and future. *Environmental Conservation*, *37*, 489–500.

Berman, R., Quinn, C., & Paavola, J. (2012). The role of institutions in the transformation of coping capacity to sustainable adaptive capacity. *Environmental Development*, *2*(0), 86–100. http://dx.doi.org/10.1016/j.envdev.2012.03.017

Biagini, B., & Miller, A. (2013). Engaging the private sector in adaptation to climate change in developing countries: Importance, status, and challenges. *Climate and Development*, *5*(3), 242–252. doi:10.1080/17565529.2013.821053

Biermann, F., Betsill, M. M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., … Zondervan, R. (2010). Earth system governance: A research framework. *International Environmental Agreements: Politics, Law and Economics*, *10*(4), 277–298.

PROOF ONLY

Brockhaus, M., & Kambire, H. (2009). Decentralization and adaptation in Burkina Faso. In W. N. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to climate change: Thresholds, values, governance*. New York, NY: Cambridge University Press.

Cameron, C. (2011). Climate change financing and aid effectiveness, Ghana case study. Agulhas Applied Knowledge.

Cash, D., Adger, W. N., Berkes, F., Garden, P., Lebel, L., Olsson, P., … Young, O. R. (2006). Scale and cross-scale dynamics: Governance and information in a multilevel world. *Ecology and Society*, *11*(2).

Christoplos, I., Anderson, M., Arnold, V., Galaz, M., Hedger, R., Klein, J. T., & Le Goulven, K. (2009). *The human dimension of climate adaptation: The importance of local and institutional issues*. Stockholm.

Cooke, B., & Kothari, U. (Eds.) (2001). *Participation: The new tyranny?* London: Zed Books.

Crawford, G. (2004). *Democratic decentralisation in Ghana: Issues and prospects*. POLIS working paper no. 9. University of Leeds.

Crook, R. C., Asante, K., & Brobbey, V. (2010). *Popular concepts of justice and fairness in Ghana: Testing the legitimacy of new or hybrid forms of state justice*. Working paper no. 14. London.

Dahl, R. A. (1958). A critique of the ruling elite model. *The American Political Science Review*, *52*(2), 463–469. doi:10.2307/1952327

Dodman, D., & Mitlin, D. (2013). Challenges for community-based adaptation: Discovering the potential for transformation. *Journal of International Development*, *25*(5), 640–659. doi:10.1002/jid.1772

Dovers, S. R., & Hezri, A. A. (2010). Institutions and policy processes: The means to the ends of adaptation. *Wiley Interdisciplinary Reviews: Climate Change*, *1*(2), 212–231. doi:10.1002/wcc.29

Eakin, H., & Lemos, M. C. (2010). Institutions and change: The challenge of building adaptive capacity in Latin America. *Global Environmental Change*, *20*(1), 1–3. http://dx.doi.org/10.1016/j.gloenvcha.2009.08.002

Eguavoen, I. (2013). Climate change and trajectories of blame in Northern Ghana. *Anthropological Notebooks*, *19*(1), 5–24.

Few, R., Brown, K., & Tompkins, E. L. (2007). Public participation and climate change adaptation: Avoiding the illusion of inclusion. *Climate Policy*, *7*(1), 46–59. doi:10.1080/14693062.2007.9685637

French, J. R. P., & Raven, B. H. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power* (pp. 150–167). Ann Arbor, MI: Institute for Social Research.

Fukuyama, F. (2014). *Political order and political decay: From the industrial revolution to the globalisation of democracy*. London: Profile Books Ltd.

Gibson, C., Ostrom, E., & Ahn, T. K. (2000). The concept of scale and the human dimensions of global change: A survey. *Ecological Economics*, *32*(2), 217–239.

Government of Ghana. (2007). *Food and agriculture sector development policy II*. Accra.

Government of Ghana. (2010a). *Decentralization policy framework: Accelerating decentralization and local governance for national*. Accra.

Government of Ghana. (2010b). *Medium term agriculture sector investment plan*. Accra.

Government of Ghana. (2010c). *Medium-term national development policy framework: Ghana shared growth and development agenda (GSGDA)*. Accra.

Government of Ghana. (2011). *Ghana's second communication to the UNFCCC*. Accra.

Government of Ghana. (2012a). *2010 population and housing census: Summary report of final results*. Accra.

Government of Ghana. (2012b). *National climate change adaptation strategy ~~United Nations environmental program~~*. Accra.

Government of Ghana. (2014a). *Ghana national climate change policy*. Accra.

Government of Ghana. (2014b). *Medium-term national development policy framework: Ghana shared growth and development Agenda (GSGDA) II*. Accra.

Government of Ghana. (2014c). *Poverty profile in Ghana (2005–2013): Ghana living standards survey Round 6*. Accra.

Granderson, A. A. (2014). Making sense of climate change risks and responses at the community level: A cultural-political lens. *Climate Risk Management*, *3*(0), 55–64. http://dx.doi.org/10.1016/j.crm.2014.05.003

Greene, R., & Elfrers, J. (1999). *Power the 48 laws*. London: Profile Books.

Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., … Bergsma, E. (2010). The adaptive capacity wheel: A method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environmental Science & Policy*, *13*(6), 459–471. http://dx.doi.org/10.1016/j.envsci.2010.05.006

Guri, B. (2006). *Traditional authorities, decentralization and development: Strengthening the capacity of traditional authorities for good governance and development at the local level*. Accra Center for Indigenous Knowledge and Organizational Development (CIKOD).

Helfgott, A. (2011). *Resilience, adaptation and development*. Lecture series. University of Oxford.

Higley, J. (2008). *Elite theory in political sociology*. Austin: University of Texas at Austin.

Hoffman, B. (2010). *The political economy of decentralization in Ghana*. Washington, DC: Georgetown University.

Ingram, J. (2011). A food systems approach to researching food security and its interactions with global environmental change. *Food Security*, *3*(4), 417–431. doi:10.1007/s12571-011-0149-9

Jain, N. K. (2005). *Organisational behaviour. Volume 1*. New Delhi: Atlantic Publishers and Distributors.

Jalloh, A., Nelson, G. C., Thomas, T. S., Zougmore, R., & Roy-Macauley, H. (Eds.). (2013). *West African agriculture and climate change: A comprehensive approach*. Washington, DC.

Jennings, T. L. (2009). Exploring the invisibility of local knowledge in decisionmaking: The Boscastle Harbour flood disaster. In W. N. Adger, I. Lorenzoni, & K. O'Brien (Eds.), *Adapting to climate change: Thresholds, values, governance* (pp. 240–254). Cambridge: Univerisity of Cambridge Press.

Lentz, C. (2006). Decentralization, the state and conflicts over local boundaries in northern Ghana. *Development and Change*, *37*(4), 901–919.

Liu, X., Lindquist, E., Vedlitz, A., & Vincent, K. (2010). Understanding local policymaking: Policy elites' perceptions of local agenda setting and alternative policy selection1. *Policy Studies Journal*, *38*(1), 69–91. doi:10.1177/1065912909346744

Lukes, S. (1974). *Power: A radical view*. 1st ed. London: Palgrave Macmillan.

Lukes, S. (2005). *Power: A radical view*. Palgrave Macmillan.

MacCarthy, D. S., Adiku, S. G. K., & Yangyuoru, M. (2013). Assessing the potential impact of climate change on maize production in two farming zones in Ghana using the CERES-maize model. *Ghana Policy Journal*, *5*(Special


PROOF ONLY

Issue on Climate change in Ghana: Impacts on agriculture and the policy implications), 27–39.
MacKinnon, D. (2011). Reconstructing scale: Towards a new scalar politics. *Progress in Human Geography*, *35*(1), 21–36.
Mayers, J., & Vermeulen, S. (2005). *Stakeholder influence mapping. Power tools*. International Institute for Environment and Development (IIED).
Merelman, R. M. (1968). On the neo-elitist critique of community power. *American Political Science Review*, *62*(2), 451–460. doi:10.2307/1952940
Mills, C. W. (1956). *The power elite*. New York, NY: Oxford University Press.
Morriss, P. (2002). *Power: A philosophical analysis*. Manchester: Manchester University Press.
Næss, L. O., Bang, G., Eriksen, S., & Vevatne, J. (2005). Institutional adaptation to climate change: Flood responses at the municipal level in Norway. *Global Environmental Change*, *15*(2), 125–138. http://dx.doi.org/10.1016/j.gloenvcha.2004.10.003
Nyantakyi-Frimpong, H. (2013). *Indigenous knowledge and climate adaptation policy in Northern Ghana*. Background No. 48.
Nyong, A., Adesina, F., & Elasha, B. O. (2007). The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. *Mitigation and Adaptation Strategies for Global Change*, *12*(5), 787–797.
O'Brien, K. (2012). Global environmental change II: From adaptation to deliberate transformation. *Progress in Human Geography*, *36*(5), 667–676. doi:10.1177/0309132511425767
Ostrom, E. (2010a). A multi-scale approach to coping with climate change and other collective action problems. *Solutions*, *1*(2), 27–36.
Ostrom, E. (2010b). Polycentric systems for coping with collective action and global environmental change. *Global Environmental Change-Human and Policy Dimensions*, *20*(4), 550–557. doi:10.1016/j.gloenvcha.2010.07.004
Pauw, P., & Pegels, A. (2013). Private sector engagement in climate change adaptation in least developed countries: An exploration. *Climate and Development*, *5*(4), 257–267. doi:10.1080/17565529.2013.826130
Rademacher-Schulz, C., Schraven, B., & Mahama, E. S. (2013). Time matters: Shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. *Climate and Development*, *6*(1), 46–52. doi:10.1080/17565529.2013.830955
Ribot, J. C. (1996). Participation without representation: Chiefs, councils and forestry law in the West African Sahel. *Cultural Survival Quarterly*, (Fall), 40–44.
Ribot, J. C. (2003). Democratic decentralisation of natural resources: Institutional choice and discretionary power transfers in Sub-Saharan Africa. *Public Administration & Development*, *23*(1), 53–53.
Ribot, J. C. (2010). *Vulnerability does not fall from the sky: Toward multiscale, pro-poor climate policy. New frontiers of social policy.* Washington, DC: World Bank.
Rowley, C. K. (2000). Political culture and economic performance in sub-Saharan Africa. *European Journal of Political Economy*, *16*(1), 133–158. http://dx.doi.org/10.1016/S0176-2680(99)00051-8
Rydin, Y., & Pennington, M. (2000). Public participation and local environmental planning: The collective action problem and the potential of social capital. *Local Environment*, *5*(2), 153–169.
Schipper, E. L. F., Fencl, A., Hoffmaister, J. P., & Osbeck, M. (2012). *Adaptation to climate change and agriculture: What role for rural institutions? Climate change, agriculture and food security.* Stockholm Environment Institute.
Sherman, M. H., & Ford, J. (2014). Stakeholder engagement in adaptation interventions: An evaluation of projects in developing nations. *Climate Policy*, *14*(3), 417–441. http://dx.doi.org/10.1080/14693062.2014.859501
Skoufias, E. (2003). Economic crises and natural disasters: Coping strategies and policy implications. *World Development*, *31*, 1087–1102.
Smit, B., & Pilifosova, O. (2001). *Adaptation to climate change in the context of sustainable development and equity.* Climate change 2001: Impacts, adaptation, and vulnerability – Contribution of working group II to the third assessment report of the intergovernmental panel on climate change. Cambridge University Press.
Sova, C., Helfgott, A. S., Chaudhury, A., Matthews, D. F., Thornton, T. J., & Vermeulen, S. (2014). Multi-level Stakeholder influence mapping: Visualizing power relations across actor levels in Nepal's agricultural climate change adaptation regime. *Systemic Practice and Action Research*, ~~1–27~~. doi:10.1007/s11213-014-9335-y
Sova, C., Vervoort, J., Thornton, T., Helfgott, A., Matthews, D., & Chaudhury, A. (2015). Exploring farmer preference shaping in international agricultural climate change adaptation regimes. *Environmental Science & Policy*, *54*, 463–474. http://dx.doi.org/10.1016/j.envsci.2015.08.008
Thomas, D. S. G., & Twyman, C. (2005). Equity and justice in climate change adaptation amongst natural-resource-dependent societies. *Global Environmental Change*, *15*(2), 115–124. http://dx.doi.org/10.1016/j.gloenvcha.2004.10.001
Tompkins, E. L., & Adger, W. N. (2004). Does adaptive management of natural resources enhance resilience to climate change? *Ecology and Society*, *9*(2).
Treby, E. J., & Clark, M. (2004). Refining a practical approach to participatory decision making: An example from coastal zone management. *Coastal Management*, *32*, 353–372.
Urwin, K., & Jordan, A. (2008). Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance. *Global Environmental Change*, *18*(1), 180–191. http://dx.doi.org/10.1016/j.gloenvcha.2007.08.002
Vergara, L. G. (2013). Elites, political elites and social change in modern societies. *Revista de Sociologia*, *28*, 31–49.
Vincent, K. (2007). Uncertainty in adaptive capacity and the importance of scale. *Global Environmental Change*, *17*(1), 12–24. http://dx.doi.org/10.1016/j.gloenvcha.2006.11.009
Weber, M. (1978). *Economy and society.* Berkeley: California University Press.
Wong, S. (2010). *Elite capture or capture elites? Lessons from the 'counter-elite' and 'co-opt elite' approaches in Bangladesh and Ghana*. Working Paper 82. World Institute for Development Economics Research.
Yaro, J. A., Teye, J., & Bawakyillenuo, S. (2014). Local institutions and adaptive capacity to climate change/variability in the northern Savannah of Ghana. *Climate and Development*, 1–11. doi:10.1080/17565529.2014.951018
Young, O. R. (2002). *The institutional dimensions of environmental change: Fit, interplay, and scale*. Cambridge: MIT Press.
Young, O. R. ~~(2012)~~. *On environmental governance: Sustainability, efficiency, and equity. On politics*. Paradigm.

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# Paper 3. Exploring Farmer Preference Shaping in International Agricultural Climate Change Adaptation Regimes

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**Abstract:** Questions of equity, justice, and fairness in the international agricultural adaptation regime have emerged in recent years, prompting interest in regime power dynamics. Here, a three dimensional conceptual framework of 'power as domination' is applied to the UNFCCC adaptation regime. We argue that this power-over framing is an important lens through which to view adaptation, a field dominated by power-to, capacity-based constructs. The framework distinguishes between power-over manifesting through decision-making, agenda setting and preference shaping. Through a literature review we demonstrate that first and second dimension behavioral views of power-over fail to account for the subtle ways in which the interests and preferences of smallholder farmers are unknowingly shaped and restricted within the regime. Potential sources of third dimension preference shaping power are explored in a survey with high-level decision makers involved in National Adaptation Plans (NAP) development in seven countries. The results suggest that several inter-related features of the international agriculture adaptation regime collectively contribute to the shaping of interests and preferences of smallholders: prevailing discourses of uncertainty and the perceived limited capacity of smallholders; the resulting privileged status of 'expert' decision makers; the predominance of neoliberal development rationalities; and systemic biases resulting from the nation state as the principle unit of UNFCCC negotiation. These forces lie beyond the explanatory scope of first and second dimensions of power-over and help to explain why stakeholder engagement in adaptation decision making remains superficial in nature and why adaptation responses in agriculture can be considered 'common and non-differentiated'. We argue for increased awareness of third dimension manifestations and impacts of power in adaptation literature to facilitate the improved participation of marginalized stakeholders in UNFCCC and domestic adaptation decision making forums, to increase the diversity of adaptation options available to smallholders, and ultimately, to improve the attribution of responsibility for adaptation outcomes.

**Keywords:** climate change, agriculture, adaptation, power-over, preference shaping, national adaptation plans

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# Exploring farmer preference shaping in international agricultural climate change adaptation regimes

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ABSTRACT

Questions of equity, justice, and fairness in the international agricultural adaptation regime have emerged in recent years, prompting interest in regime power dynamics. Here, a three-dimensional conceptual framework of 'power as domination' is applied to the UNFCCC adaptation regime. We argue that this 'power-over' framing is an important lens through which to view adaptation, a field dominated by 'power-to', capacity-based constructs. The framework distinguishes between power-over manifesting through decision-making, agenda setting and preference shaping. Through a literature review we demonstrate that first and second dimension behavioral views of power-over fail to account for the subtle ways in which the interests and preferences of smallholder farmers are unknowingly shaped and restricted within the regime. Potential sources of third dimension preference shaping power are explored in a survey with high-level decision makers involved in National Adaptation Plans (NAP) development in seven countries. The results suggest that several inter-related features of the international agriculture adaptation regime collectively contribute to the shaping of interests and preferences of smallholders: prevailing discourses of uncertainty and the perceived limited capacity of smallholders; the resulting privileged status of 'expert' decision makers; the predominance of neoliberal development rationalities; and systemic biases resulting from the nation state as the principle unit of UNFCCC negotiation. These forces lie beyond the explanatory scope of first and second dimensions of power-over and help to explain why stakeholder engagement in adaptation decision making remains superficial in nature and why adaptation responses in agriculture can be considered 'common and non-differentiated'. We argue for increased awareness of third dimension manifestations and impacts of power in adaptation literature to facilitate the improved participation of marginalized stakeholders in UNFCCC and domestic adaptation decision making forums, to increase the diversity of adaptation options available to smallholders, and ultimately, to improve the attribution of responsibility for adaptation outcomes.

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## 1. Introduction

Adaptation to climate change has gained prominence in recent international negotiations (Kates, 2000; Smit and Wandel, 2006; Pielke et al., 2007; Adger et al., 2006; Schipper, 2006). This can be attributed to the slow progress in achieving binding emission reduction mechanisms as well as the manifestation of climate impacts through increased frequency of extreme events (IPCC, 2013). The agricultural sector is both especially vulnerable to the impacts of climate change and a major contributor to greenhouse gas emissions (GHGs) (Burton and Lim, 2005; Vermeulen et al., 2012a,b). However, the sector has yet to receive serious attention during United Nations Framework Convention on Climate Change (UNFCCC) negotiations (Campbell et al., 2014). This is due to a variety of factors including the degree to which agriculture features in national economies, the prominence of 'competing' sectors for climate finance (e.g. forestry), fear over domestic

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restrictions on land use management and terms of trade, among other barriers.

The competing viewpoints around climate change responses in agriculture have been responsible for delaying implementation of adaptive measures to assist highly vulnerable small-scale farmers. Consequently, the ability of international negotiations to deliver equitable and just outcomes for the rural poor has been put in to question. While there have been many examinations of both procedural and distributive justice in the area of climate change mitigation, the issue of justice firmly applies to adaptation as well (Arler, 2001; Azar, 2000; Jamieson, 2001; Muller, 2001; Ringius et al., 2002; Rose and Kverndokk, 1998; Morgan and Waskow, 2013). Discussions of equity, justice and fairness in the climate change adaptation literature have emerged in greater number as of late, particularly in the realm of adaptation financing and stakeholder participation (Thomas and Twyman, 2005; Adger et al., 2006; Dellink et al., 2009; Grasso, 2010; Barrett, 2013; Reid and Huq, 2014; Reed, 2008; Sherman and Ford, 2014; Few et al., 2007).

Underlying the discussions on equity, justice, and fairness in each of these studies is the concept of power. Power relations between actors in adaptation regimes can determine how adaptation is defined, who or what is considered vulnerable, and what adaptive measures are prioritized. Explicitly acknowledging the role of power in adaptation regimes can improve our understanding of its origins and manifestations, and lead to improved policy and institutional design (Sherman and Ford, 2014; Taylor, 2013). Yet how these power dynamics are conceived in studies of governance is not well understood (Biermann et al., 2010; Barnett and Duvall, 2005a; Barnett and Duvall, 2005b; Lebel, 2006; Okereke et al., 2009; Sova et al., 2014). This is due to the diverse ways in which we can think about power, and its limited application to date in empirical studies.

Broadly speaking, this article seeks to make power the subject of analysis instead of, in the words of Mitchell, "an answer known in advance" (2002, p. 53). It seeks to provide a more thoroughgoing synthesis of power than previous treatments in environmental governance literature. We review diverse conceptualizations of power across various disciplines and introduce modern interpretations of power as advanced by 'elite-centered' and 'pluralist' debates in political science. Steven Lukes, emerging from this debate, offers a three-dimensional view of power that is adopted here (1974, 2005). Lukes' framework, we argue, provides an alternative to the predominant 'view' of powerlessness in adaptation regimes as a product of limited capability or capacity (i.e. a lack of power-to), focusing attention instead towards powerlessness as a relational construct (i.e. power-over).

Specifically, in advancing the three-dimensional lens we argue that when analyzing agricultural climate change adaptation traditional behavioral views of power-over (i.e. decision making and agenda setting) are insufficient in capturing the myriad ways in which power manifests in climate change adaptation regimes. That is, power in the UNFCCC is derivative not only of visible negotiating resources or the established 'rules of the game' outlined in the convention's charter, but is also derived from a less-visible, third-dimension of power-over (i.e. preference shaping) often neglected by positivist scholars (Lukes, 2005; Plaw, 2007). This paper asks: "in what ways does third dimension preference shaping power manifest in the international agricultural adaptation regime?" In advancing this question, we propose a typology of third dimension preference shaping sources that disadvantage smallholder farmers, and illustrate instances of preference shaping through literature and survey data.

Following this introduction, a broad overview of the treatment of power across various disciplines is provided, along with a brief summary of power in adaptation literature. Lukes' dimensional view of power is then introduced in Section 3 and is followed by an assessment of the current state of agricultural adaptation within the United Nations Framework Convention on Climate Change (UNFCCC) in Section 4. A literature review applying Lukes' dimensional framework of power to the UNFCCC process is provided in section 5 (first and second 'behavioral' dimensions) and 6 (third dimension preference shaping). Sources of third dimension power resulting from section 6 are further evidenced through a questionnaire administered to high-level decision-makers from seven developing countries at COP 19 in Warsaw in sections 7 and 8. This is followed by a discussion regarding the utility of the three dimensional view and the insights it produces in section 9 and concluding remarks in section 10.

## 2. Power in adaptation: power-to versus power-over

Power is a ubiquitous term and its various origins, ontological and epistemological foundations are difficult to identify. Given the 'essentially contested' nature of power, multiple typologies and theories have developed in order to capture its essence (Gallie, 1956). 'Bases', 'foundations', 'sources', 'species', 'manifestations' and 'faces' have all been used in describing power or its characteristics. Some theorists, for example, have aimed to explore the origins of power (i.e. Where is power derived from? What are its sources?) (Weber, 1978; Hindess, 1982; Oliga, 1996; Clegg, 1989; Flood and Romm, 1996; Parsons, 1967; Arendt, 1970; Giddens, 1984). Others have aimed to identify the basic nature of power (i.e. Where does power lie? What are the principle characteristics of power?) (French and Raven, 1959; Foucault, 1982, 1980; Greene and Elfrers, 1999; Bourdieu, 1991, 1979), while some have sought to identify the manifestations of power (i.e. How do we know that power has been 'exercised'?) (Dahl, 1961; Polsby, 1980; Bachrach and Baratz, 1962; Lukes, 1974, 2005; Wolfinger, 1974; Mills, 1956). Adding to the typological complexity, many theorists explore some combination of these framings. As Ringen points out, some "definitions [of power] conflate the thing power and the outcome of its use. In methodological language, they do not separate the independent from dependent variables which is a recipe for confused analysis" (2013, p. 42).

One consistent, prevailing dichotomy used by power theorists consists of distinguishing between 'power to' and 'power-over' (Morriss, 2002). This reflects the understanding that power is derivative of not only one's individual or collective agency (power-to) but also the relational, and asymmetrical interactions between the agencies of two or more individuals (power-over). Power-to refers to power as a capacity, whether or not that capacity is exercised. Meanwhile, power-over indicates the securing of compliance, or domination, by one group over another. Of course, these two framings cannot exist independently of one another, and power-over is considered by some authors to be a 'subspecies' of power-to (Lukes, 2005).

Climate change adaptation theorists have written widely on the concept of adaptive capacity. Adaptive capacity can be defined as the ability or potential of a system to respond successfully to climate variability and change (Adger et al., 2007). In the language of power theorists, adaptive capacity represents a clear power-to framing. In seeking to raise the adaptive capacity of vulnerable populations, theorists propose institutional designs and new technologies, both contributing to greater resource and social capital availability but without explicit recognition of relational power. This focus on power-to, we argue, does not place sufficient emphasis on the subtle ways in which certain actors exercise power-over others within adaptation regimes. That is, when power-to interventions fail to achieve the desired results and commensurate improvements in adaptive capacity, we must look beyond the capacity framing at asymmetrical or relational

dynamics between actors. As it is the exercise of domination over others that is of immediate concern in evaluating social systems (Plaw, 2007), a power-over framing in adaptation can assist in the allocation of responsibility for adaptation outcomes that does not fall on the vulnerable alone.

## 3. Three-dimensional power

This paper adopts an understanding of power as captured in Lukes' seminal work, "Power, A Radical View (PRV)" (1974, 2005), which traces debates between 'elite-centered' and 'pluralist' power theorists in the United States in the 1950s and 1960s and articulates three emerging dimensions of 'power as domination': decision making; agenda setting; and preference shaping. Lukes' framework was among the first to facilitate the empirical study of power beyond its visible manifestations as traditionally considered by positivist scholars. His three dimensional view promotes a wider understanding of power that does not require actual foresight and positive actions in its exercise. In fact, in Lukes' framework, power does not "need to involve deliberate and strategic manipulation" (Lukes, 2006, p. 171). Instead, he points to the ways in which individuals in strategic positions become complicit in domination through their inaction or through other less visible, and sometimes unintentional, power exercises.

### 3.1. The first dimension of power—decision making

Lukes' first dimension of power has been historically advanced by 'pluralist' ideologies; the so-called neo-elitists (Dahl, 1961; Polsby, 1980; Wolfinger, 1974). Robert Dahl is considered the preeminent scholar within this dimension, and his work "Who Governs" (1961) and "A Critique of the Ruling Elite Model" (1958) treats the analysis of power in an objective, quantifiable way (Merelman, 1968). Dahl believed that studies of U.S. politics that suggested power to lie in the hands of a ruling elite were flawed in that the analyses reflected reputation, not actual power. The solution lied in studying the visible, intentional exercises of power in key decision making settings and ascertaining the frequency of who wins and who loses with respect to the issues at hand (Lukes, 1974). The pluralist perspective owes its name to Dahl's findings that power in New Haven (his seminal case study) is distributed amongst a plurality of actors, not concentrated in the hands of a ruling elite. The pluralist view of power can be described such that "A has power over B to the extent that he can get B to do something B would not otherwise do" (Dahl, 1957, pp. 202–203). Lukes succinctly defines this first dimensional view of power as one that "focuses on behavior in the making of decisions on issues over which there is an observable conflict of (subjective) interests, seen as express policy preferences, revealed by political participation" (2005, p. 19).

Lukes and other critics of the one-dimensional view of power note that this approach recognizes only one face of power, and, in particular, ignores those situations in which decision are prevented from happening or are not taken. As such, the pluralist framework is charged with taking over the bias of the political system under observation, simply reflecting the inherent biases as evidenced by actual, visual behavior (Lukes, 2005).

### 3.2. The second dimension of power—agenda setting

The second dimension of power is captured in the work of Bachrach and Baratz (1962) in their critique of purely pluralistic, behavioral views of first dimensional power. In articulating this second dimension of power, Barchrach and Baratz employ C. Wright Mills' seminal statement that "whether they [decision makers] do or do not make such decision is less important than the fact that they do occupy such pivotal positions" (Mills, 1956, p. 4). Bachrach and Baratz criticize the pluralist's over-emphasis on behavior, and failure to take in to account so called 'non-decisions', or what they suggest to be the "confining the scope of decision making to relatively 'safe' issues" (1970, p. 44), favorable to a ruling elite or status quo defenders. Power in this second dimension, then, is the power to decide what is decided, or "a qualified critique of the behavioral focus on the first view allowing for consideration of the ways in which decisions are prevented from being taken on potential issues over which there is an observable conflict of (subjective) interests, seen as embodied in express policy preferences and sub-political grievances" (Lukes, 1974).

While Bachrach and Baratz's second dimension marked a welcome advance on the work of pluralist theorists, critics question whether non-decisions (e.g. if B fails to act because he anticipates A's reaction) lend themselves to empirical study. Additionally, in his critique Lukes suggests that Bachrach and Baratz remain too committed to the study of actually behavior and concrete decisions (and non decisions). "In both cases (that of first and second dimension theorists)", Lukes suggests, "the assumption is that interests are consciously articulated" (2005, p. 24). The third dimension of power challenges this assumption.

### 3.3. The third dimension of power—preference shaping

Common to the first two dimensions of power is the existence of an identifiable conflict of competing interests; conflict that is played out head-to-head (first dimension) or which is denied entry in to the political process (second dimension). Bachrach and Baratz suggest that when no conflict can be identified then it must be presumed that consensus on the allocation of values has been reached (1970). Lukes rejects this view, claiming that, in fact, the "most effective and insidious use of power is to prevent such conflict from arising in the first place" (2005, p. 27).

The third dimension of power is defined by a notable absence of an overt conflict of competing interests. It refers to the tendency for potential issues or conflicts to be successfully kept out of politics—in both formal and informal venues—by "shaping the perceptions, cognitions and preferences of subordinates in such a way that they accept their role in the existing order of things or imagine no alternative to it" (Lukes, 2005, p. 28). This third dimension is especially concerned with the topic of interests (i.e. what is important in peoples lives) and the ability of an agent to impact on the interests of a subject. Specifically, Lukes defines third dimensional power as:

"Involving a thoroughgoing critique of the behavioural focus of the first two views as too individualistic and allows for consideration of the many ways in which potential issues are kept out of politics, whether through the operation of social forces and institutional practices or through individual's decisions. This, moreover, can occur in the absence of actual, observable conflict, which may have been averted—though there remains here an implicit reference to potential conflict. This potential, however, may never in fact be actualized. What one may have here is a latent conflict, which consists in a contradiction between the interests of those exercising power, and the real interests of those they exclude (2005, p. 28)"

In summary (see Table 1), Lukes' dimensional framework focuses on power-over (i.e. power as domination) as it manifests in decision making, agenda setting, and preference shaping dimensions. The first two dimensions examine visible decision making and so called non-decisions as they occur in formal and informal political forums. The third dimension, commonly ignored by behaviourist or positivist scholars, is characterized by a distinct lack of conflict between actor groups and addresses the ways in which the interests and preferences of certain actors are

**Table 1**
Summary of Lukes' dimensional views of power.

| One-dimensional view of power (decision making) | Two-dimensional view of power (agenda setting) | Three-dimensional view of power (preference shaping) |
|---|---|---|
| Behavioral. Focus on: | (Qualified) critique of behavioral focus. Focus on: | Critique of behavioral focus. Focus on: |
| (a) Decision making | (a) Decision-making and nondecison-making | (a) Decision making and control over agenda (not necessarily through decisions) |
| (b) Key issues | (b) Issues and potential issues | (b) Issues and potential issues |
| (c) Observable (overt) conflict | (c) Observable (over or covert) conflict | (c) Observable (overt or covert), and latent conflict |
| (d) (Subjective) interests, seen as policy preferences revealed by political participation | (d) (Subjective) interests, seen as policy preferences or grievances | (d) Subjective and real interests |

*Source*: Adapted from Lukes (2005).

unknowingly shaped. Having introduced our conceptual framework, we now turn to our case study context, agricultural adaptation in the UNFCCC.

## 4. Agricultural adaptation and the UNFCCC

The Conference of the Parties (COP) is the supreme body of the UNFCCC. The ultimate objective of the Convention is to prevent 'dangerous' human interference with the climate system. As such, the mission focuses primarily on mitigation of GHG emissions, but the Convention contains several provisions for adaptation, mainly within Article 4 (UNFCCC, 1992). Adaptation to climate change gained momentum starting from the release of the IPCC Third Assessment Report (IPCC, 2001). Since then, several milestones around adaptation have been achieved within the convention including the establishment of the Adaptation Fund (AF), Least Developed Country Fund (LDCF), and Special Climate Change Fund (SCCF). We have also seen the establishment of National Adaptation Programmes of Action (NAPA), the Nairobi Work Program, the Bali Action Plan, and the Cancun Adaptation Framework, including the Adaptation Committee, National Adaptation Plans (NAP), and most recently, the work stream on Loss and Damage (L&D) (UNFCCC, 2013). Each of these initiatives is aimed at providing resources for developing countries to adapt to climate change. Although adaptation has gained momentum in recent years, it still accounts for a comparatively small proportion of investment when compared to mitigation. Of total climate financing, only 5 percent of resources have been directed toward climate change adaptation (Buchner et al., 2012). In Sub-Saharan Africa where 47% of climate change projects are adaptation related, the total amount of funds approved for mitigation projects is three times that of adaptation (Afful-Koomson, 2014).

Meanwhile, impacting both mitigation and adaptation, agriculture is not addressed directly within the UNFCCC COP negotiations (Campbell et al., 2014). Since 2009 at COP 15 in Copenhagen, a host of governments and international civil society organizations have petitioned for agriculture's improved visibility within COP negotiations (Agriculture and Rural Development Day, 2011). Supporters argue that food systems contribute up to 29% of global green house gas (GHG) emissions when indirect sources from land-use change are considered (Vermeulen et al., 2012b). Meanwhile, the sector supports the world's most vulnerable populations and investment has dropped substantially in the past decades. According to Beddington et al. (2012), views on the inclusion of agriculture in international climate agreements depend on the extent to which agriculture features in national economies. Countries experience different vulnerability to climate change, their GHG emissions from agriculture vary in size, as do their opportunities to reduce emissions from changes in agricultural practices. Countries that may benefit from Reducing Emissions from Deforestation and Forest Degradation (REDD+) policies, for example, may see the inclusion of agriculture as delaying or competing for climate finance. Agriculture is currently being discussed in the Subsidiary Body for Scientific and Technical Advice (SBSTA), but recommendations to the COP are not expected until 2016 (Campbell et al., 2014). Ultimately, this article does not constitute a referendum on the inclusion or exclusion of agricultural within the UNFCCC. While our focus remains on adaptation, agriculture's broader position within the UNFCCC is relevant to the underlying power dynamics within the regime.

What follows in the next section is an application of Lukes' first (decision making) and second (agenda setting) dimensions of power within the international agricultural adaptation regime. It introduces behavioral, or visible manifestations of power as they occur through negotiation bargaining resources, traditional balance of power in the international regime, and the power-laden 'rules of the game' within the UNFCCC.

## 5. Decision making and agenda setting: the 'behavioral' dimensions of power

### 5.1. The first dimension of power: decision making in agricultural adaptation

From a first dimension perspective, those opposing agriculture's place within a binding UNFCCC agreement have won-out within the COP process. Decision making at COP relies on consensus as articulated in Article 7 of the Convention; to 'win', in this formal setting is tantamount to breaking with consensus. At COP 19 in Warsaw, the G77 + China defeated consensus over the inclusion of agriculture in SBSTA negotiations, citing that the focus of discussions around agriculture should remained solely on adaptation (Group of 77 and China, 2013).

Power in this first dimension has been the preferred 'lens' of analysis for power theorists in climate change governance. Weiler (2012) exemplifies this approach, writing on bargaining success in climate change negotiations and testing six central categories of bargaining resources for their impact on COP outcomes: country's external power (i.e. GDP and economic status), internal power (i.e. delegation size, negotiation skill, delegate leader), salience (i.e. the level of importance of an issue, in this case vulnerability), extremity of positions (i.e. exaggerated or radical views), hard versus soft bargaining strategies (i.e. threats, demands, proposing solutions, and compromise). He concludes that an increase in external power (total GDP) improves the probability of success, as does high physical vulnerability. These bargaining 'resources', and others, have helped to shape COP outcomes since inception in 1992. There are countless examples of countries 'strong-arming' the UNFCCC process (i.e. A getting B to do something he wouldn't otherwise do). Saudi Arabia, in particular, is regularly cited for its obstructionist behavior during the COP negotiations given their concerns of mitigation policies and their potentially damaging effects on the country's oil-based economy (Depledge, 2008).

The one-dimensional view is also prevalent among international relations theorists. Brenton (2013), for example, argues that efforts to frame the climate discussions in 'ethical and universalist' ways has failed and have given way to power politics focusing on economic competitiveness, energy policy, and financial transfers. Power politics implicates traditionally 'Great Powers' including US, Japan and Russia, the European Union, and an emerging China, India and Brazil. Some international relations authors suggest that the climate change impasse could even be resolved via high-level bilateral negotiations between the U.S. and China (Terhalle and Depledge, 2013).

The first dimension of power, especially visible in agriculture's exclusion from a formal agreement, manifests in instances of visible decision-making in formal settings, where in a case of conflicting interests certain groups win out over that of others by wielding superior resource bases or employing traditional, relational power politics.

### 5.2. The second dimension of power: agenda setting in agricultural adaptation

The 'rules of the game' concerning adaptation are spelt out in UNFCCC Convention articles. Adaptation, while not addressed comprehensively in any single article (nor in the charter's 'objective'), is referred to across the document outlining actions related to funding, insurance, and the transfer of technology to developing nations (Mace, 2006). Significant efforts have been made to ensure second dimension equity within the UNFCCC process (Heyward, 2007). The fact that the climate change convention is handled under the auspices of the United Nations has handed several procedural victories to developing countries in the way of equitability, including a voluntary fund for developing country participation in COP meetings, extension of UNFCCC membership to include UN specialized agencies, and the inclusion of non-governmental organizations (NGOs) (Okereke, 2008). Consensus voting also offers developing nations a veto against proposals by developed countries (although this tactic has been used more frequently *by* developed nations). Moreover, the fundamental principle of 'common but differentiated responsibilities' (CBDR) seeks to ensure fair, balanced and equitable process by recognizing the differing economic circumstances and 'special needs' of countries, separating signatories in to Annex I (developed countries) and non-Annex I (developing countries) categories, each with differing, voluntary burdens. Developing nations within the UNFCCC, at present, face no financial obligation. Outwardly at least, the UNFCCC 'rules of the game' seem to favor developing nations.

Yet the lack of funding commitment by Annex I countries can be considered an act of non-decision making consistent with second-dimension power. While the National Adaptation Plans (NAP) and National Adaptation Programmes of Action (NAPA) guidelines seek to ensure equity in procedural justice, if these programs are not adequately funded then concerns regarding distributive justice may remain unmet. Contributions to the main financial mechanisms for adaptation—Least Developed Countries Fund (LDCF), Special Climate Change Fund (SCCF-A), and Adaptation Fund—remain voluntary. The most recent COP decision text does no more than to "urge developed country Parties to provide and mobilize enhanced financial support to developing country Parties for ambitious mitigation and adaptation actions, especially to Parties that are particularly vulnerable to the adverse effects of climate change" (ADP, 2014, p. 2). To date, the scale of funding for adaptation remains incommensurate with need. As noted in the NAP guidelines, lack of sufficient funding was the principle reason for the lack of NAPA (UNFCCC, 2012). In fact, to-date only USD $603.4 million had been approved for activities from the LDCF (GEF, 2013). This compared to annual adaptation needs assessments estimated to be in the range of USD $100 billion to USD $450 billion a year (Schalatek et al., 2012). Annex I countries are simply not making good on their financial pledges.

Finally, Mace (2006) discusses buried inequities in adaptation funding, another second dimension power manifestation. The UNFCCC's financial mechanism, the Global Environment Facility (GEF), takes significant decisions outside of the negotiating arena. While there is equal representation from both developed and developing countries on the 32-member GEF Council, decisions are made on a double weighted majority that takes in to account the member's total financial contributions. This, according to Streck, means that the votes of GEF council members from countries that make the large contributions to the UNFCCC, in effect, weigh more (2001).

The second dimension of power, then, manifests through the UNFCCC 'rules of the game', like consensus voting, Annex 1 and non-Annex 1 classifications, and the underlying principle of CBDR. Non-decision making, another critical second dimension concept, manifests through non-funding of adaptation initiatives by developed countries.

If the analysis were to end after the first and second dimensions of power, one might be tempted to conclude that developing countries and their constituents (farmers, in this case) are well placed within the international adaptation regime, with a strong G77 + China voting block and rules of the game that seek to ensure equitable outcomes for all parties. There are still, however, less visible factors that shape the interests of smallholders that cannot be accounted for by the purely behavioral manifestations identified here. This includes national and subnational features of UNFCCC member countries that can shape international outcomes (McKibbin and Wilcoxen, 2002; Sprinz, 2001; Bernstein, 2002). The following section introduces potential third dimension, preference shaping power manifestations within the regime as derived from adaptation literature. This includes discourses of uncertainty and the perceived capacity of farmers, the underlying neoliberal development rationality that determines 'viable' adaptation pathways, and systemic bias resulting from the distance that farmers sit from international negotiations.

## 6. The third dimension of power: preference shaping in agricultural adaptation

Lukes provides admittedly little direction for analysts to determine what system features enable the third dimension of power to be exercised. This is because these preference shaping features are contextually dependent. Several sources of preference shaping have been explored by Lukes' and subsequent authors including the perpetuation of historical narratives to support a particular view, inducing, reinforcing and exploiting misconceptions (Gaventa, 1980), flooding the media with a biased perspective (Graetz and Shapiro, 2005), and leveraging assumptions regarding the anticipated response of powerful actors (i.e. the rule of anticipated reactions) to a potential action (Freidrich, 1941; Crenson, 1971), among others. The sources of preference shaping in these previous studies have been derived anecdotally, without the direction of an analytical framework.

We, however, propose that from the limited accounts of such factors, three sources of preference shaping power can be explored, relevant to the context of climate change adaptation: (1) the dominant narratives (discourses) that contribute to adaptation stakeholder and problem identification; (2) the prevailing 'rationalities' and technologies of government that have come to be accepted as inevitable in identifying solutions; (3) and the institutional design features that inadvertently limit an individual's choices or exclude certain groups from participating in

decision making. These sources are introduced here and explored in further detail in sections 7 and 8.

### 6.1. Dominant narratives and discourses

Climate change adaptation in agriculture is dominated by discourses of uncertainty (Adger and Vincent, 2005; Antón et al., 2013; Vincent, 2007; Vermeulen et al., 2013; Dovers and Hezri, 2010; Brugnach and Ingram, 2012). As noted in the IPCC 5th Assessment Report, decision-making around climate change differs from 'traditional' decision-making in that the time horizons for actions are longer, and the potential impacts affect a wider range of human and earth systems (2014). This poses significant challenges for conventional economic and environmental planning tools, especially in the agricultural sector, producing a reliance on 'robust decision support' tools like global climate models (GCM), empirical vulnerability assessments, and integrated assessment models (Ramirez-Villegas et al., 2013; Kissinger et al., 2014). Few et al. (2007) argue that given long term planning requirements and uncertainty, there is an inherent tension in adaptation planning between the principles of public participation and the unique requirements of expert-led anticipatory decision-making. The prevailing discourse of 'uncertainty' privileges expert intervention and technical knowledge over that of local and traditional knowledge within adaptation regimes (Huq and Reid, 2003; Huq and Khan, 2006; Spires et al., 2014; Kosamu, 2013; Thornton and Comberti, 2013). This reduces the need for integration of 'non-experts' or those perceived to have low capacity (e.g. smallholders) in to the decision making process. Dominant discourse of uncertainty and the perceived capacity of non-expert agents constitute the first potential source of third dimension power explored here.

### 6.2. Prevailing 'rationalities' of government

The effect of this perceived reliance on expert-led decision-making in adaptation regimes is a bias toward the promotion of neoliberal rationalities in adaptation responses (Okereke, 2008; Fieldman, 2011). Rationalities, or 'inevitable', unquestioned logics are established through a sustained preference for certain technologies of government over others, as captured in Foucault's concept of 'governmentality' (1991). As stated with a high degree of certainty and consensus in the IPCC Fifth Assessment Report, adaptation interventions remain mainly engineered and technical in nature (Agrawal, 2008; Spires et al., 2014; Pramova et al., 2012; Khan and Roberts, 2013; IPCC, 2014). This neoliberal rationality favoring hard, techno-fix interventions legitimizes some adaption responses over others often limiting the diversity of adaptation pathways available to smallholders (Thornton and Manasfi, 2010). It is, in effect, a form of a-political adaptive preference shaping (Elster, 1983) in which smallholders are unaware of the portfolio of adaptation responses available to them and the subtle ways in which that portfolio has been modified such that some adaptations are supported and others blocked. The second proposed preference shaping source, then, is prevailing rationalities and technologies of government.

### 6.3. Systemic institutional bias

COP is characterized by a system of representation where small-scale farmers are represented in formal negotiations by expert agents of their respective governments, or by other vested non-governmental organizations. Procedural equity within the UNFCCC process, then, extends as far as the nation state, the principle unit of negotiation. That is to say, equity within adaptation regime focuses on poor countries and not poor people. Yet, as Kates demonstrates, interests of poor people are not always the same as the interests of poor countries, since in the interest of 'development' the poor may grow poorer (2000). Most non-Annex I, resource dependent societies exhibit profound structural inequalities that reinforce poverty and status quo class regimes (Ribot, 2010; Huq and Khan, 2006). Some adaptation theorists refer to this as the development deficit (Burton, 2009; Fankhauser and McDermott, 2014). The nation state as the principle unit of UNFCCC negotiation and existing development deficits do not constitute a conscious exclusion of smallholders, but are rather the product of unintentional, and perhaps unavoidable, characteristics of complex multi-level systems. Processes of regime formation in such instances occur at a distance and necessarily limit public participation (Okereke, 2008). That climate change is a global phenomenon that manifests locally is what Ayers refers to as the adaptation paradox (2011). The final source of preference shaping is systemic institutional bias, and deals with the collective multi-level nature of the climate change response and the inadvertent structural challenges it presents smallholders.

The sources of preference shaping explored here (dominant narratives, prevailing rationalities, and systemic institutional bias), each highlight exercises of power that lie beyond the explanatory scope of first and second dimensions. Table 2 summarizes the means, definition, responsible agents, and trends in adaptation regimes for each of the three sources of preference shaping discussed here.

While these sources of third dimension preference shaping have been derived from adaptation literature to this point, they are explored empirically using survey data from select policy makers at COP 19 in Warsaw in section 7 and 8.

## 7. Validating sources of third dimension 'preference shaping'

A questionnaire containing 24 Likert-type questions (Likert, 1932) was completed by National Adaptation Plan workshop participants at COP 19 in Warsaw and is used to further explore these proposed sources of preference shaping. Likert-scale questions are a common response scaling technique measuring the level of respondent agreement or similar metric (e.g. 'agree', 'strongly agree', 'undecided', etc.). The survey aims to highlight (albeit indirectly) the prevalence of narratives of uncertainty and the associated perceived importance of 'expert' agents, the prevalence of a-political, techno-fix interventions or neoliberal rationalities, and multi-level systemic deficiencies in the adaptation regime—each indicative of third dimension power as introduced in section 6.

A total of 14 high-level representatives—the entire group of workshop participants— from Mali, Niger, Burkina Faso, Kenya, Colombia, Guatemala, and India completed the questionnaire. The group consisted of both 'political' and 'technical' representatives, including climate change council members, representatives from various ministries of agriculture and environment, national planning commissions, and UNFCCC focal points. The respondents were chosen for their intimate knowledge of agricultural NAPs in their country. These stakeholders came together for a CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS) workshop entitled "National Adaptation Plans and agriculture: A learning workshop", held on November 13-14th, 2013.

The printed questionnaire consisted of two sections. The first asked the respondents to identify the importance of various actor groups in shaping the NAP for agriculture in their countries. In the absence of NAP development, respondents were invited to respond more generally with respect to "agricultural adaptation plans" in their respective countries. The second section of the survey asked respondents to indicate their level of agreement with 18 questions concerning the proposed sources of preference shaping. In both

**Table 2**
Summary of sources of preference shaping in agricultural climate change adaptation regimes.

| Source | Definition | Means | Responsible Agent | Trend in adaption regimes |
|---|---|---|---|---|
| a. Dominant discourses and narratives | Preference shaping occurring through an ensemble of ideas, concepts, categories, and systems of thought through which meaning is given to social and physical phenomena and 'truths' established | Discourses around uncertainty, expertise, and stakeholder capacity | Academics, development practitioners, bi/multi-lateral donors, | Prevailing discourse of uncertainty has elevated the status of experts and technical knowledge at the expense of local traditional knowledge. |
| b. Prevailing 'rationalities' | Preference shaping occurring through the perpetuation of taken-for-granted notions and 'technologies' of government that predetermine system boundaries, bias problem identification, and make specific outcomes more plausible than others, or seemingly inevitable. | 'Rendering technical' of adaptation decision-making and the anti-politics of adaptation | Government technocrats, epistemic communities, donors | A prevailing neoliberal rationality has given preferential treatment to engineered and technical adaptation interventions, and rendered adaptation decision making a-political with the effect of limiting the diversity of adaptation pathways available to smallholders. |
| c. Systemic institutional bias | Preference shaping occurring through the unintentional result of collective action and extensive webs of interaction and historical precedent beyond the capacity of any individual element, manifesting through systems of representation, multi-level and 'polycentric' governance through which meaning is negotiated and transformed. | Nation state as the unit of negotiation, cross-level dynamics, proximity and access to decision making | UNFCCC, national governments, status quo development regime | The multi-level and collective nature of the adaption regime (i.e. the adaptation paradox), together with existing development deficits unintentionally limit access to and proximity of smallholders to key decision making forums |

*Source*: Authors.

sections, respondents were asked to respond to each question and leave no response blank. The survey was completed individually.

Given the sample size ($n = 14$) and the diverse combination of question themes (particularly in the second 'agreement' section of the questionnaire), the responses from each Likert 'range' have not been summed for interval analysis, nor has the data been analyzed against any respondent characteristic (e.g. country LDC or non-LDC status). Responses are treated here as simply descriptive, ordinal data reflecting the subjective perceptions of adaptation 'planning agents'. The results herein are not intended to provide conclusive evidence of sources of preference shaping, but rather to illustrate that these proposed sources are worthy of continued investigation.

## 8. Survey results

Table 3 contains the results of survey section one, 'the perceived importance of actor groups in shaping agricultural adaptation plans'.

Table 4 contains the results of the section two 'agreement' portion of the Likert-type questionnaire. The questions have been grouped according to the proposed source of preference shaping to which they most closely pertain.

With respect to the first proposed source of third dimension power, dominant narratives and discourses, Table 3 effectively evidences the privileged status of experts within the adaptation regime. 'National experts', 'international experts' and 'development partners' are perceived to be the most important actors in the development of agricultural adaptation plans in the seven countries present. When asked to assess the importance of 'national experts', 100% of respondents suggested them to be either 'important' (57%) or 'very important' (43%) in shaping agricultural adaptation plans. The same trend holds true for international experts. Meanwhile, the importance of non-technical (non-expert) actors in the regime was far less decisive. The importance of 'farmers' in shaping adaptation plans, for example, was equally split between those perceiving farmers to be 'very

**Table 3**
Perceived importance of actor groups in shaping agricultural adaptation plans.

| How important was/is the role of the following actor groups in shaping agricultural adaptation plans in your country? | Very Important (% respondents) | Important | Moderately Important | Of Little Importance | Unimportant |
|---|---|---|---|---|---|
| Development Partners | 36% | 29% | 36% | 0% | 0% |
| Farmers | 21% | 14% | 36% | 29% | 0% |
| Political Parties | 0% | 0% | 14% | 57% | 29% |
| Bilateral/Multilateral Donors | 14% | 36% | 43% | 7% | 0% |
| Private Sector | 0% | 14% | 50% | 29% | 7% |
| National Experts | 57% | 43% | 0% | 0% | 0% |
| International Experts | 31% | 46% | 23% | 0% | 0% |
| Traditional Authorities/Community Leaders | 38% | 8% | 23% | 15% | 15% |

*Source*: Authors.
Note: Table 3 evidences the importance attributed to 'experts' within the adaptation regime, a key contributor to third dimension preference shaping power perpetuated by discourses of uncertainty and the perceived low capacity of smallholders and other 'non-experts'. National and international experts and development partners are nearly unanimously considered highly important, while non-technical, non-expert agents like farmers, the private sector, community leaders, and political parties are considered far less important to NAP formulation.

**Table 4**
Stated level of agreement with statements corresponding to proposed sources of preference shaping in NAP development.

a. Dominant narratives

| Please indicate your level of agreement with the following statements: | Strongly Agree (% respondents) | Agree | Undecided | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Development partners and donors in my country have too much control over agricultural adaptation policy objectives | 14% | 0% | 57% | 29% | 0% |
| District level (or equivalent) agencies currently have the capacity to plan for climate change adaptation | 0% | 21% | 14% | 64% | 0% |
| Small Scale Farmers have the knowledge and capacity to adapt to climate change without the need for policy support | 7% | 21% | 14% | 21% | 36% |
| International NGOs and development partners are more active than line ministries in delivering agricultural adaptation services | 7% | 29% | 7% | 50% | 7% |
| The best way to set agendas in adaption policy is to provide technical knowledge | 29% | 64% | 7% | 0% | 0% |
| Farming communities have strong knowledge/awareness regarding climate change and its impacts | 8% | 54% | 15% | 23% | 0% |

b. Prevailing rationalities

| Please indicate your level of agreement with the following statements: | Strongly Agree (% respondents) | Agree | Undecided | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Most agricultural adaptation interventions in my country come form existing agricultural policies | 8% | 69% | 15% | 8% | 0% |
| Agricultural adaption policy making is based on evidence, not by political negotiation. | 7% | 57% | 7% | 21% | 7% |
| The ministry of finance determines what adaption projects will get funded and those that will not | 7% | 29% | 14% | 43% | 7% |
| The cabinet determines what adaption projects will get funded and those that will not | 0% | 36% | 7% | 43% | 14% |
| It is important that the president or prime minister's office (or equivalent) lead climate change coordination in my country | 38% | 46% | 15% | 0% | 0% |
| The best way to influence agendas in adaption policy in my country is to provide funding for adaption projects and programs | 29% | 50% | 21% | 0% | 0% |

c. Systemic institutional bias

| Please indicate your level of agreement with the following statements: | Strongly Agree (% respondents) | Agree | Undecided | Disagree | Strongly disagree |
|---|---|---|---|---|---|
| Small scale farmers are aware of the official development planning procedures in their villages/districts | 0% | 14% | 21% | 50% | 14% |
| Agricultural adaption plans in my country accurately capture/incorporate the needs of farmers | 14% | 64% | 7% | 14% | 0% |
| Decisions about agricultural climate change adaptation interventions are made exclusively at the national level | 0% | 50% | 14% | 29% | 7% |
| Decisions (by negotiators) made at COP affect my national policy decisions | 14% | 64% | 14% | 7% | 0% |
| Local development planning in my country is dominated by local elites | 7% | 21% | 36% | 36% | 0% |
| Decision makers are aware of the needs of farming communities and these needs are incorporated in to policy | 14% | 36% | 29% | 21% | 0% |

*Source*: Authors.
Note: Table 4 evidences the importance attributed to the provision of technical knowledge within the NAP process, the importance of policy precedence (i.e. existing development rationalities) in shaping adaptation priorities, and farmers' perceived lack of access and capacity to participate in the adaptation planning processes. Each of these concepts contributes to third dimension, preference shaping power within the regime.

important/important' (36%) and those perceiving farmers to be 'of little importance/unimportant' (29%). A similar trend is true for 'traditional authorities/community leaders'. Importantly, political parties were perceived to be the least important of the non-expert actor groups.

In the related area of prevailing rationalities, the second proposed source of third dimension power, delegates confirmed that NAP planning is an empirical, technically driven process as opposed to a political negotiation (Table 4). This provides a space for prevailing technical rationalities to bias problem identification and influence the 'technologies' slated for adaptation without political interference. For example, 77% of respondents suggested that "most agricultural adaptation interventions in my country come from existing agricultural practices", highlighting that many adaptation strategies are drawn from technical precedence and existing plans. While the survey does not capture evidence regarding trends in hard or soft adaptation, it is suggestive of the a-political nature of the adaptation planning process. While 85% of respondents either agreed or strongly agreed with the statement "It is important that the president or prime minister's officer lead climate change coordination in my country" when asked to assess the importance of 'political parties' in shaping agricultural adaptation plans in the country, 86% of respondents suggested them to be 'of little importance' or altogether 'unimportant' (Table 3). This suggests that political party leaders as President or Prime Minister are perceived as more closely aligned with the bureacratic and technocratic mechanism of the state than with the political parties to which they belong.

Finally, regarding systemic institutional bias, the final proposed source of third dimension power, the interests of farmers are presumed to be captured in adaptation plans, yet paradoxically there is disagreement as to whether farmers are important in adaptation policy development, and general agreement that farmers are unaware of official development planning procedures. For example, while 79% of respondents suggest that "agricultural adaptation plans in my country accurately capture/incorporate the needs of farmers" only 36% of respondents suggest that farmers are 'important' or 'very important' to the development of agricultural adaptation plans". This could suggest that while farmers interests are reflected in policy, that those same farmers are not perceived to be influential with regard to plan development, or are even viewed as an impediment. Furthermore 62% of respondents suggested that

"farmers have strong knowledge with regard to climate change and its impacts", yet 64% 'disagreed' or 'strongly disagreed' that "farmers are aware of the official development planning procedures in their villages/districts". This implies that knowledgeable farmers may lack an understanding of the local planning structures that would allow for the integration of their local and knowledge or expertise.

## 9. Discussion and implications

The results of the literature review and survey serve to evidence the existence of a third dimension of power within the international agricultural adaptation regime—a dimension beyond that of purely behavioral phenomenon that invisibly shapes interests and preferences and lies beyond the realm of political conflict. These third dimension manifestations of power including dominant narratives, prevailing rationalities, and systemic institutional bias can shed light on key trends in the international adaptation regime. Results demonstrate the importance attributed to 'experts' within the adaptation regime, the limited importance attributed to political groups, and the perceived limited capacity of farmers to participate in development planning structures, among other features of the adaptation regime. These inter-related sources of preference shaping and their manifestations can collectively lead to superficial stakeholder consultation and what we refer to as the 'common and non-differentiated' nature of adaptation responses. Both of these outcomes, explored here, disadvantage smallholders within the regime.

### 9.1. Stakeholder participation

The multi-level nature of the UNFCCC adaptation regime and the system of representation of the marginalized ensures that first dimension decision making and second dimension agenda setting are undertaken by those actors with privileged access to the negotiating forums. Without direct access to these forums, farmers are left vulnerable to the forces of third dimension 'preference shaping'. Climate change adaptation is particularly vulnerable to 'managerial containment', or the attempt by influential actors to direct stakeholders towards predetermined goals (Few et al., 2007). In the words of Brown (2004), "the only priests allowed in to the temple of environmental decision making are scientists, engineers, economists and lawyers" (pg 111). In adaptation, little regard is given to farmers' mental models pertaining to new farming practices and technologies, despite evidence that traditional knowledge determines the acceptability of adaptation options (Leonard et al., 2013; Wheeler et al., 2013; Biggs et al., 2013; Chhetri et al., 2013; Halbrendt et al., 2014). Invisibility of local knowledge in decision-making can reinforce unequal power and produce inaction, institutional paralysis and clientelism and is the subject of a wide body of critical stakeholder engagement literature in adaptation (Eakin et al., 2010; Jennings, 2009; Sherman and Ford, 2014; Cooke and Kothari, 2001; Treby and Clark, 2004; Rydin and Pennington, 2000). It is unsurprising then, in our survey results, that smallholders' needs are presumed to be included in adaptation plans, yet there is simultaneously serious doubt over whether farmers are 'important' to the NAP development process or are aware of official planning processes. In such a context, genuine stakeholder participation is not needed for expert decision makers to arrive at 'appropriate' adaptation responses, dis-incentivizing the development of participatory planning processes. Third dimension power also affects domestic political institutions and forms of representation in to which adaptation is to be mainstreamed. Issues that have been 'rendered technical'—as we have seen to be true of climate change adaptation—are simultaneously rendered non-political (Ferguson, 1990; Murray Li, 2007). A-politicization elevates technical experts over political representatives within a given regime. This phenomenon is confirmed by our survey results suggesting that political parties are not perceived to be important to the NAP development process. Yet we know that decentralized planning regimes in most countries rely on local political authorities to ensure downward accountability and true participation from key stakeholders (Ribot, 2003). The three sources of preference shaping explored here have very real impacts on stakeholder participation on the adaptation regime.

### 9.2. Common but non-differentiated adaptation

Given the trends in stakeholder participation, it can be said that the NAP development process is a system in which power is dependent upon the acquisition of knowledge and expertise resulting from discourses of uncertainty, the privileged status of 'experts', and the perceived limited capacity of the rural poor to adapt to climate change. This is clearly reflected in the survey results, where national and international experts are perceived as far more important than non-technical, or non-expert actors in the NAP process. Uncertainty, in the case of climate change adaptation, provides an opportunity for 'experts', both qualified and self-proclaimed, to perpetuate the expert-driven style of environmental management (Few et al., 2007). This has important preference shaping implications. Deferral to expert-led decision-making inherently limits the scope of enquiry around adaptation to those issues and responses promoted by state and non-state technocratic agents (Schulz and Siriwardane, 2015). That is to say, the identification of a 'problem' in climate change adaptation is intimately linked to the availability of a solution as identified by decision making 'trustees' (Murray Li, 2007). In climate change adaptation, expert trustees are biased toward neoliberal development rationalities, common to the existing agricultural development regime (Fieldman, 2011; Okereke, 2008; McClure and Baker, 2013). As a consequence, while we outwardly acknowledge common but differentiated responsibilities with regard to GHG mitigation, adaptation responses can be considered *common and non-differentiated*—they are largely homogenous and uniform across diverse contexts. That is, there is an empirical bias toward hard, engineered adaptation solutions and away from ecosystem and community based institutional and social interventions (IPCC, 2014). The focus on a narrowed group of adaptation pathways may ignore or undermine alternative strategies, leading to a reduction in adaptive capacity of smallholders (Thornton and Comberti, 2013). Importantly, in a regime where decision makers and adaptation options come effectively predetermined, the resulting experts can focus more on the capacity of the poor than on the practices through which one group impoverishes another (Murray Li, 2007). That is, if we ignore the impact that these third dimension preference shaping forces have on smallholders, we perpetuate the dominance of power-to, capacity based framings in the adaptation regimes and responsibility for adaptation outcomes remain squarely on smallholders themselves.

## 10. Conclusion

Steven Lukes' dimensional view of power contributes to the thinking of power theorists still today. Among the first frameworks to facilitate the empirical study of power, it has been applied in a variety of settings and the existence of a third, preference-shaping dimension has come to be widely accepted. The application of Lukes' framework in the context of the international agricultural adaptation regime constitutes a major theoretical advance on current power literature. Specifically, it offers the first application of the three-dimensional view of 'power-over' in multi-state and

multi-level regimes, and provides a replicable typology of preference shaping sources. We argue that Lukes' power-over framing is an important lens through which to view climate change adaptation, a field dominated by power-to, capacity-based constructs. Through a literature review we demonstrated that Lukes' first and second dimensional views of power-over—visible decision making and agenda setting—fail to account for the ways in which the interests and preferences of smallholder farmers are unknowingly shaped and restricted, especially by national and subnational forces. That is, visible negotiating resources, the established balance of power between states, and the 'rules of the game' within the UNFCCC contribute to only a partial understanding of power dynamics within the regime. A third dimension is also needed. To advance on existing power literature we proposed a replicable typology of third dimension preference shaping power sources in the adaptation regime, and illustrated the plausibility of those sources through a questionnaire with select high-level technical and political decision makers at COP 19. By exploring dominant narratives, prevailing rationalities, and systemic institutional biases, we conclude that prevailing discourses of uncertainty and the perceived minimal capacity of farmers, the resulting privileged status of 'expert' decision makers, the predominance of neoliberal development rationalities, and the nation state as the principle unit of negotiation each facilitate exercises of power in adaptation regimes that lie beyond the explanatory scope of first and second dimensions. These third dimension forces help to explain why stakeholder (farmer) engagement in the UNFCCC and domestic adaptation decision making forums remains superficial and consultative (as opposed to truly participatory) and why adaptation responses in agriculture in developing countries are 'common and non differentiated', privileging technical, hard adaptation over ecosystem and community-based approaches. The third dimension manifestations of power and their impacts serve to disadvantage smallholders, leading to the shaping or distortion of their interests and preferences. Increased awareness of the prevalence of these insidious forces can lead to improved participation from marginalized stakeholders and to the increased diversity of adaptation options available to smallholders. More broadly, the power-over perspective advanced here can contribute to the improved attribution of responsibility for adaptation outcomes that extends beyond farmers themselves to the system features and actor groups that work to knowingly and unknowingly shape the adaptation outcomes of smallholders.

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## References

Adger, W.N., Agrawala, S., Mirza, M.M.Q., Conde, C., O'Brien, K., Pulhin, J., Pulwarty, R., Smit, B., Takahashi, K., 2007. Assessment of adaptation practices, options, constraints and capacity. Climate Change 717–743.
Adger, W.N., Paavola, J., Huq, S., Mace, M.J. (Eds.), 2006. Fairness in Adaptation to Climate Change. MIT Press, Cambridge, Massachusetts.
Adger, W.N., Vincent, K., 2005. Uncertainty in adaptive capacity. Comptes Rendus Geosci. 337 (4), 399–410, http://dx.doi.org/10.1016/j.crte.2004.11.004.
ADP, 2014. Report of the Ad Hoc Working Group on the Durban Platform for Enhanced Action. UNFCCC, Lima.
Afful-Koomson, T., 2014. The Green Climate Fund in Africa: what should be different? Climate Dev. 1–13, http://dx.doi.org/10.1080/17565529.2014.951015.
Agrawal, A., 2008. The role of local institutions in adaptation to climate change. Paper presented at the Social Dimensions of Climate Change, Washington, D.C., 5–6 March.
Agriculture and Rural Development Day, 2011. Open Letter. Agriculture: A Call to Action for COP17 Climate Change Negotiators. Durban, South Africa.
Antón, J., Cattaneo, A., Kimura, S., Lankoski, J., 2013. Agricultural risk management policies under climate uncertainty. Global Environ. Change 23 (6), 1726–1736, http://dx.doi.org/10.1016/j.gloenvcha.2013.08.007.
Arendt, H., 1970. On Violence. Houghton Mifflin Harcourt, New York.
Arler, F., 2001. Global partnership, climate change and complex equality. Environ. Values 10, 301–329.
Ayers, J., 2011. Resolving the adaptation paradox: exploring the potential for deliberative adaptation policy making in Bangladesh. Global Environ. Polit. 11 (1), 62–88.
Azar, C., 2000. Economics and distribution in the greenhouse. Climat. Change 47, 233–238.
Bachrach, P., Baratz, M.S., 1962. The two faces of power. Am. Political Sci. Rev. 56, 941–952.
Bachrach, P., Baratz, M.S., 1970. Power and Poverty: Theory and Practice. Oxford University Press, New York.
Barnett, M.N., Duvall, R. (Eds.), 2005a. Power in Global Governance. Cambridge University Press, New York.
Barnett, M.N., Duvall, R., 2005b. Power in international politics. Int. Organizat. 59, 39–75.
Barrett, S., 2013. Local level climate justice? Adaptation finance and vulnerability reduction. Global Environ. Change 23 (6), 1819–1829, http://dx.doi.org/10.1016/j.gloenvcha.2013.07.015.
Beddington, J., Asaduzzaman, M., Clark, M., Fernández, A., Guillou, M., Jahn, M., Erda, L., Mamo, T., Van Bo, N., Nobre, C., Scholes, R., Sharma, R., Wakhungu, J. 2012. Achieving food security in the face of climate change: final report from the Commission on Sustainable Agriculture and Climate Change. Copenhagen, Denmark.
Bernstein, S., 2002. International institutions and the framing of domestic policies: The Kyoto Protocol and Canada's response to climate change. Policy Sci. 35 (2), 203–236, http://dx.doi.org/10.1023/A:1016158505323.
Biermann, F., Betsill, M.M., Gupta, J., Kanie, N., Lebel, L., Liverman, D., Schroeder, H., Siebenhüner, B., Zondervan, R., 2010. Earth system governance: a research framework. Int. Environ. Agreements: Politics, Law Econ. 10 (4), 277–298.
Biggs, E.M., Tompkins, E.L., Allen, J., Moon, C., Allen, R., 2013. Agricultural adaptation to climate change: observations from the Mid-Hills of Nepal. Climate Dev. 5 (2), 165–173, http://dx.doi.org/10.1080/17565529.2013.789791.
Bourdieu, P., 1979. Disctinction: A Social Critique of the Judgment of Taste (trans: Nice R). Harvard University Press, Cambridge, MA.
Bourdieu, P., 1991. Language and Symbolic Power. Polity, Cambridge.
Brenton, A., 2013. 'Great Powers' in climate politics. Climat. Policy 13 (5), 541–546, http://dx.doi.org/10.1080/14693062.2013.774632.
Brown, D.A., 2004. Environmental ethics and public policy. Environ. Ethics 26, 110–112.
Brugnach, M., Ingram, H., 2012. Ambiguity: the challenge of knowing and deciding together. Environ. Sci. Policy 15 (1), 60–71, http://dx.doi.org/10.1016/j.envsci.2011.10.005.
Buchner, B., Falconer, A., Hervé-Mignucci, M., Trabacchi, C., 2012. The Landscape of Climate Finance 2012. San Francisco.
Burton, I., 2009. Climate change and the adaptation deficit. In: Burton, I., Schipper, E.L.F. (Eds.), The Earthscan Reader on Adaptation to Climate Change. Earthscan, London.
Burton, I., Lim, B., 2005. Achieving adequate adaptation in agriculture. Climat. Change 70, 191–200.
Campbell, B.M., Wamukoya, G., Kinyangi, J., Verchot, L., Wollenberg, E., Vermeulen, S., Minang, P., Neufeldt, H., Vidal, A., Loboguerrero Rodriguez, A.M., Hedger, M., 2014. The role of agriculture in the UN climate talks: how COP20 and COP21 can ensure a food-secure future. CCAFS Info Note. Copenhagen.
Chhetri, N., Subedi, M., Ghimire, S., 2013. Niche-based responses in addressing the climatic constraints to farm production: analogues to climate-change adaptation in Nepal. Climate Dev. 5 (2), 174–181, http://dx.doi.org/10.1080/17565529.2013.789790.
Clegg, S.R., 1989. Frameworks of Power. Sage, London.
Cooke, B., Kothari, U. (Eds.), 2001. Participation: The New Tyranny? Zed Books, London.
Crenson, M.A., 1971. The Un-Politics of Air Pollution: A Study of Non-Decision-making in the Cities. The John Hopkins Press, Baltimore and London.
Dahl, R.A., 1957. The concept of power. Behav. Sci. 2, 201–215.
Dahl, R.A., 1958. A critique of the ruling elite model. Am. Polit. Sci. Rev. 52 (2), 463–469, http://dx.doi.org/10.2307/1952327.
Dahl, R.A., 1961. Who Governs? Democracy and Power in an American City. Yale University Press, New Haven, CT.
Dellink, R., den elzen, M., Aiking, H., Bergsma, E., Berkhout, F., Dekker, T., Gupta, J., 2009. Sharing the burden of financing adaptation to climate change. Global Environ. Change 19, 411–421.
Depledge, J., 2008. Striving for no: saudi arabia in the climate change regime. Global Environ. Polit. 8 (4), 9–35.
Dovers, S.R., Hezri, A.A., 2010. Institutions and policy processes: the means to the ends of adaptation. Wiley Interdisciplinary Rev.: Climate Change 1 (2), 212–231, http://dx.doi.org/10.1002/wcc.29.

Eakin, H., Lerner, A.M., Murtinho, F., 2010. Adaptive capacity in evolving peri-urban spaces: responses to flood risk in the Upper Lerma River Valley, Mexico. Global Environ. Change 20 (1), 14–22.
Elster, J., 1983. Sour Grapes: Studies in the Subversion of Rationality. Cambridge University Press, Cambridge.
Fankhauser, S., McDermott, T.K.J., 2014. Understanding the adaptation deficit: why are poor countries more vulnerable to climate events than rich countries? Global Environ. Change 27 (0), 9–18, http://dx.doi.org/10.1016/j.gloenvcha.2014.04.014.
Ferguson, J., 1990. The Anti-politics Machine: Development, Depoliticization and Bureaucratic Power in Lesotho. Cambridge University Press, Cambridge, New York.
Few, R., Brown, K., Tompkins, E.L., 2007. Public participation and climate change adaptation: avoiding the illusion of inclusion. Climate Policy 7 (1), 46–59, http://dx.doi.org/10.1080/14693062.2007.9685637.
Fieldman, G., 2011. Neoliberalism, the production of vulnerability and the hobbled state: systemic barriers to climate adaptation. Climate Dev. 3 (2), 159–174, http://dx.doi.org/10.1080/17565529.2011.582278.
Flood, R.L., Romm, N.R.A., 1996. A typology of power supporting intervention. Syst. Practice 9 (4), 339–355.
Foucault, M., 1980. The History of Sexuality (trans: Hurley R), vol. 1. Random House, New York.
Foucault, M., 1982. The subject and power. Crit. Inquiry 8 (4), 777–795, http://dx.doi.org/10.2307/1343197.
Foucault, M., 1991. Governmentality. In: Burchell, G., Gordon, C., Miller, P. (Eds.), The Foucault Effect: Studies in Governmentality. University of Chicago Press, Chicago.
Freidrich, C.J., 1941. Constitutional Government and Democracy. Little, Brown, Boston, MA.
French, J.R.P., Raven, B.H., 1959. The bases of Social Power. In: Cartwright, D. (Eds.), Studies in Social Power. Institute for Social Research, Ann Arbor, MI, pp. 150–167.
Gallie, W.B., 1956. Essentially contested concepts. Proc. Aristotelian Soc. 56, 167–198.
Gaventa, J., 1980. Power and Powerlessness: Quiescence and Rebellion in an Appalachian Valley.
GEF, 2013. Report of the Global Environment Facility to the Conference of the Parties. Paper presented at the Conference of the Parties, Nineteenth Session, Warsaw.
Giddens, A. 1984. The Constitution of Society. Outline of the Theory of Structuration. Polity, Cambridge.
Graetz, M.J., Shapiro, I., 2005. Death by a Thousand Cuts: The Fight over Taxing Inherited Wealth. Princeton University Press, Princeton, NJ.
Grasso, M., 2010. An ethical approach to climate adaptation finance. Global Environ. Change 20 (1), 74–81, http://dx.doi.org/10.1016/j.gloenvcha.2009.10.006.
Greene, R., Elfrers, J., 1999. Power the 48 Laws. Profile Books, London.
Group of 77 and China, 2013. Statement on behalf of the Group of 77 + China to the 39th Session of the Subsidiariy Body for Scientific and Technological Advice. United Nations Framework Convention on Climate Change, Warsaw.
Halbrendt, J., Gray, S.A., Crow, S., Radovich, T., Kimura, A.H., Tamang, B.B., 2014. Differences in farmer and expert beliefs and the perceived impacts of conservation agriculture. Global Environ. Change 28 (0), 50–62, http://dx.doi.org/10.1016/j.gloenvcha.2014.05.001.
Heyward, M., 2007. Equity and international climate change negotiations: a matter of perspective. Climate Policy 7 (6), 518–534, http://dx.doi.org/10.1080/14693062.2007.9685674.
Hindess, B., 1982. Power, interests and the outcomes of struggles. Sociology 16 (4), 498–511, http://dx.doi.org/10.1177/0038038582016004002.
Huq, S., Khan, M.R., 2006. Equity in National Adaptation Programs of Action (NAPAs): The case of Bangladesh. In: Adger, W.N., Paavola, J., Huq, S., Mace, M.J. (Eds.), Fairness in Adaptation to Climate Change. MIT Press, Cambridge, MA.
Huq, S., Reid, H., 2003. The role of people's assessments. Tiempo 28, 5–9.
IPCC, 2001. Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, New York, New York.
IPCC, 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, New York, New York.
IPCC, 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, New York, New York.
Jamieson, D., 2001. Climate change and global environmental justice. In: Miller, C.A., Edwards, P.N. (Eds.), Changing the Atmosphere: Expert Knowledge and Environmental Governance. MIT Press, Cambridge, pp. 287–307.
Jennings, T.L., 2009. Exploring the invisibility of local knowledge in decisionmaking: the Boscastle Harbour flood disaster. In: Adger, W.N., Lorenzoni, I., O'Brien, K. (Eds.), Adapting to Climate Change: Thresholds, Values, Governance. Univeristy of Cambridge Press, Cambridge, pp. 240–254.
Kates, R., 2000. Cautionary tales: adaptation and the global poor. Climatic Change 45 (1), 5–17, http://dx.doi.org/10.1023/a:1005672413880.
Khan, M.R., Roberts, J.T., 2013. Adaptation and international climate policy. Wiley Interdisciplinary Rev.: Climate Change 4 (3), 171–189, http://dx.doi.org/10.1002/wcc.212.
Kissinger, G., Lee, D., Orindi, V.A., Narasimhan, P., Mutua King'uyu, S., Sova, C.A., 2014. Planning climate adaptation in agriculture: meta-synthesis of national adaptation plans in West and East Africa and South Asia. Report No. 10.
Kosamu, I.B.M., 2013. National level organisational responses to climate change adaptation: a case study of Malawi. Climate Dev. 5 (1), 93–98, http://dx.doi.org/10.1080/17565529.2013.763762.
Lebel, L., 2006. Reflections on Power. USER breifing BN-2006-10. Chiang Mai: Unit for Social and Environmental Research.
Leonard, S., Parsons, M., Olawsky, K., Kofod, F., 2013. The role of culture and traditional knowledge in climate change adaptation: insights from East Kimberley Australia. Global Environ. Change 23 (3), 623–632, http://dx.doi.org/10.1016/j.gloenvcha.2013.02.012.
Likert, R., 1932. A technique for the measurement of attitudes. Arch. Psychol. 140, 1–55.
Lukes, S., 1974. Power: A Radical View. 1st ed. Palgrave Macmillan, London.
Lukes, S., 2005. Power: A Radical View. Palgrave Macmillan.
Lukes, S., 2006. Reply to comments. Polit. Stud. Rev. 4, 164–173.
Mace, M.J., 2006. Adaptation under the UN framework convention on climate change: the international legal framework. In: Adger, W.N., Paavola, J., Huq, S., Mace, M.J. (Eds.), Fairness in Adaptation to Climate Change. MIT Press, Cambridge, MA.
McClure, L., Baker, D., 2013. Doing adaptation differently?. Does neoliberalism influence adaptation planning in Queensland?. In: Paper Presented at the State of Australian Cities Conference, Sydney Australia.
McKibbin, W.J., Wilcoxen, P.J., 2002. The role of economics in climate change policy. J. Econ. Perspect. 16 (2), 107–129, http://dx.doi.org/10.2307/2696499.
Merelman, R.M., 1968. On the neo-elitist critique of community power. Am. Political Sci. Rev. 62 (02), 451–460, http://dx.doi.org/10.2307/1952940.
Mills, C.W., 1956. The Power Elite. Oxford University Press, New York.
Mitchell, T., 2002. Rule of Experts: Egypt, Techno-Politics Modernity. University of California Press, Berkeley.
Morgan, J., Waskow, D., 2013. A new look at climate equity in the UNFCCC. Climate Policy 14 (1), 17–22, http://dx.doi.org/10.1080/14693062.2014.848096.
Morriss, P., 2002. Power: A Philosophical Analysis. Manchester University Press, Manchester.
Muller, B., 2001. Varieties of distributive justice in climate change: an editorial comment. Climatic Change 48, 273–288.
Murray Li, T., 2007. The Will to Improve: Govermentality, Development and the Practice of Politics. Duke University Press.
Okereke, C., 2008. Global Justice and Neoliberal Environmental Governance: Ethics Sustainable Development and International Co-operation. Routledge, New York.
Okereke, C., Bulkeley, H., Schroeder, H., 2009. Conceptualizing climate governance beyond the international regime. Global Environ. Polit. 9 (1), 58–78, http://dx.doi.org/10.1162/glep.2009.9.1.58.
Oliga, J., 1996. Power, Ideology and Control. Plenum, New York.
Parsons, T., 1967. On the Concept of Political Power: Sociological Theory and Modern Society. Free Press, London.
Pielke Jr., R.A., Gwyn, P., Rayner, S., Sarewitz, D., 2007. Lifting the taboo on adaptation. Nature 445, 597–598.
Plaw, A., 2007. Luke's three-dimensional model of power redux: is it still compelling? (Review Essay). Soc. Theory Practice 33 (3) .
Polsby, N.W., 1980. Community Power and Political Theory, 2 ed. Yale University Press, New Haven, CT.
Pramova, E., Locatelli, B., Brockhaus, M., Fohlmeister, S., 2012. Ecosystem services in the National Adaptation Programmes of Action. Climate Policy 12 (4), 393–409, http://dx.doi.org/10.1080/14693062.2011.647848.
Ramirez-Villegas, J., Challinor, A.J., Thornton, P.K., Jarvis, A. 2013. Implications of regional improvement in global climate models for agricultural impact research. Environ. Res. Lett. 8.
Reed, M.S., 2008. Stakeholder participation for environmental management: a literature review. Biol. Conserv. 141, 2417–2431.
Reid, H., Huq, S., 2014. Mainstreaming community-based adaptation into national and local planning. Climate Dev. 6 (4), 291–292, http://dx.doi.org/10.1080/17565529.2014.973720.
Ribot, J.C., 2003. Democratic decentralisation of natural resources: institutional choice and discretionary power transfers in Sub-Saharan Africa. Public Administrat. Dev. 23 (1), 53-53.
Ribot, J.C., 2010. Vulnerability Does Not Fall from the Sky: Toward Multiscale, Pro-poor Climate Policy. New Frontiers of Social Policy. World Bank, Washington, D.C.
Ringen, S., 2013. Nation of Devils: Democratic Leadership and the Problem of Obedience. Yale University Press, New Haven.
Ringius, L., Asbjorn, T., Underdahl, A., 2002. Burden sharing and fairness principles in international climate policy. Int. Environ. Agreements: Politics, Law Econ. 2, 1–22.
Rose, A., Kverndokk, S., 1998. Equity in Environmental Policy: An Application to Global Warming. Handbook on Environmental and Resource Economics. Cheltenham, Elgar.
Rydin, Y., Pennington, M., 2000. Public participation and local environmental planning: the collective action problem and the potential of social capital. Local Environ. 5 (2), 153–169.

Schalatek, L., Nakhooda, S., Barnard, S., Caravani, A., 2012. Climate Finance Thematic Briefing: Adaptation Finance. Cliamate Finance Fundamentals 3. London, Washington DC.
Schipper, E.L.F., 2006. Conceptual history of adaptation in the UNFCCC process. Rev. Eur. Commun. Int. Environ. Law 15 (1), 82–92, http://dx.doi.org/10.1111/j.1467-9388.2006.00501.x.
Schulz, K., Siriwardane, R., 2015. Earth System Governance Working Paper No. 33: Depoliticised and technocratic? Normativity and the Politics of Transformative Adaptation. Lund, Amsterdam.
Sherman, M.H., Ford, J., 2014. Stakeholder engagement in adaptation interventions: an evaluation of projects in developing nations. Climate Policy 14 (3), 417–441, http://dx.doi.org/10.1080/14693062.2014.859501.
Smit, B., Wandel, J., 2006. Adaptaton adaptive capacity and vulnerability. Global Environ. Change 16 (3) , 282-282.
Sova, C., Helfgott, A., Chaudhury, S., Matthews, A.D., Thornton, F.T., Vermeulen, J.S., 2014. Multi-level stakeholder influence mapping: visualizing power relations across actor levels in Nepal's agricultural climate change adaptation regime. Systemic Practice Action Res. 1–27, http://dx.doi.org/10.1007/s11213-014-9335-y.
Spires, M., Shackleton, S., Cundill, G., 2014. Barriers to implementing planned community-based adaptation in developing countries: a systematic literature review. Climate Dev. 6 (3), 277–287, http://dx.doi.org/10.1080/17565529.2014.886995.
Sprinz, D.F., 2001. Domestic politics and global climate policy. In: Luterbacher, U., Sprinz, D.F. (Eds.), International Relations and Global Climate Change. MIT Press, Cambridge, MA.
Streck, C., 2001. The global environment facility: a role model for global governance? Global Environ. Polit. 1, 17–18.
Taylor, M., 2013. Climate change, relational vulnerability and human security: rethinking sustainable adaptation in agrarian environments. Climate Dev. 5 (4), 318–327, http://dx.doi.org/10.1080/17565529.2013.830954.
Terhalle, M., Depledge, J., 2013. Great-power politics, order transition, and climate governance: insights from international relations theory. Climate Policy 13 (5), 572–588, http://dx.doi.org/10.1080/14693062.2013.818849.
Thomas, D.S.G., Twyman, C., 2005. Equity and justice in climate change adaptation amongst natural-resource-dependent societies. Global Environ. Change 15 (2), 115–124, http://dx.doi.org/10.1016/j.gloenvcha.2004.10.001.
Thornton, T.F., Comberti, C., 2013. Synergies and trade-offs between adaptation, mitigation and development. Climatic Change.
Thornton, T.F., Manasfi, N., 2010. Adaptation—genuine and spurious: demystifying adaptation processes in relation to climate change. Environ. Soc.: Adv. Res. 1 (1), 132–155, http://dx.doi.org/10.3167/ares.2010.010107.
Treby, E.J., Clark, M., 2004. Refining a practical approach to participatory decision making: an example from coastal zone management. Coastal Manag. 32, 353–372.
UNFCCC, 1992. United Nations Framework Convention on Climate Change. United Nations.
UNFCCC, 2012. National Adaptation Plans: Technical Guidelines for the National Adaptation Plan Process.
UNFCCC, 2013. The State of Adaptation under the United Nations Framework Convention on Climate Change.
Vermeulen, S., Aggarwal, P.K., Ainslie, A., Angelone, C., Cambell, B.M., Challinor, A.J., Hansen, J.W., Ingram, J.S.I., Jarvis, A., Kristjanson, P., Lau, C., Nelson, G.C., Thornton, P.K., Wollenberg, E., 2012a. Options for support to agriculture and food security under climate change. Environ. Sci. Policy 15, 136–144.
Vermeulen, S.J., Campbell, B.M., Ingram, J.S.I., 2012b. Climate change and food systems. Ann. Rev. Environ. Resources 37 (1), 195–222, http://dx.doi.org/10.1146/annurev-environ-020411-130608.
Vermeulen, S.J., Challinor, A.J., Thornton, P.K., Campbell, B.M., Eriyagama, N., Vervoort, J.M., Kinyangi, J., Jarvis, A., Läderach, P., Ramirez-Villegas, J., Nicklin, K.J., Hawkins, E., Smith, D.R., 2013. Addressing uncertainty in adaptation planning for agriculture. Proc. Natl. Acad. Sci. 110 (21), 8357–8362, http://dx.doi.org/10.1073/pnas.1219441110.
Vincent, K., 2007. Uncertainty in adaptive capacity and the importance of scale. Global Environ. Change 17 (1), 12–24, http://dx.doi.org/10.1016/j.gloenvcha.2006.11.009.
Weber, M., 1978. Economy and Society. California University Press, Berkeley.
Weiler, F., 2012. Determinants of bargaining success in the climate change negotiations. Climate Policy 12 (5), 552–574.
Wheeler, S., Zuo, A., Bjornlund, H., 2013. Farmers' climate change beliefs and adaptation strategies for a water scarce future in Australia. Global Environ. Change 23 (2), 537–547, http://dx.doi.org/10.1016/j.gloenvcha.2012.11.008.
Wolfinger, R.E., 1974. The Politics of Progress. Prentice-Hall, Englewood Cliffs, NJ.

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# Paper 4. Agricultural climate change policy in Ghana: Examining neoliberal and 'techno-fix' influences

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**Abstract:** It is argued in adaptation literature that climate change policy interventions are biased toward 'techno-fix', hard actions and do not place sufficient emphasis on more inclusive capacity-based approaches to adaptation. Simultaneously, interventions often promote neoliberal development rationality that privileges market-based solutions over other adaptation process types. These forces, it is argued, result in a suite of adaptation options available to smallholders that is inadvertently narrowed, and that neglects certain human dimensions of adaptive capacity. This study examines such claims in the context of climate change and agricultural policy objectives in Ghana. In two phases, we apply content analysis to 531 policy actions from two separate climate change policies, and three medium-term agricultural development policies. In the first phase, we demonstrate that approximately 75% of adaptation interventions in the climate portfolio have been derived directly from Ghana's existing agricultural development portfolio – a portfolio, we argue, aimed at 'modernizing' the agricultural sector via enhanced commercialization, intensification, and export-led development. In the second phase, we explore the impact of this neoliberal bias on the resulting climate portfolio. Testing two recent climate change policies against key neoliberal indicators, we find that Ghana's climate adaptation portfolio generally supports a wide range of human dimensions of adaptive capacity, and is composed primarily of 'soft' capacity building interventions and a balance of private and public actions. This is consistent with the findings of other authors, and does not debunk theories purporting a neoliberal 'techno-fix' bias, but instead is reflective of the 'novice' stage of climate policy development in the country and a lack of unambiguous indicators of neoliberalism. The results suggest that direct mainstreaming of climate change adaptation in to existing agricultural policy portfolios can leave climate actions vulnerable to business-as-usual trends in agricultural development. As such, the authors highlight the important role that 'revitalization' plays in breaking with the status-quo regime and facilitating a paradigm shift in agricultural policy that directs us toward more transformational adaptation.

**Keywords:** climate change, adaptation, policy, agriculture, neoliberalism

## 1. Introduction

Adaptation to climate change in the agricultural sector can take many forms. We can distinguish between long-term and short-term adaptation, and actions that are planned by the state or other entities and those that are taken autonomously by individuals and communities. Adaptations can be forward looking and proactive or reactive. More recently, given the advancing state of adaptation policy implementation, adaptation options can be referred to by their process type, or 'typology of specific adaptation actions' (i.e. technology, infrastructure, capacity building etc).

The process types that are ultimately selected for inclusion in an adaptation policy portfolio depends on a variety of factors, including the power and influence of actors negotiating the portfolio, the perceived climate impacts, the time horizon for action, and the availability of human, physical and financial capital, among others (Sova et al. 2015a). But process type is also influenced by the less visible force of prevailing rationalities of government (Keskitalo et al. 2012). Rationalities, or 'inevitable' logics, are established through a sustained preference for certain 'technologies of government' over others (Foucault 1988).

That certain 'technologies' or intervention types and might prevail in adaptation and agricultural policy reflects a long standing truism in comparative politics: that "policy-making in virtually all fields takes place within a context of a particular set of ideas that recognize some social interests as more legitimate than others and privilege some lines of policy over others" (Hall 1993 p. 292). Amanor and Pabi (2007), citing Keeley and Scoones (2003), suggest that "policy knowledge is often embedded in institutional and organization arrangements that are linked with political and economic interests and prestige. This enables particular perspectives to persist in the face of counter evidence. The narratives are often used to justify the technical interventions and mandates of development programs" (p. 52). These prevailing logics, or 'doxa', to borrow a term form Bourdieu (1977), are established by the state or other entity creating the conditions under which some interventions come to be viewed as natural or inevitable and others unthinkable (Webb et al. 2002).

It is argued by some authors, and examined here, that climate change responses are shaped by a prevailing neoliberal rationality (Keskitalo et al. 2012; Okereke 2008; Fieldman 2011; Hajer and Versteeg 2005; Oels 2005; Bäckstrand and Lövbrand 2006) combined with a widely acknowledged preference for 'techno-fix', 'hard' adaptation interventions at the expense of broader, more inclusive behavioral-based, soft approaches (Thornton and Manasfi 2010; IPCC 2014a; Massey 2015). Sietz et al. (2011), for example, in discussing challenges in mainstreaming climate change adaptation in to existing development regimes, state that

"while attempts are being made to open up developmental decision-making for the newly emerging issues of adverse climate, climate adaptation needs to further broaden its scope by overcoming technology-centred approaches" (p. 494). In Ghana Sarpong and Anyidoho (2012) state that "dominant narratives are promoting technology transfer and 'climate proofing' of agriculture. This is questioned by some actors, emphasizing the need for vulnerability reduction among the poorest through small-scale, locally-relevant strategies rather than the technological fixes and an agricultural transformation to large-scale, mechanized agriculture envisaged by the Ministry of Environment, Science and Technology (MEST)" (p. 11). This neoliberal tendency can result in a suite of adaptation options available to small-scale farmers that is inadvertently narrowed, and that neglects important human dimensions of adaptive capacity.

This paper asks "to what extent does the neoliberal bias in Ghana's agricultural sector manifest in the country's climate policy, and how might this impact on the adaptation options available to smallholders?" In pursuing this question, the article first establishes the extent to which Ghana's agricultural *adaptation* portfolio is derived from the country's existing agricultural *development* portfolio— a portfolio, we argue, with the explicit aim of modernizing agriculture through export-led growth. Following from here, the country's climate change adaptation policy interventions – derived from the National Climate Change Adaptation Strategy (NCCAS) (2010) and National Climate Change Policy (NCCP) (2014) – are examined against key indicators of neoliberal and techno-fix rationalities. Here, we seek to determine the diversity of local adaptation process types supported by the climate change policies and whether, if at all, so-called 'hard' adaptation strategies have been chosen over 'soft' interventions, and autonomous strategies over state-led initiatives.

Following this brief introduction, section 2 discusses literature on neoliberalism in climate change adaptation, and section 3 examines the neoliberal bias inherent in Ghana's agricultural sector policies. Section 4 presents the analytical framework used in this study, introducing literature on public versus private adaptation, hard versus soft adaptation, and adaptation process types reflective of neoliberal rationality. Section 5 presents methodological considerations, while section 6 introduces the two phases of analysis and their results. Section 7 discusses the paper's main findings and is followed by concluding remarks.

## 2. Neoliberalism and climate change adaptation

Neoliberalism is among the most pervasive political and economic doctrines of our generation. While a common definition has been difficult to achieve, features of the neoliberalism have been assembled by a host of authors (Harvey 2005). Susan George (1999) suggests that neoliberalism implies "that the market should be allowed to make major social and political decisions; that the state should voluntarily reduce its role in the economy; that corporations should be given total freedom; that trade unions should be curbed; and that citizens should be given less rather than more social protection" (p.1, cited in Okereke 2008). This implies the dismantling of trade barriers, improved mobility of capital, and adoption of export led growth models, referred to by Fieldman as the "global institutionalization of *laissez-faire* economics" (2011 p. 159). Consistent with Foucault's concept of 'governmentality' (1991) and Bourdieu's 'doxa', Fieldman draws on Leichenko and O'Brien (2008) to suggest "that [neoliberalism] is a neutral and inevitable process, driven by advances in technology and communications as much as by politics" (p. 160). It is neoliberalism's seeming inevitability that makes it such a pervasive rationality.

Specific to agricultural climate change adaptation, neoliberalism enters the literature as a source of underlying vulnerability, a structural factor limiting the role of the state in adaptation policy, and a prevailing discourse inherent in the identification of adaptation solutions. First, the stressors and vulnerabilities produced by globalization combined with the impacts of climate change have been referred to as 'double-exposure' (O'Brien and Leichenko 2000; Leichenko and O'Brien 2008). O'Brien and Leichenko (2000) cite import competition and income disruptions from currency devaluations among two such neoliberal outcomes that increase the underlying vulnerability of small-scale farmers. This affects both the availability of resources and certain groups' ability to access those resources, affecting adaptive capacity (Adger 2003). Social capital, discussed by a number of adaptation theorists as a key element of adaptive capacity (Adger 2003; Chen et al. 2014; Pelling and High 2005), can be eroded by the neoliberal doctrine, leading to class divide and a loss of trust and mutual reciprocity, according to some critics (Davis 2007). In other words, the common maxim that 'a rising tide lifts all boats' neglects the distributional aspects of the neoliberal model that elevates absolute, not relative, poverty alleviation above all else (Fieldman, 2011).

Second, neoliberal rationality defines the role of the state in responding to climate change. The neoliberal rationality effectively shrinks the welfare state, limiting adaptation processes involving state planning and intervention. Under the neoliberal doctrine, "states . . . are increasingly 'hollowed out' in terms of both substance and process" (Cerny 1999, cited in

Fieldman 2011), leading to what Olukoshi (2002) notes as a parallel lack of local accountability and morale by civil servants. Instead, the neoliberal agenda emphasizes individual responsibility (Felli and Castree 2012) and autonomous adaptation (Whitehead 2013). The reduced public sector participation central to the neoliberal model has led to the emergence of a robust civil society (Harriss 2001). This is marked by growth in the number of non-governmental organizations (NGOs) actively stepping in to the void left by the state (Cerny, 1999; Kettl, 2000; Newell, 2008 in Fieldman 2011), manifesting in global climate change negotiations by increased presence and influence of non-state actors (Schroeder and Lovell 2012; Pattberg and Widerberg 2015). This, according to some authors, further perpetuates the neoliberal rationality: "It seems reasonable to wonder…whether this kind of networking will result simply in definitions of the 'adaptation problem' that invite further liberalization, since so many international NGOs have been effectively co-opted into transnational networks of governance dominated by international capital, development consultants and global neoliberal institutions…" (Goldman 2005; Bello 2001 in Fieldman 2011 p. 168).

Finally, neoliberal rationality contributes to our understanding of which type of adaptation options are deemed legitimate and desirable. Consensus among adaptation theorists is that adaptation policy interventions to-date are biased toward a 'hard' classification. The most recent IPCC fifth assessment report states "engineered and technological options are commonly implemented adaptive responses, often integrated within existing programs such as disaster risk management and water management" (IPCC 2014b p. 8). Massey (2015) suggest that this paradigm "as put forth by the United Nations envisions adaptation as a technocratic process to reduce risks and vulnerabilities from climate impacts…" (pg 1). Khan and Roberts (2013) point out that the focus on technical solutions neglects important social, political and cultural problems that underlie vulnerability. Agrawal cites similar neglect of institutional factors, and that "despite a stated commitment to grassroots involvement, the actual focus in national adaptation plans is on technical and infrastructure options for adaptation, with little attention to their social and institutional context" (2008 p. 50, cited in Thornton and Manasfi 2010). Meanwhile, Pramova et al. (2012) discuss the presence of ecosystem based adaptation (EbA) interventions within National Adaptation Programmes of Action (NAPA) documents and conclude that EbA "has been largely missed in the design of national adaptation strategies, which have focused on technological an infrastructure developments such as the construction of dams and irrigation facilities" (CBD 2009) (In Pramova 2012 p. 394)

Double exposure, limits to state intervention, and a preference for hard adaptation options serve to collectively steer adaptation policies towards a neoliberal rationality, and away from

other alternatives. That is, away from competing rationalities that may promote low-emissions and restoration agriculture, permaculture, agroecology, community-based adaptation, and ecosystem-based adaptation, among other less capital and market-intensive alternatives (Dodman and Mitlin 2013; Badejo 1998; Ferguson and Lovell 2014; Kalame et al. 2011; Schipper et al. 2014). BAU agricultural policy, then, is often at odds with what might be termed 'climate smart agriculture' (CSA), a movement that aims to direct agricultural systems towards high-resilience, low risk futures and safe operating spaces for socio-ecological systems (Lipper et al. 2014; Neufeldt et al. 2013).

**3. Neoliberalism in Ghana's agricultural policy portfolio**

The analysis of Ghana's agricultural climate change adaptation regime is predicated upon the fact that the country's business-as-usual agricultural development regime prescribes to a neoliberal rationality. This bias is explored in this section and is attributed to several factors, we argue, including Ghana's colonial history, structural adjustment, and current path towards middle-income country status, among others.

In the agricultural sector, neoliberalism is often associated with techno-fix, 'hard' interventions or what might be termed 'high modernist' or 'industrial' agricultural (Scott 1998). Modern scientific agriculture is characterized by capital intensiveness, mono-cropping, mechanization and chemical inputs. Amanor and Pabi define 'modernization' in Ghana as "state supported initiatives to transform agriculture through mechanization, synthetic inputs, new high-yielding varieties, and standardized recommended practices" (2007 p. 51). This uniformity was brought on by commercial pressures, driven by the globalization of agricultural markets, as well as by the export of a hegemonic American agricultural model. Proponents of high modernism "believe in large, integrated, planned projects rather than piecemeal improvements, partly because the large, capital-intensive schemes could be planned as nearly pure technical exercises…" (ibid p. 271). High-modern agriculture serves as a proxy for neoliberal, techno-fix rationality in this study.

The dominance of the 'commercialization' growth model in Ghana's agricultural sector dates back to colonial times (Foster et al. 2000). From the turn of the 20th century, British colonial rulers promoted cocoa and coffee production and developed infrastructure in the south of the country to facilitate its exportation (Seini 2002; Plange 1979). Cash crops with the greatest export potential formed the foundation of the colony's agricultural model, leading to extensive infrastructure deficits in the north of the country and a neglect of food security crops. The Agricultural Development Company (ADC) was established just prior to

independence in the First Five Year Plan period (1951-1956) to promote large-scale industrial farming, effectively perpetuating the geographic disparities in the country produced by the colonial model. The ADC, according to Asuming-Brempong, encouraged high-input agriculture in the food crop sector in the northern territories and in the cocoa and rubber subsectors within the southern Gold Coast (2003).

The neoliberal experience formally began in Ghana in 1983 with the enactment of International Monetary Fund (IMF) and World Bank supported structural adjustment programs (SAP) following a sharp decline in cocoa exports and general economic depression. During this period, both input and output markets were deregulated economy-wide, guaranteed price minimums and input (fertilizer) subsidies eliminated, state marketing boards closed, and tariff barriers that kept smallholder farmers sheltered from foreign competition removed. Ayelazuno (2014) suggests that while the neoliberal growth model saved Ghana from its impending 1980 economic downfall—in fact, Ghana has been widely considered the most successful case of African structural adjustment (Konadu-Agyemang 2000)—that a concentration of foreign direct investment in to extractive instead of manufacturing sectors led to 'growth without development' in the country. Mohan (1996) similarly suggests that SAPs favored already export-oriented segments of the Ghanaian economy, fortifying the north-south divide in the country. While macro indicators signaled a boon in Ghana's economy, human development indicators deteriorated, especially in the north of the country (Konadu-Agyemang 2000). The exported oriented bias of the SAP adjustments further marginalized small-scale producers in Ghana, with the input intensive technologies ill-suited and incompatible with the local political economy and ecology of production (Nyantakyi-Frimpong and Bezner Kerr 2014; Nyantakyi-Frimpong 2013b).

Industrial agriculture continues to be the dominant ideology with respect to Ghana's food and agricultural sector portfolio. As stated by Amanor and Pabi, "mainstream development policy sees development as the product of the transformation of existing indigenous farming systems — which either move along an evolutionary sequence transforming themselves to conform to Western notions of agricultural intensification, or which spiral downwards in to a cycle of poverty and land degradation until transformed by external assistance and new scientific technology" (2007, p. 52). Since this period of economic adjustment began in the early 1980's Ghana has increasingly prioritized the 'modernization' of agriculture within its medium term and agricultural development plans. In fact, in the most recent medium term plan, falling yields in the period from 2010-2014 are directly attributed to the "low adoption of technology in the major production areas" (Government of Ghana 2014c p. 4). The goal of modernization and industrialization followed naturally from Ghana's transition from Least Developed

Country (LDC) to middle-income country status in 2010. The Accelerated Agricultural Growth and Development Strategy (AAGDS) (1996), for example, focused on two central pillars including "the promotion of agricultural intensification in high potential areas using small scale irrigation and modern inputs" and "trade-led policies and export diversification" (Government of Ghana 2014b p. 2-3). This was soon followed in 2003 by the Ghana Poverty Reduction Strategy I, aiming "to achieve accelerated growth through modernized agriculture, led by a vibrant and competitive private sector" (GPRS I), and the accompanying Food and Agricultural Sector Development Policy I (FASDEP I) (2002) purporting the same market-based objectives as the AAGDS. The development of the Growth and Poverty Reduction Strategy II (GPRS II) in 2005 made some progress in diversifying crop production in the country, but both the GPRS II and FASDEP II (2007) endeavored, in particular, to modify agricultural production to meet quality standards of production for international markets. The strategic "New Direction" adopted by FASDEP II is described in this extract:

> "The Government of Ghana now wants to have a focus in its efforts for greater effectiveness, sustainability and equity in impacts. In particular, a few commodities will be targeted for support. A value chain approach to agricultural development will be adopted with value addition and market access given more attention. Efforts will be intensified to build capacity towards meeting challenges of quality standards in the international market, with focus on increasing productivity along the value chain" (Government of Ghana 2007).

Most recently, Ghana has established the Savannah Accelerated Development Authority (SADA), a public-private partnership scheme to modernize agriculture in northern Ghana and orient farmers towards larger markets (Al-hassan, 2013). The country is also among nine nations to join the G8 Cooperation Framework to Support the "New Alliance for Food Security and Nutrition" that aims to generate greater private investment in agricultural development.

The neoliberal rationality is thus clearly at work within Ghana's agricultural sector. In fact, in their analysis, Sova et al. (2014) suggest that the four most frequently identified policy objectives from 1996 to present in Ghana's agricultural sector include 'improved access to domestic marketing', 'improved access to external markets', 'transformation of the agricultural sector from a resource-based to a technology-based industry' and 'accelerating the provision of irrigation infrastructure' (Table 1).

**Table 1. Objectives and priorities between agricultural policies in Ghana (1996-2012)**

| | Policy | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Objective*** | GPRS II, 2005 | GSGDA, 2010 | NDC 2012 Manifesto, 2012 | NPP 2012 Manifesto, 2012 | Accelerated Agricultural Growth and Development Strategy (AAGDS), 1996 | Food and Agriculture Sector Development Policy (FASDEP), 2002 | Food and Agriculture Sector Development Policy II (FASDEP II), 2007 | Medium-Term Agriculture Sector Investment Plan (METASIP), 2010 | **Frequency Identified as Objective or Priority** |
| Improve agricultural marketing (domestic) | x | x | | x | x | x | x | x | 7 |
| Improved access to external markets | x | x | x | | x | x | x | x | 7 |
| Transformation of the agriculture sector from a resource-based to a technology-based industry (investment in technology) | | | x | x | x | x | x | x | 6 |
| Accelerating the provision of irrigation infrastructure | x | | | x | | x | | x | 4 |
| Improving institutional coordination | | x | | | | x | x | x | 4 |
| Promoting selective crop development | x | x | x | | | x | | | 4 |
| Promotion of agro-processing | x | | x | x | | x | | | 4 |
| Promotion of industrial sub-contracting and partnership exchange (including PPPs) | x | | x | x | | | | x | 4 |

Source: Sova et al. (2014)

*Only policy objectives common to four or more documents are included in this table

*Note: Since the colonial period, Ghana's agricultural policy objectives have been aimed at modernizing the sector through private sector led, market-oriented, hard infrastructure and technology interventions. This focus has traditionally prioritized cash crops for export purposes grown in the south of the country leading to systemic disparities in wealth and human development between the northern and southern regions. Formalized structural adjustment in the 1980's effectively reduced the role of the state in agricultural development, deregulated markets, and eliminated most input subsidies, perpetuating a trend in reforming and replacing indigenous farming practices with mechanized, and input and capital intensive production.*

## 4. Analytical framework

Neoliberal rationality represents one way of conceptualizing and understanding reality. Neoliberalism as a construct is inherently multi-dimensional, relying on certain ideas about the state's involvement and the nature of interventions in the economy. For example, in the section above, a broadly neoliberal agricultural sector implies limited state direct-involvement in agricultural production through subsidies and state-owned farms, and a preference for input-intensive Western-style agricultural practices. While it is conceptually possible to accept that Ghana's agricultural development or adaptation regime is broadly neoliberal, examining this trend through specific policy interventions is more challenging. It is possible, for example, for a policy intervention to be consistent with neoliberalism in one dimension, but not in another. Most obviously, the state can, and often does, promote input-intensive agriculture, for example. This is also true of adaptation interventions.

Here, we introduce the conceptual framework for the examination of neoliberalism in this study, centering on three commonly discussed themes in adaptation literature: (1) public versus private (i.e. planned versus autonomous) adaptation; (2) hard versus soft adaptation; and (3) common adaptation process types. A discussion of the multi-dimensionality of these themes is then offered.

### *4.1 Planned versus autonomous adaptation*

First, perhaps the most widely applied binary in adaptation theory is that of 'planned' versus 'autonomous' adaptation. Planned adaptation is defined by the IPCC as "a deliberate policy decision based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state"(IPCC 2007). Autonomous (or spontaneous) adaptation, in contrast, does not constitute a conscious response to climatic stimuli, but rather is triggered by ecological changes in natural systems and by market or welfare changes in human systems (Leary 1999). Dixit et al. refer to planned and autonomous adaptation as 'attributed' and 'indirect', respectively (2011). Importantly, planned and autonomous adaptation is often associated with 'state' and 'private' adaptation, a perspective that limits autonomous actions to non-state actors (Smit et al. 1996). This dichotomy is introduced in the IPCC 3rd Assessment Report (3AR), which defines private adaptation as any intervention that is "initiated and implemented, by individuals, households or private companies". Public adaptation, meanwhile, refers to "adaptation that is initiated and implemented by governments at all levels. Public adaptation is usually directed at collective needs" (IPCC 2001).

*4.2 Hard vs. soft adaptation*

A second, enduring high-level adaptation classification of importance to this study is that of hard, 'technical' adaptation interventions and soft, capacity-based interventions. Sovacool (2011) defines hard adaptation as relying predominately on artificial human-built infrastructure, involving large-scale disturbances to local communities and/or ecosystems, being complex and capital intensive, using technologies and/or processes owned by foreign firms, and lacking flexibility and adaptability to sudden changes in projections of climate change. Meanwhile, 'soft' adaptation involves natural infrastructure or natural capital, such as ecosystems and forests, empowers local communities and builds institutional capacity and community assets, uses simple and modular technologies, incorporates technologies and/or processes owned by local people and that have the ability to respond to alterations in climate change projections.

*4.3 Adaptation process types*

Finally, adaptation process types that are reflective of a neoliberal bias are of interest here. Process type is often discussed in terms of actions that produce an enabling environment for adaptation policy versus specific policy strategies (Eakin et al. 2014). The former include what Dupuis and Biesbock (2013) refer to as "measures that enable the conditions necessary for adaptive response" (p. 5), and may include such activities as 'recognition' (awareness) or 'groundwork' in the typology put forth by Berang-Ford et al. (2011). The latter—specific policy strategies—may include research, planning, network building, legislation, awareness raising, implementing change, training, and advocacy interventions, among other strategies (Thompkins et al. 2010). Most recently, Biagini et al. (2014) in analyzing 92 projects financed by multilateral agencies suggest that ten principal adaptation process types exist: capacity building, management and planning, practice or behavior, policy, information, physical infrastructure, warning or observing systems, "green" infrastructure, financing, and technology.

These process types, both enabling and specific, tend to favor the state as the principal unit of adaptation (Thornton and Manasfi 2010). They are, to borrow a term from Scott, expressed in language 'legible' to the state and policy planners (1998). Yet we can also explore dimensions of adaptation that occur at the household or individual level that promote a certain type of human behavior or action. Agrawal (2008), for example, suggests that local adaptation responses can be organized in to five categories: mobility, storage, diversification, communal pooling, and market exchange. Expanding on these bases, Thornton and Manafsi (2010) advance eight key processes of human adaptation that include: mobility, exchange, rationing,

pooling, diversification, intensification, innovation and revitalization. This same framework has been applied recently by Thorn et al. (2015) to address how autonomous adaptation processes in per-urban slums in Nairobi Kenya combine to create adaptation pathways. Localized adaptations of this variety have often been neglected by scholars in favor of higher level, purely planned policy intervention types (Thornton and Manasfi 2010).

When considered holistically and in concert with other political economic factors and settings, the following analytical framework proves useful in determining the high-level, broad direction of the policy regime with respect to neoliberalism (Table 2).

**Table 2. Summary of adaptation categories indicative of neoliberal rationality**

| | |
|---|---|
| **Private*** Vs. Public | Private Adaptation: "Adaptation that is initiated and implemented by individuals, households or private companies. Private adaptation is usually in the actor's rational self-interest"<br><br>Public Adaptation: "Adaptation that is initiated and implemented by governments at all levels. Public adaptation is usually directed at collective needs" (IPCC 2001) |
| **Hard** Vs. Soft | Hard Adaptation: "Relies predominately on artificial human-built infrastructure, involves large-scale disturbances to local communities and/or ecosystems, is complex and capital-intensive, uses technologies and/or processes owned by foreign firms, and lacks flexibility and adaptability to sudden changes in projections of climate change"<br><br>Soft Adaptation: "[uses] forms of natural infrastructure or natural capital, such as ecosystems and forests, together with low-impact technology, empowering local communities, and building institutional capacity and community assets, simple and modular technologies, relatively easy to understand, that do not require large outlays of capital or human resources, technologies and/or processes owned by local people, and the ability to respond to alterations in climate change projections" (Sovacool 2011) |
| Human adaptation processes | Mobility: "Seasonal movement or permanent migration to avoid risk or in search of better circumstances" *(Keywords: mobility, movement, relocation, transportation, spatial planning)*<br><br>**Exchange: "Flow of material and symbolic goods and services between people"** ***(Keywords: exchange, markets, income, agro-processing, trade, insurance, payments of ecosystem services, access to credit, intellectual property)***<br><br>Rationing: "Controlling the circulation or consumption of limited or critical resources among members of a group" *(Keywords: rationing, storage, preservation, stockpiling, resource conservation, carbon capture, redistribution)*<br><br>Pooling: "Sharing or linking of assets (wealth, labor, knowledge) across social groups" *(Keywords: pooling, forecasting, land tenure, knowledge or capacity building, awareness, research)* |

| | |
|---|---|
| | Diversification: "Increasing the variety of food, income production strategies, specialization, etc., to enhance livelihoods" *(Keywords: diversification, variation, integration, alternative, biodiversity)*<br><br>**Intensification: "Increasing the availability of resources by boosting their yield within a certain space or time" *(Keywords: Intensification, yield, centralization, 'drought/ flood/heat tolerance, varietal selection, irrigation, fertilizer, waste reduction, mechanization)***<br><br>**Innovation: "New, unplanned method or technique that arises to address a certain need" *(Keywords: innovation, technology, development of new varieties, modern)***<br><br>Revitalization: "Organized reconfiguration of ideology and practices to reduce stress and create a more satisfying culture" *(Keywords: ideology, social movement, social change)* (Thornton and Manasfi 2010) |

Source: Authors

**Features in bold are presumed broadly indicative of a neoliberal or techno-fix rationality*

These three adaptation features combine to represent the analytical framework for this analysis. To summarize, in distinguishing between public and private adaptation we use the IPCC Third Assessment report (2001) definition. Meanwhile, Sovacool's (2011) hard and soft adaptation definitions are adopted, derived from Amory Lovin's classification for energy path technologies (1984). Finally, as the focus of this study is the impact of neoliberal 'rationality' on the adaptation options available to small-scale farmers, we have chosen Thornton and Manasfi's (2010) human dimensions of adaptive capacity process types to determine the extent to which market exchange, intensification, and innovation processes are promoted.

*4.4. Multi-dimensionality*

Importantly, the three dimensions of neoliberalism offered in this analytical framework are not mutually exclusive. They operate in concert with one another, sometimes complicating the simple assignment of 'neoliberal' to a given policy item. This is especially true when the state—an antagonist in neoliberal thought—intervenes in ways that might be considered neoliberal.

For example, in a neoliberal setting, actions that are undertaken by private actors autonomously might be privileged over state-led, planned interventions. Yet the state is not always at odds with the neoliberal doctrine, and government is capable, if not prone, to intervene with what might be considered neoliberal adaptation measures (Harvey 2005; Pinkerton 2015; Pinkerton and Davis 2015). The neoliberal rationality penetrates the state's adaptation planning regime through prevailing discourses limiting the perceived viability of

certain adaptation process types and elevating others (Sager 2011). The state is a key player in the neoliberal project, particularly when considered in the context of globalization and the exportation of Western scientific agriculture in to the developing world. High modernist officials "prefer certain forms of planning and social organization (such as huge dams, centralized communication and transportation hubs, large factories and farms, and grid cities), because these forms fit snugly in to a high modernist view and also answered their political interests as state officials" (Scott 1998 p. 5). Further, "given the presumptions about expertise embodied in modernist agricultural planning, the actual schemes were continually bent to serve the power and status of officials and the state organs they controlled" (ibid p. 264). Kwami Nkrumah himself —far from what we might consider a neoliberal—ruled in the era of the Agricultural Development Company in Ghana, effectively promoting export-oriented operations of small-scale cocoa producers in the country. The state, then, often has vested political interest tied to the implementation of the imported neoliberal model.

Similarly, the state often has a hand in implementing what might be considered 'hard' adaptation interventions. Even in state-led regimes, "large scale disturbances to local communities and/or ecosystems" are altogether possible, and in-fact historically common. Hard interventions, in other words, are not limited to ownership by foreign firms. State planning and collectivized farming under Stalin's Union of Soviet Socialist Republics (USSR) is an especially striking example of this. There, state farms were hugely capital-intensive relying on uniform mechanization across collectives, and, through the process of wholesale land re-distribution, inherently disruptive for local communities (Bagdasaryan 2014; Kochin 1996). The same is true with the nationalization of lands in Ethiopia in the 1970's (Lanckriet et al. 2015). Even overtly socialist states, then, are capable of promoting what might be considered 'hard', disruptive interventions.

Finally, in Thornton and Manafsi's framework, interventions that promote market exchange provide the most direct link to neoliberalism. Even here, free market principles are not the only force at work to deliver farmers to markets. In Ghana, the Ghana Cocoa Board (COCOBOD) is a clear example of the role that state marketing boards play in the agricultural sector. COCOBOD participates in price-fixing for all cocoa commodities produced in Ghana, and works with market intermediaries to aggregate the harvests of many small-scale producers for shipment to state-controlled processing operations. While the COCOBOD no longer provides input subsidies to its producers (a clear neoliberal influence), this powerful state marketing board continues to play a major role in linking farmers to markets (Barrientos and Asenso-Okyere 2009; Glin et al. 2015).

Given the multi-dimensionality of neoliberalism, it will be important for interpreting the results presented in the follow sections to remain conscious of the fact that policy interventions may be neoliberal in some aspects, but not in others.

## 5. Methodology

This analysis of neoliberal rationality within Ghana's agricultural climate change adaptation portfolio consists of two phases: first, we explore shared objectives between development and climate change policies in the country to determine the extent to which adaptation policies are derived from business as usual development policies; and second we apply our analytical framework to determine what range of human dimensions of adaptive capacity are supported by the adaptation policy portfolio (NCCAS and NCCP) and whether hard, autonomous, techno-fix policy process types are favored over soft, state-led, behavioral approaches.

A total of five policy documents are consulted here, two climate change policies and three medium-term agricultural development policies. The climate change policy portfolio is represented by the National Climate Change Adaptation Strategy (NCCAS) (Government of Ghana 2012b) and the National Climate Change Policy (NCCP) (Government of Ghana 2014a). The agricultural development polices are composed of the Ghana Shared Growth and Development Agenda (GSGDA)(Government of Ghana 2010c), Food and Agriculture Sector Development Policy (FASDEP II)(Government of Ghana 2007), and the Medium-Term Agriculture Sector Investment Plan (METASIP). Combined across these documents, a total of 531 policy objectives were analyzed, as outlined in Table 3 below.

**Table 3. Number of policy objectives analyzed by policy document**

| **Policy Document** | **No. of Objectives Analyzed** |
|---|---|
| National Climate Change Adaptation Strategy (NCCAS) | 7 |
| National Climate Change Policy (NCCP) | 19 |
| Ghana Shared Growth and Development Agenda (GSGDA) | 133 |
| Food and Agriculture Sector Development Policy (FASDEP II) | 58 |
| Medium-Term Agriculture Sector Investment Plan (METASIP) | 316 |
| **Total** | 531 |

Source: Authors

Policy objectives used in this study were derived from the agricultural sections of each policy document. The NCCAS, for example, identifies seven specific agricultural actions implemented across several of the strategy's programs, mainly within program #3 (adaptation through land-use planning) and #7 (adaptation through agricultural diversification), which were used here. The NCCP, within Focus Area One (Agriculture and Food Security), identifies eight program areas and 19 specific agricultural policy actions. The GSGDA,

Ghana's medium term planning framework, outlines 133 specific policy actions under the theme "Accelerated Agricultural Modernization and Sustainable Natural Resource Management". Meanwhile, the FASDEP II, a policy devoted entirely to agriculture, presents 58 policy 'strategies' grouped according to the document's six principal policy objectives. Finally, the METASIP sets out an investment framework for the FASDEP II medium-term policy objectives, organizing these objectives into development themes and 316 specific actions.

## 6. Analysis and results

### *6.1. Phase I analysis*

The first analysis phase, determining shared policy objectives between Ghana's agricultural development and climate change policies, involved searching key words derived form the NCCP within the GSGDA, FASDEP II and METASIP documents to determine how many of the adaptation objectives were derived directly from existing agricultural policies. The 'key words' merely directed the analyst to existing agricultural policy objectives containing those words, but it was up to the analyst to then determine whether in fact the identified objective referred to the same (or similar) goal as listed in the NCCP. Table 4 outlines the key words used in this analysis.

**Table 4. Key words from the NCCP searched across agricultural sector policies**

| National Climate Change Policy – Agricultural Objectives | Key Words Searched |
|---|---|
| Build capacity for community-level weather data collection, analysis and dissemination for agricultural planning | 'weather', 'forecast' |
| Institute risk transfer schemes (e.g., insurance) against local supply changes, harvest failure or weather risk | 'risk transfer', 'insurance' |
| Promote capacity building for farmers and fisherfolks and build awareness on climate change issues | 'awareness' |
| Build capacity for recycling and conversion of agricultural waste | 'recycling', 'waste' |
| Document and promote appropriate indigenous knowledge and best practices | 'indigenous', 'local knowledge', 'traditional', 'local' |
| Design and implement programmes on fisheries management and disease control, which integrate climatic and hydrological parameters | 'fisheries management' |
| Promote and support agricultural diversification (livestock–crop integration as well as management practices) as a coping strategy and for income generation | 'diversification', 'livestock-crop', 'crop-livestock', 'integrated' |
| Prepare and enforce spatial plans to address conflicts between peri-urban agriculture and human settlements | 'peri-urban', 'settlements', 'spatial' |
| Provide sustained support in the use of simple agronomic soil and water conservation measures (e.g., agro-forestry, crop rotation, tied ridging, mulching, contour earth mounds, vegetative barriers and improved fallow) | 'conservation', 'soil management', 'water management', 'agroforestry', 'tree', 'crop rotation', 'tied ridging', 'mulching', 'contour earth mounds', 'vegetative |

| | |
|---|---|
| | barriers', 'fallow' |
| Improve efficiency of farming practices through secure land tenure, effective pricing policies and access to credit | 'tenure', 'credit', 'pricing', 'price support' |
| Develop climate-resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought and salinity | 'varietal', 'breed', 'tolerant', 'biotech' |
| Improve productivity through improved farming technologies and practices, such as the integration of trees into farming systems, integrated nutrient management under various crops, green/organic farming, and so on | 'technology', 'trees', 'nutrient management', 'organic' |
| Promote alternative livelihood systems to diversify incomes, such as beekeeping, poultry production, piggery, snail rearing, mushroom cultivation, sustainable aquaculture, and so on | 'alternative livelihoods', 'beekeeping', 'poultry', 'snail', 'mushroom', 'aquaculture' |
| Build and strengthen the capacity of extension officers in climate smart-agriculture to enhance support to farmers and fishermen | 'extension' |
| Promote diversified land use practices, including agroforestry, dry-land farming, urban/backyard vegetable production, to reduce risk and increase the capacity of farmers to cope with droughts and floods | 'land management, 'sustainable land management', 'SALM', 'agroforestry', 'dry-land', 'vegetable', 'forest', 'tree' |
| Promote appropriate technologies for small-scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, and so on | 'irrigation', 'water harvesting', 'water management', 'rainwater harvesting' |
| Improve and harmonize research activities in climate-smart agriculture | 'research' |
| Improve post-harvest capacity, for example, storage and processing facilities and infrastructure | 'post-harvest', 'storage', 'processing' |
| Improve marketing policies that increase competitiveness for the domestic and international market | 'market' |

Source: Authors

*6.2 Phase I results*

To render the underlying objectives and rationalities in existing development trajectories visible, the analysis here turns to Ghana's agricultural development portfolio, GSGDA, FASDEP II, and METASIP. Table 5 explores precedence from Ghana's existing agricultural sector portfolio as they relate to the climate change interventions listed in the NCCP and NCCAS in Ghana. It asks the question, "are climate change adaptation objectives derived directly from the existing agricultural policies?" To achieve this precedence ranking, the highest resolution (i.e. specific) policy objectives or interventions were extracted from each of the FASDEP II, METASIP, and GSGDA documents. Key words (see table 3 above) from the NCCP actions were searched across these policies. Table 5 provides the number of agricultural policies with the same objectives for each of the NCCP and NCCAS actions.

**Table 5. Climate change actions derived from Ghana's existing agricultural sector portfolio**

| Policy Objectives | | |
|---|---|---|
| **National Climate Change Policy (n=19)** | **National Climate Change Adaptation Strategy (n=7)** | **Frequency of inclusion in existing FASDEP II, METASIP and GSGDA documents (using key words in Table 4 above)** |
| Build capacity for community-level weather data collection, analysis and dissemination for agricultural planning | | 1 |
| Institute risk transfer schemes (e.g., insurance) against local supply changes, harvest failure or weather risk | | 1 |
| Promote capacity building for farmers and fisherfolks and build awareness on climate change issues | Build and strengthen capacity of local farmers to increase agricultural productivity and awareness of climate issues | 2 |
| Build capacity for recycling and conversion of agricultural waste | | 2 |
| Document and promote appropriate indigenous knowledge and best practices | Document existing indigenous knowledge and best practices | 3 |
| Design and implement programmes on fisheries management and disease control, which integrate climatic and hydrological parameters | | 4 |
| Promote and support agricultural diversification (livestock–crop integration as well as management practices) as a coping strategy and for income generation | | 5 |
| Prepare and enforce spatial plans to address conflicts between peri-urban agriculture and human settlements | | 6 |
| Provide sustained support in the use of simple agronomic soil and water conservation measures (e.g., agro-forestry, crop rotation, tied ridging, mulching, contour earth mounds, vegetative barriers and improved fallow) | | 7 |
| Improve efficiency of farming practices through secure land tenure, effective pricing policies and access to credit | | 8 |
| Develop climate-resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought and salinity | Promote cultivation of crops and rearing of animals adapted to harsh climatic conditions | 14 |
| Improve productivity through improved farming technologies and practices, such as the integration of trees into farming systems, integrated nutrient management under various crops, green/organic farming, and so on | | 14 |
| Promote alternative livelihood systems to diversify incomes, such as beekeeping, poultry production, piggery, snail rearing, mushroom cultivation, sustainable aquaculture, and so on | Enhance the living standards of vulnerable groups through acquisition of alternative livelihoods skills | 16 |
| Build and strengthen the capacity of extension officers in climate smart-agriculture to enhance support to farmers and fishermen | Build and strengthen capacity of extension officers on new farming technologies in order to enhance their support for farmers | 20 |
| Promote diversified land use practices, including agroforestry, dry-land farming, urban/backyard vegetable production, to reduce risk and increase the capacity of farmers to cope with droughts and floods | Protect the environment through the promotion of agricultural biodiversity | 22 |
| Promote appropriate technologies for small-scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, and so on | | 27 |
| Improve and harmonize research activities in climate-smart agriculture | | 29 |
| Improve post-harvest capacity, for example, storage and processing facilities and infrastructure | Train trainers to promote post-harvest technologies to minimize losses of farm produce | 34 |
| Improve marketing policies that increase competitiveness for the domestic and international market | | 48 |

Source: Authors

*Note: Every NCCP and NCCAS intervention contains at least one parallel reference in the existing, business as usual agricultural policy regime in Ghana. Some measures, like 'improved marketing', are mentioned upwards of 40 times in the agricultural documents. Adaptations with strong precedence in existing development pathways are more likely to be implemented than newly introduced measures requiring different rationalities, or prevailing logics related to agricultural development.*

Of the 19 separate agricultural climate change goals listed in NCCP and NCCAS, it can be suggested that only five of these interventions constitute 'concrete policy changes' (< 3 references) from Ghana's existing agricultural sector portfolio. This includes (1) increasing capacity for community level weather data collection, (2) establishing risk transfer (insurance) schemes, (3) awareness building on climate change, (4) recycling and conversion of agricultural waste, and (5) the documentation of indigenous knowledge. The remaining stated policy goals are backed by a number of existing interventions within FASDEP II, METASIP, and GSGDA. Four NCCP/NCCAS interventions in particular are found in abundance in existing agricultural policy documents (>25 references). These include (1) improved domestic and international market access, (2) improved post-harvest storage and processing infrastructure, (3) agricultural research (defined broadly), and (4) small scale irrigation and water harvesting technology.

This generally strong and widespread alignment of actions between adaptation policies and agricultural development policies surely facilitates the mainstreaming of climate change interventions in to the existing development portfolio. However, it is also posited here that the strong alignment renders Ghana's climate change portfolio vulnerable to existing neoliberal development rationalities in the business as usual agricultural sector. This is explored in phase II analysis

*6.3 Phase II analysis*

During phase II analysis, the 26 NCCAS and NCCP actions (19 of which are unique given that all NCCAS objectives have been included in the more recent NCCP) were mapped on to Thornton and Manafsi's (2010) eight key dimensions of human adaptation using the definitions and keywords in Table 2, and a designation of planned/autonomous and hard/soft was given. Given the broad, low-resolution nature of some policy goals the analyst had to assume the intended outcome of the policy to assign a process type. Here, when the target of the policy was unclear or not smallholders directly, the authors categorized the policy items by the most obvious first-degree impacts only. For example, the policy item 'Improve and harmonize research activities in climate-smart agriculture' was recorded as a 'pooling' because of its knowledge generation component, and 'revitalization' given the reference to Climate Smart Agriculture (CSA), a social movement and emerging ideology. While it is likely that this research will ultimately lead to farm-level interventions that may increase diversification, rationing, exchange and the like, as these impacts cannot be readily identified they were not indicated as supported process types. In this same spirit, determining whether and adaptation activity is 'planned' (i.e. public) or 'autonomous' (i.e. private) required the

analyst to identify the likely final implementer of the policy under consideration. Any intervention seeking to improve capacity (e.g. 'Promote capacity building for farmers and fisherfolks and build awareness on climate change issues, 'Promote appropriate technologies for small-scale irrigation, water re-use and water harvesting etc), for example, was determined a private adaptation, as state intervention is intended only to facilitate autonomous actions by autonomous agents (i.e. smallholders). In the case where it is necessary to support autonomous activities with infrastructure or technology (e.g. "Build capacity for community-level weather data collection', Improve productivity through improved farming technologies), the combined 'public/private' was chosen. The 'public/private' identifier was also applied to likely public private partnerships including insurance mechanisms, post harvest storage and processing facilitates, and land/credit access. With regard to 'hard' versus 'soft' classifications, a combined 'hard/soft' rating was given when an individual adaptation policy item promoted both management practices (i.e. capacity building) and technical intervention as is the case with the policy item "Improve productivity through improved farming technologies and practices, such as the integration of trees into farming systems, integrated nutrient management…". Given the inherent subjectivity in this process owing to the ambiguity of the policy items, each policy actions was categorized independently and then conferenced by two separate researchers.

*6.4 Phase II results*

Phase II analysis aims to determine the range of human dimensions of adaptation supported by the NCCP and NCCAS policy actions, and the composition of process types in terms 'private' and 'public' and 'hard' and 'soft' adaptation. Table 6 contains the full list of 19 unique adaptation policy actions mapped against these adaptation process type features.

**Table 6. Assigned adaptation features of NCCP and NCCAS policy actions**

| NCCP/NCCAS combined policy actions (n=19) | Private or Public | Hard or Soft | Mobility | Exchange | Rationing | Pooling | Diversificatio | Intensificatio | Innovation | Revitalization |
|---|---|---|---|---|---|---|---|---|---|---|
| Improve and harmonize research activities in climate-smart agriculture | Public | Soft | | | | x | | | | x |
| Build and strengthen the capacity of extension officers in climate smart-agriculture to enhance support to farmers and fishermen | Public | Soft | | | | x | | | | x |
| Promote capacity building for farmers and fisherfolks and build awareness on climate change issues | Private | Soft | | | | x | | | | |
| Build capacity for community-level weather data collection, analysis and dissemination for agricultural planning | Public/Private | Soft | | | | x | | | | |
| Document and promote appropriate indigenous knowledge and best practices | Public/Private | Soft | | | | x | | | | |
| Develop climate-resilient cropping and livestock systems as well as crop varieties and livestock breeds tolerant to flooding, drought and salinity | Public | Hard | | | | | | x | x | x |
| Promote diversified land use practices, including agroforestry, dry-land farming, urban/backyard vegetable production, to reduce risk and increase the capacity of farmers to cope with droughts and floods | Private | Soft | | | | | x | | | |
| Prepare and enforce spatial plans to address conflicts between peri-urban agriculture and human settlements | Public | Soft | x | | | | | | | |
| Improve productivity through improved farming technologies and practices, such as the integration of trees into farming systems, integrated nutrient management under various crops, green/organic farming, and so on | Public/Private | Hard/ Soft | | | | | | x | x | x |
| Promote and support agricultural diversification (livestock–crop integration as well as management practices) as a coping strategy and for income generation | Private | Soft | | x | | | x | | | |
| Design and implement programmes on fisheries management and disease control, which integrate climatic and hydrological parameters | Public | Soft | | | x | | | | | |
| Provide sustained support in the use of simple agronomic soil and water conservation measures (e.g., agro-forestry, crop rotation, tied ridging, mulching, contour earth mounds, vegetative barriers and improved fallow) | Private | Soft | | | x | | | | | |
| Promote appropriate technologies for small-scale irrigation, water re-use and water harvesting (e.g., waste/water recycling), rainwater harvesting, and so on | Private | Hard | | | x | | | | | |
| Improve efficiency of farming practices through secure land tenure, effective pricing policies and access to credit | Public/Private | Soft | | x | | x | | | | |
| Institute risk transfer schemes (e.g., insurance) against local supply changes, harvest failure or weather risk | Public/Private | Soft | | x | | | | | | |
| Promote alternative livelihood systems to diversify incomes, such as beekeeping, poultry production, piggery, snail rearing, mushroom cultivation, sustainable aquaculture, and so on | Private | Soft | | x | | | x | | | |
| Improve post-harvest capacity, for example, storage and processing facilities and infrastructure | Public/Private | Hard | | x | x | | | | | |
| Build capacity for recycling and conversion of agricultural waste | Private | Hard/ Soft | | | x | | | x | | |
| Improve marketing policies that increase competitiveness for the domestic and international market | Public/Private | Soft | | x | | | | | | |
| | **FREQUENCY** | | **1** | **6** | **5** | **6** | **3** | **3** | **2** | **4** |
| | | | **Mobility** | **Exchange** | **Rationing** | **Pooling** | **Diversification** | **Intensification** | **Innovation** | **Revitalization** |

Source: Author

*Note: Ghana's agricultural climate change portfolio supports a wide range of human dimensions of adaptive capacity and a clear balance between private/public and hard/soft interventions. The existence of a neoliberal or techno-fix bias is not abundantly obvious in Ghana's climate change adaptation policy portfolio. This may, however, simply reflect the novice stage of adaptation policy development and the portfolio may become more or less 'balanced' based on funding allocations and selective implementation of the NCCP and NCCAS.*

As indicated in Section 4 (Table 2), we suggest that private, hard, or those adaptation interventions focusing on 'market exchange', 'innovation', or 'intensification' to be reflective of neoliberal or techno-fix doctrine. It is hypothesized that a policy regime exhibiting this prevailing rationality will possess a disproportionality high proportion of these traits. Yet Ghana's agricultural climate change portfolio, at least at this macro policy level, supports a wide range of human dimensions of adaptive capacity. The combined 19 policy objectives for agriculture between the NCCP and the NCCAS most often promote exchange and pooling process types among smallholders. Pooling, as per the definition established by Thornton and Manasfi (2010), includes those interventions related to capacity development and knowledge transfer like the documentation of local and traditional practices, community forecasting, and agricultural extension services. Exchange, meanwhile, captures the flow of good between people and often manifests in Ghana's policy regime in interventions designed to increase farmer incomes, access to credit, and market opportunities. Rationing strategies—often productively linked with systems of exchange or pooling—are the third most frequent process type and includes such strategies as soil and water conservation and increasing post-harvest storage capacity. This is followed by revitalization given the NCCP's focus on climate resilient agriculture, and the realignment of priorities and practices to support that 'ecological modernization' social movement. Intensification and diversification, meanwhile, are identified on three occasions each. Intensification refers to the adoption of varieties suited to changing environmental conditions, and the adoption of practices like agroforestry and green manures intended to increase on-farm productivity, while diversification encourages the adoption of multiple land management practices and crop-livestock systems. Innovation is promoted through two interventions focusing on improved farming technologies, and new crop and livestock varieties and breeds. Finally, the least promoted process types include 'mobility'—facilitated by a single spatial planning intervention. It can be said that while exchange, intensification, and innovation do feature centrally in Ghana's adaptation policy regime, they do not constitute an overwhelming majority of promoted processes.

Meanwhile, regarding the composition of hard and soft interventions, 84% (16 of 19) of the climate change responses in the NCCP and NCCAS can be categorized as 'soft'—or 'soft/hard'—, capacity-based or natural capital adaptation. This, prescribing to Sovacool's definition of 'hard' adaptation, assumes that these technologies are not foreign owned and that land management practices (i.e. agroforestry, water and soil conservation etc) do not entail large-scale disturbances to local communities and/or ecosystems. Meanwhile, what might be considered 'techno-fix', hard solutions are explicitly supported by only five interventions: 'improved crop varieties and animal breeds', 'improved farming technologies

and practices', 'small scale irrigation and water harvesting', 'post harvest storage and processing facilities', and presumably, 'conversion of agricultural waste'.

Finally, approximately 37% (7 of 19) of the above interventions can be classified as 'private' or autonomous adaptations, and an additional 37% as combined 'public/private'. These results indicate that the regime tends to be relatively balanced between private and state actions, with only a slight bias towards private adaptation primarily due to the number of capacity building interventions in the portfolio. Given the profound development deficits in the northern regions of Ghana and the country's long history with democratic socialism in response to colonial occupation, the role of the state, however, remains implicit in almost every intervention.

**7. Discussion**

While the existence of a neoliberal bias is not abundantly obvious in Ghana's climate change adaptation policy interventions, these results are perhaps reflective of the novice stage of climate change policy development in the country, and the product of certain peculiarities of the agricultural sector that favor 'soft' interventions. Ultimately, as the first stage of analysis unambiguously determined, direct mainstreaming of climate actions in to BAU agricultural development leaves those initiatives vulnerable to existing neoliberal trends, and the pervasiveness of the rationality within climate policy will depend on final funding allocations made to each policy item. Finally, we argue here that 'revitalization', an often-overlooked adaptation process type, is vitally important in allowing climate change adaptation policy to break from the status quo development regime and to question the hegemonic high-modern view of agriculture.

First, Ghana's climate change portfolio supports a wide range of adaptation process types, both hard and soft measures, and a mix of private and public actions. There is, in other words, no explicit preference for techno-fix, or otherwise neoliberal interventions. These results are reflective of those of Biagini et al. (2014) who conclude in their study of 158 distinct global adaptation actions that "the adaptation categories that have the highest 'groundedness' are those that contain projects with soft measures, such as those related to capacity building, policy reform, and planning and management" (p. 105) They suggest, consistent with Ayers and Huq (2009) and Tompkins et al. (2010), that capacity building is a first step in the adaptation process, "reflective of the novice stage of overall societal adaptation" (p. 105). This, then, does not constitute a 'debunking' of adaptation theorist's perceived bias towards a 'techno-fix' policy portfolio, but only the state of progress in adaptation policy. In fact Biagni

et al. expect that 'technology' as a process type will grow dramatically over the long term (2014). In Ghana, existing development deficits in rural infrastructure, including agricultural feeder roads, markets, and irrigation infrastructure may also ultimately serve to bias process types towards 'hard' interventions.

Second, the current 'market exchange' bias found in Ghana's agricultural regime is perhaps explained by the peculiarities of the agricultural sector, and, in time, may similarly shift adaptation measures towards exchange processes (recall that the NCCP climate intervention with the greatest precedence in existing agricultural policy was "improved marketing policies that increase competitiveness for the domestic and international market"). That is, unlike other direct service providing sectors like education and health, which build health facilities and schools and other physical infrastructure, agriculture is primarily concerned with creating an enabling environment for a host of private sector actors to successfully participate in the market. This commonly includes providing accurate weather and commodity price forecasting, providing input subsidies, and ensuring favorable currency exchange and terms of trade for the export of agricultural products. In fact, many of the supposed 'services' offered by the Ministry of Agriculture—including rural feeder roads and irrigation infrastructure—are provided by other ministries entirely (Foster et al. 2000; Van Donge 2007). The agricultural sector, then, by its very nature may be biased against 'techno-fix' or hard intervention types, and towards market-oriented exchange intervention types.

Third, we must also consider that while the written policy portfolio may support a wide range of process types, the relative funding applied to each item will determine which interventions are ultimately implemented—that is to say, 'the proof is in the pudding'. Surely the government's ability to "build and strengthen capacity of extension officers on new farming technologies", as well as the other adaptation responsibilities that are categorized as 'public', for example, should be evaluated in light of the austerity policies that are universally associated with neoliberalism (i.e. the source of 'double exposure' mentioned in section 2). With externally imposed fiscal austerity and structural adjustments, the resources available to the state may simply prohibit these actions in the first place. In the case of Ghana, for example, there is widespread understanding that while each of the FASDEP II, METASIP, and GSGDA make explicit reference to building capacity of extension workers, hiring freezes and reduced agricultural sector budgets have rendered these policy actions inoperable (Bawakyillenuo et al. 2014; Yaro et al. 2014; Laube et al. 2012; Antwi-Agyei et al. 2014a). This highlights the important point that it is not just that specific agriculture policy items in Ghana have a neoliberal orientation; Ghanaian agriculture exists in a neoliberal world. A

world in which powerful rent-seeking coalitions compete in "free trade" with Ghanaian farmers, heavily subsidized by their respective governments producing unfair terms of trade (Khor and Hormeku 2006). These forces work to restrict governments and impose severe limitations on the effectiveness of interventions intended to assist smallholders. To evidence the impact of funding in biasing policy priorities, the final budget allocations of Ghana's NCCP with regard to the agricultural sector are outlined in Table 7, derived from the NCCP II implementation document:

**Table 7. NCCP II budget allocations for program areas**

| **Policy Focus Area 1: Agriculture and Food Systems** | **Budget US$** | **% of Budget** |
|---|---|---|
| Program Area 1.1: Institutional capacity development for research and dissemination | 35,000,000 | 4% |
| Program Area 1.2: Development and promotion of climate-resilient cropping systems | 150,000,000 | 16% |
| Program Area 1.3: Adaptation of livestock production systems | 15,000,000 | 2% |
| Program Area 1.4: Support to climate change adaptation activities in fisheries and aquaculture | 45,000,000 | 5% |
| Program Area 1.5: Support to water conservation and irrigation systems | 50,000,000 | 5% |
| Program Area 1.6: Risk transfer and alternative livelihood systems | 55,500,000 | 6% |
| Program Area 1.7: Improved post-harvest management | 100,000,000 | 11% |
| Program Area 1.8: Improved marketing systems | 500,000,000 | 53% |
| **Total Budget** | **950,500,000** | |

Source: Adapted from Government of Ghana, NCCP II (Forthcoming)

While the specific policy actions listed in the NCCP II are not identical to those items found in the NCCP, the program areas (1.1- 1.8) are the same. We find that 53% of the estimated NCCP budget is proposed for "improved marketing systems". The second most heavily funded program area is that of "development and promotion of climate resilient cropping systems", which includes improved crop and livestock varieties, at 16% of the total NCCP budget. These results indicate that, despite the diversity of adaptation pathways supporting by stated policy measures alone, the implementation schedule will place disproportional emphasis on what might be considered neoliberal, techno-fix interventions.

These financial allocations represent only an indication of the priority areas for agricultural adaptation as determined by NCCP stakeholders— the state, civil society, and development partners. In other words, it constitutes a level of improvement beyond simply analyzing policy objectives alone, but is still not necessarily indicative of how funding will actually be applied and whether financing goals will even be met. As noted by Asante et al. (2015), for example,

the annual spending on climate change related activities by MoFA are anticipated at US $54 million, or 44% of the Ministry's current US $124 million budget. This, then, places considerable and perhaps unrealistic[18] demand on the ministry to implement the NCCP. Ultimately, true ex-post analysis of funding will be required to determine the extent or pervasiveness of the neoliberal rationality within Ghana' agricultural adaptation regime.

Finally, the power of neoliberalism and other taken for granted rationalities of government and economy is that they are largely invisible, manifesting through discourses and narratives around development and privileging certain courses of action over others. The neoliberal bias in Ghana's adaptation regime manifests strongly when placed in the context of the broader political economy and when mainstreamed in to agricultural policies. Climate change has evolved to become a development issue in Ghana, as opposed to simply an 'environmental' issue (Sarpong and Anyidoho 2012). As such, both NCCAS and NCCP policy objectives are to be mainstreamed in to existing sectoral policies. Approximately 75% of the analyzed agricultural adaptation interventions have been derived directly from this portfolio, and it is envisioned that the same agricultural Ministries, Department and Agencies (MDAs) will implement these adaptation measures once mainstreamed. These adaptation priorities, then, are subject to the trends and rationalities of the existing development regime. FASDEP II's focus on 'a few commodities', for example, disincentivizes poly-cropping and agricultural diversification, with obvious risks to food security in the event of disease, flooding, drought and so on. Similarly, high modernism's inability to incorporate local knowledge – or any knowledge outside of its paradigm—limits its utility to many farmers in tropical environments (Scott 1998). In fact, the NCCP policy item "document and promote appropriate indigenous knowledge and best practices" has only three references throughout existing BAU agricultural policy, facilitating a simplification of complex real objectives of farmers and of the microclimates and local biotic conditions where they plant. In other words, the NCCAS's call for the "promotion of sustainable development and poverty reduction" may in some instances be at odds with Ghana's agricultural development strategy emphasizing commercialization, modernization, and export-led growth.

*Revitalization*

Mainstreaming will not be effective if existing development trajectories are inconsistent with the objectives of adaptation or if they directly contribute to vulnerability (Schipper 2007). Achieving food security in the face of climate change means diverting from status quo

[18] The Ministry of Gender, Children and Social Protection's NCCP budget allocations represent 970% of the ministry's 2015 budget (Asante et al. 2015).

agricultural practices and allowing transformational adaptation to occur when necessary (Kates et al. 2012; O'Brien 2012; Pelling and Manuel-Navarrete 2011). This reflects Fieldman's wider stance that if neoliberalism constitutes a problem to be addressed then vulnerability is a systemic issue and thus not treatable through "any number of climate-specific adaptation interventions" (Fieldman 2011 p. 163). Bassett and Fogelman (2013) review 558 articles and IPCC reports and determine that there is a normative bias towards 'adjustment' or incremental adaptation in the literature. This has the effect, it is suggested by Shulz and Siriwardane (2015), of perpetuating the business as usual economic development model and undermining truly transformational adaptation. That is to say, incrementalism in the form of climate proofing is not consistent with the type and scale of adaptation required to alter the underlying high-modernist agricultural system and to sustainably meet caloric demands of a growing population, especially in the north of Ghana. This phenomenon is explored in Box 1.

**Box 1. Risky mainstreaming—tractor mechanization in the UWR**

Tractor mechanization serves as a telling example of the risk of direct mainstreaming of climate policy goals in to the status quo development regime. The increased mechanization of agriculture is considered a central tenant of Ghana's business-as-usual (BAU) agricultural development strategy, featuring centrally in the GSGDA (I and II), FASDEP II and METASIP policy documents. Agricultural communities in the Upper West Region commonly cite a lack of mechanization as a central productivity challenge (Houssou et al. 2013; Cobbinah and Anane 2015) and the government has established private sector run Agricultural Mechanization Service Centers (AMSECs) across the country for tractor provision. Recently, the Savannah Accelerated Development Authority (SADA), a northern-focused private public partnership (PPP) has provided a fleet of tractors for the UWR[19]. Still, at present, tractor and plowing resources are hard to come by for smallholders.

> "The District Assembly has a tractor. When it comes to cropping season, MoFA has to arrange from the DA or private tractor owners to plough for these farmers." (Interview, Local, 72, 2013)

> "…the government has done very well by giving a pool of tractors at the regional level, more than 50 of them for Upper West Region. The district can demand several of the tractors, they bring it here and they service people who want to...who can afford the services of the tractor and they send it back to the regional pool. But there is a challenge there. They were brought under the SADA, and SADA has got people we call contractors, or people who produce cereal crops and tree crops in mass. So the

[19] Medium and larges scale producers who own tractors often rent plowing services to small farmers in the UWR.

> tractors tend to concentrate on their farms. And it takes time to plow such fields. By the time they have finished plowing, they want to send to the people, it is too late. It is already almost August. If you plow in August you are wasting your time" (Interview, Local, 68, 2014)
>
> When its time for farming, its not easier for you to get a tractor to plough for you. And if you do not get a tractor and you farm late and the rain has not extended, you are going to lose [your] yield. So one of main challenge is getting tractor service. Interview, Local, 80, 2013)

AMSECs have been criticized for their provision of large, costly tractors and unsustainable business model that relies heavily on government subsidy (Houssou et al. 2013). Recently, under increasing pressure from NCCP policy objectives and the broader climate change agenda (e.g. "improved productivity through improved farming technologies and practices" and "simple agronomic soil and water conservation measures"), BAU agricultural development practices have increasingly incorporated sustainability and soil conservation measures. In the case of mechanization, this has resulted in renewed interest in contour plowing. Tractor operators are trained to plow across slopes rather than up or down slopes to reduce erosion and surface water runoff and increase infiltration (FAO 1993). As one respondent from the Ministry of Agriculture suggests, tractor operators in the north of Ghana are being trained with only limited success in practice:

> "…even if the agricultural engineering services have trained almost all the tractor operators on the best way of plowing to conserve soil as part of the land management issues, on the ground they do it differently. Because they have less than one month to plow for all your clients in the community…you ask him to plow along the slope, which delays his time. If you insist he leaves your field and goes to the next person who wouldn't complain (Interview, Ministry of Food and Agriculture, Accra, 2013)

This is consistent with Amponsah et al. who suggest that among the greatest limiting factors for increased agricultural mechanization in Ghana is the lack of skilled labor to operation the machinery (2012). While this quote demonstrates the challenges in integrating sustainability and adaptation measures in to existing BAU practices, it hides a more fundamental point regarding tractor mechanization in northern Ghana: *that agricultural specialists there have deemed four-wheel tractors altogether inappropriate for the thin, dry soils.*

> "Farmers need the technology that they can use to work faster on their land, to increase area. Like [in the] Lawra area we are not even recommending that they use tractors because of the soils. The soils are very fragile. But they need some simple equipment like these simple hand-held tractors" (Interview, Ministry of Food and Agriculture, Wa, 2014).

In the Guinea Savannah Zone, mechanized plowing can turn sub-soil up over the thin topsoil, destroying this nutrient-rich layer and contributing to soil crusting and compacting[20]. As a by-product, synthetic fertilizers must be consistently applied to maintain yields (Amanor and Pabi 2007). Compounding this issue is the general state of disrepair of tractors used in the UWR, often missing furrow wheels for appropriate depth control (Bobobee et al. 1998). In the face of climate change and anticipated shorter growing seasons, there is even greater the impetus for mechanization given that fields must be prepared ever more rapidly. In this environment, farmers in Northern Ghana are increasingly at risk of losing inherited sustainable land use and soil conservation strategies due to increased mechanization, chemical inputs and other capital intensive practices (Mikkelsen and Langohr 2004).

These important biophysical considerations often come second to the commonly-stated challenges in scaling mechanization, including small farm sizes, restrictive traditional land tenure schemes, inadequate training, and limited resources for equipment acquisition (Skelton et al. 2014). Until mechanization is fundamentally questioned for its soil carbon emissions and general sustainability relative to agroecological practices like zero-till and cover cropping, then the type of 'safe operating spaces' envisioned by a growing climate smart agriculture (CSA) movement will go unmet. Mainstreaming, or incremental improvement in the case of contour plowing, will not adequately serve farmers' needs.

Given the reification of BAU agricultural development that direct mainstreaming can produce, the importance of 'revitalization' within a given adaptation policy process can thus not be overstated. Revitalization, according to Thornton and Manafsi (2010), refers to an "organized reconfiguration of ideology and practices to reduce stress and create a more satisfying culture (Wallace 1956)". In Ghana's agricultural adaptation policy portfolio, revitalization is best captured in continued references to 'climate smart agriculture', 'climate-resilient development', 'green/organic farming', and other practices that effectively break with the status quo agricultural development rationality and encourage transformative measures. CSA can be considered a social movement or ideology born out of rapid social change in response to climate impacts on the agricultural sector and is defined as practices that "sustainably increase productivity, enhance resilience, reduce/remove greenhouse gas emissions, and enhance achievement of national food security and development goals" (FAO 2010). CSA promotes locally appropriate, site-specific adaptation measures that are

[20] In addition to topsoil erosion there is some concern of extensification (increasing the area of cultivation) resulting from increased mechanization and improved on-farm labor productivity. Yet evidence amassed so far in Ghana suggests that total plowed area has not increased (Benin 2015).

simultaneously more sensitive to indigenous and local knowledge systems and less carbon intensive than the status quo agricultural development model.

A step in the direction towards status-quo breaking, transformational, and revitalized measures we argue, can be taken by placing increased attention on these 'novel' CSA interventions within the NCCP, not simply those interventions derived from existing agricultural policy that are easiest to mainstream (i.e. marketing and post-harvest infrastructure). 'Increasing capacity for community level weather data collection', 'establishing risk transfer (insurance) schemes', 'awareness building on climate change', 'recycling and conversion of agricultural waste', and,—in particular—'the documentation of indigenous knowledge' are inventions that find minimal precedence within the BAU agricultural policy portfolio but that have the potential to break with the status quo development regime and contribute to climate smart practices.

To achieve this adaptive revitalization, attention must also be paid to the means in which stakeholders (i.e. smallholders) are engaged in the policy process. This is key also to ensuring that climate smart agriculture does not become an empty promise of ecological modernization. Central to shifts in policy paradigms (i.e. policy rationalities) are parallel or triggering shifts in the locus of authority (Hall 1993). In the case of climate change and agriculture, this may mean a shift in authority from central level technocrats to farmers, legitimizing traditional, experiential knowledge and practical skills— what Scott (Scott 1998) calls 'metis'—over so-called 'high-modernist' techno-fix infrastructure solutions in some instances. This will require active participation from vulnerable stakeholders, not simply 'consultation' on pre-determined policy actions.

**9. Conclusion**

This article examined the claim that climate change adaptation policy tends to support techno-fix interventions derived from neoliberal development rationalities. In doing so, we analyzed a total of 531 policy objectives from two separate climate change policies, and three medium-term agricultural development policies in Ghana. The first phase of analysis determined that the majority (approximately 75%) of adaptation interventions in the NCCP and NCCAS have been derived directly from Ghana's existing agricultural development portfolio. The agricultural sector priorities in Ghana, in turn, are aimed at 'modernizing' agriculture via enhanced commercialization and export-led development. Direct mainstreaming, then, leaves the adaptation policy portfolio vulnerable to the existing neoliberal trends, for better or for worse, in business-as-usual agricultural development. The

second analysis phase determined that at the macro policy level Ghana's climate change adaptation portfolio supports a wide range of human dimensions of adaptive capacity, and is composed primarily of 'soft' capacity-based interventions and a balance of private and public adaptation actions. While the adaptation priorities do not necessarily favor 'hard' interventions, there remains a policy bias towards processes of exchange, rationing, and pooling, particularly knowledge exchange. The portfolio also emphasizes 'revitalization' through repeated reference to 'climate-smart' and 'climate resilient' agriculture. Processes of mobility are the least supported by the policy documents. This does not constitute an outright debunking of 'techno-fix' theories, rather is likely reflective of the 'novice' stage of policy development, the unique characteristics of the agricultural sector, and the fact that high resolution categorizations of this sort do not capture broader political-economic trends indicative of neoliberalism. The authors highlight the key role that 'revitalization' plays in breaking with the status-quo regime and facilitating transformational adaptation. Climate-smart agriculture can be a catalyst for such revitalization provided it facilitates a shift in authority towards farmers and away from those forces that perpetuate the status quo regime. While this study provides a preliminary, theoretical look at the neoliberal and techno-fix bias, ex-post analysis of budgeting and finance of these same policies are required to provide empirical assessment of the prevalence and implications of these trends.

**Paper 4 Supplement: Identifying 'real' interests —hard vs. soft adaptation in northern Ghana**

Paper 4 examined third dimension preference shaping as it exists in 'D3.b prevailing rationalities of government'. Specifically, it articulated the tension in agricultural climate change policy between hard and soft adaptation, and the underlying bias towards market-oriented, neoliberal adaptation responses (Keskitalo et al. 2012; Okereke 2008; Fieldman 2011; Hajer and Versteeg 2005; Oels 2005; Bäckstrand and Lövbrand 2006). The literature suggests that planned adaptation in developing countries tends to be focused on hard, techno-fix interventions (Thornton and Manasfi 2010; IPCC 2014a; Massey 2015), this despite the fact that high resolution, localized studies of adaptation indicate that most adaptation measures adopted by households are non-engineering measures (Chen et al. 2014). While I find that Ghana's agricultural adaptation portfolio supports a mix of hard and soft interventions, I ultimately conclude that this balanced portfolio is at risk from direct mainstreaming in to a market oriented, "large-scale, mechanized agriculture" system in Ghana, to again borrow Sarpong and Anyidoho's language (2012 p. 11).

In an effort to ground this research in practice at a farm level, this supplement explores how the purported techno-fix and neoliberal bias plays out in adaptation literature regarding climate impacts and responses in Northern Ghana (and how the literature itself contributes to this bias). The objectives are twofold: first, I seek to determine whether there is a difference between adaptation strategies being undertaken by smallholders and what is being recommended in the literature; and second, to demonstrate the challenge in identifying the 'true interests' of smallholders, and thus contributing to the debate around Steven Lukes' third dimension of power, preference shaping. Hard and soft adaptation—consistent with Paper 4— is defined by Sovacool (2011) and provided in Box 1.

**Box 1 Sovacool's definition of hard and soft adaptation**

| |
|---|
| **Hard Adaptation:** "Relies predominately on artificial human-built infrastructure, involves large-scale disturbances to local communities and/or ecosystems, is complex and capital-intensive, uses technologies and/or processes owned by foreign firms, and lacks flexibility and adaptability to sudden changes in projections of climate change" |
| **Soft Adaptation:** "[uses] forms of natural infrastructure or natural capital, such as ecosystems and forests, together with low-impact technology, empowering local communities, and building institutional capacity and community assets, simple and modular technologies, relatively easy to understand, that do not require large outlays of capital or human resources, technologies and/or processes owned by local people, and the ability to respond to alterations in climate change projections" |

Source: (Sovacool 2011)

To achieve these ends, I divide the literature in to two 'camps', those authors that document adaptations (i.e. observed adaptations) and those that propose adaptations (i.e. recommended adaptations). The implicit assumption here (a problematic one, as it turns out) is that recommended adaptation literature can serve as a proxy for 'adaptation establishment' figures' preferred modes of adaptation and observed adaptations as a proxy for farmers' preferred modes.

Note that research on agricultural adaptation in the Upper West Region of Ghana is sparse (Ndamani and Watanabe 2015; Onyango et al. 2012; Tachie-Obeng et al. 2013). Adaptation research in the Guinea Savannah Zone tends to concentrate on Northern[21] and Upper East Regions. As such, we rely here on research across the country's northern regions (Upper West, Upper East, Northern and Brong Ahafo) to inform us of trends that are generally reflective of conditions in the UWR. Table 1 outlines the adaptation strategies identified in the climate change literature on Northern Ghana[22].

**Table 1 Recommended and observed agricultural adaptation strategies in northern Ghana**

| Author(s) | Year | Agricultural adaptations (H= Hard, S=Soft) | Observed/ Recommended |
|---|---|---|---|
| Dumenu and Obeng | (2016) | (S) crop and livestock diversification, (S) livelihood diversification, (S) migration, (S) extensification | Observed |
| Antwi-Agyei et al. | (2015) | (S) adjusted land tenure arrangements | Recommended |
| Heve et al. | (2015) | (S) improved soil management (increase soil organic matter) | Recommended |
| Ndamani and Watanabe | (2015) | (H) adopt improved varieties, (H) irrigation expansion | Observed (preferred) |
| Cobbinah and Anane | (2015) | (S) increasing farm size (extensification), (S) cash cropping, (S) livelihood diversification | Observed |
| Wossen and Berger | (2015) | (S) improved access to credit, (S) livelihood diversification | Recommended |
| Bawakyillenuo et al. | (2014) | (H) irrigation expansion, (S) integrated crop livestock systems, (S) changes in tillage practices, | Observed |

[21] The Northern region's capital, Tamale, serves as the headquarters for most northern-focused development agencies.

[22] A Scopus database search for "climate change" AND "adaptation" AND "agriculture" AND "Ghana", was conducted in November 2013 and again in November 2015 searching title, keywords and abstracts from the year 2000 to present. This yielded 74 total results that I then reviewed in detail. The relevant studies —i.e. those with a geographic focus on northern Ghana (Savannah Zone)— were included in this table. For its extreme relevancy, the CCAFS baseline survey (Onyango et al. 2013) was also included here.

| | | | |
|---|---|---|---|
| | | (H) increased fertilizer application, (S) livelihood diversification, (S) migration, (S) crop and livestock insurance | |
| Yaro et al. | (2014) | (S) improved institutional collaboration | Recommended |
| Samaddar et al. | (2014) | (H) irrigation expansion, (H) rainwater harvesting, (S) watershed management, (S) improved weather forecasting | Observed (preferred) |
| Antwi et al. | (2014b) | (S) adjustment to planting dates, (H) adopt improved varieties, (S) crop and livestock diversification, (S) adjustment to diet, (S) livelihood diversification | Observed |
| Wossen et al. | (2014) | (S) improved access to credit, (H) irrigation expansion, (S) adjustment to planting dates, (H) adopt improved varieties | Recommended |
| MacCarthy et al. | (2013) | (H) adopt improved varieties | Recommended |
| Adiku | 2013 | (S) improved weather forecasting, (S) crop and livestock insurance, (S) improved soil management practices | Recommended |
| Eguavoen | (2013) | (S) document and utilize local and indigenous knowledge | Recommended |
| Arku | (2013) | (S) livelihood diversification, (H) irrigation expansion, (S) integrated crop livestock systems | Observed |
| Nyantakyi-Frimpong | (2013a) | (S) document and utilize local and indigenous knowledge | Recommended |
| Olesen et al. | 2013 | (H) adopt improved varieties, (H) increased fertilizer application, (H) irrigation expansion | Recommended |
| Rademacher-Schulz et al. | 2013 | (S) migration | Observed |
| Derbile | (2013) | (H) adopted improved (indigenous) varieties, (S) adjustments to planting dates, (S) improved soil management (organic manure, grass strips, stone terracing, paddy farming) | Observed |
| Tachie-Obeng et al. | (2013) | (S) adjustments to planting dates, (H) adopt improved varieties | Recommended |
| Laube | 2012 | (S) crop and livestock diversification, (S) migration, (H) irrigation expansion (shallow groundwater) | Observed |
| Derbile and Kasei | (2012) | (S) building capacity among district agents, (S) improved access to seed inputs, (H) improved market infrastructure, (H) Establish community seed banks, (S) promote 'nursing and transplanting' for millet and guinea corn, (H) promote solar seed drying, (S) livelihood diversification | Recommended |
| Onyango et al. | 2012 | (H) adopt improved (different) varieties, (S) intercropping, (S) adjustment to planting dates, | Observed |

| | | | |
|---|---|---|---|
| | | (S) extensification, (H) increased pesticide, herbicide and fertilizer application, (S) integrated pest management, (H) irrigation expansion (including micro-catchments), (S) cover crops, (S) improved soil management (mulching, ridges, contouring, crop rotation, composting), (S) improved animal feed | |
| Armah et al. | 2011 | (H) irrigation expansion, (H) adopt improved varieties, (S) document and utilize local and indigenous knowledge | Recommended |
| Van der Geest | 2011 | (S) migration | Observed |
| Tan et al. | (2010) | (H) increased fertilizer application | Recommended |
| Dietz et al. | 2004 | (S) livelihood diversification, (S) cash cropping, (H) adopt improved varieties, (S) crop and livestock diversification | Observed |

Source: Author

*Observed adaptations*

Thirteen separate authors have recorded observed agricultural climate change adaptations in northern Ghana. Collectively, they identify 18 unique adaptation measures, and 47 total adaptations (Table 2). In analyzing their work, I find that only 30% (14 of 47) of total adaptation responses observed in this literature can be considered 'hard' adaptations. This includes primarily the 'adoption of improved varieties' and 'irrigation expansion', but also comprises 'increased fertilizer application' (Bawakyillenuo et al. 2014; Onyango et al. 2012) and 'rainwater harvesting' (Samaddar et al. 2014). While categorized as hard adaptations, several of these measures are perhaps more nuanced. Derbile (2013), for example, writing on the integration of local knowledge in to agricultural adaptation in the Upper East Region (UER), refers to the adoption of 'improved *indigenous* varieties' of key crops, not necessarily hybrid or modified varieties. Similarly, Onyango et al. (2012) simply state that all of the farmers in their study have "adopted three or more new crops and/or varieties in the past ten years" (p. 6). These actions were categorized as 'hard adaptation' despite the fact that they do not necessarily use 'technologies and/or processes owned by foreign firms' — a central characteristic of Sovacool's hard adaptation definition (2011). Similarly, Laube's (2012) shallow groundwater irrigation (SGI) and Onyango et al.'s (2012) dugouts and earth dams were also included in 'irrigation expansion' despite the fact that these interventions mainly use 'forms of natural infrastructure' (i.e. so-called green infrastructure as opposed to artificial infrastructure). This is to say that the already small proportion of hard adaptations observed in the literature may in fact be overstated.

**Table 2 'Hard' versus 'soft' composition of agricultural adaptation strategies *observed* in northern Ghana**

| Type of Adaptation | # of instances observed | % of total adaptations |
|---|---|---|
| **Hard Adaptation** | 14 | 30% |
| **Soft Adaptation** | 33 | 70% |

Source: Author

Meanwhile, commonly observed soft adaptation measures include 'livelihood diversification' (the most widely observed adaptation measure in the study) and 'crop and livestock diversification'. 'Migration' as an adaptation strategy was observed by five separate authors (Dumenu and Obeng 2016; Bawakyillenuo et al. 2014; Rademacher-Schulz et al. 2013; Laube et al. 2012; van der Geest 2011). Rademacher-Schulz et al. (2013), for example, find that dry season migration is a common livelihood strategy used by households in the UWR, but has recently been accompanied by an increase in rainy-season migration as well, given the combined expectation of a poor harvest and cumulative food shortages. Also on the topic of migration, Van der Geest (2011) determines that north-south migration in Ghana is largely environmentally induced. Respondents site the scarcity of fertile land as a primary reason for migration, over climate change or erratic rainfall. This 'structural environmental scarcity' (slow-onset), then, combined with economic and political factors, weighs more heavily than sudden-onset environmental stress. In fact, during the Sahelian drought leading to the 1983 economic collapse, outward migration form northern Ghana was reduced. Pull-factors, like improved land fertility and rainfall patterns in other regions of Ghana impact more heavily on decision making than the concurrent deterioriation of those same factors in northern Ghana (i.e. push factors). Meanwhile, soft market-based mechanisms—indicative of neoliberal rationality— included 'cash cropping' (Cobbinah and Anane 2015; Dietz et al. 2004) and 'crop and livestock insurance' (Bawakyillenuo et al. 2014), but represent only a small minority (approximately 6%) of total adaptation responses.

Ultimately, most authors in this first grouping observed a mix of hard and soft adaptations. Dietz et al. (2004), for example, in assessing the historical productivity of six main northern crops (sorghum, millet, maize, rice, groundnut, and cotton) in the UER, identify a variety of coping strategies including (S) reliance on non-agricultural-based income sources, (S) moving to market oriented activities (cotton and tomato cash crops, for example), (H) adopting drought tolerant varieties, and (S) diversification of livestock production to include goats, pigs and fowl.

*Recommended adaptations*

In the second grouping, fourteen authors *recommend* agricultural adaptations in northern Ghana, promoting 17 unique strategies, and 31 total adaptations (Table 3). Notably, the percentage of hard adaptation responses in this second literature sample is 42% (compared to 30% for observed adaptations). The hard measures most frequently recommended within the portfolio include the 'adoption of improved varieties' (the most widely recommended adaptation measure in the study), 'irrigation expansion' and 'increased fertilizer application'. Olesen et al. (2013) provides what might be considered a prototype study of hard adaptation in Ghana, suggesting that effective adaptation begins with delivering access to a critical inputs including "improved seeds, fertilizers, agrochemical and where possible, irrigation water" (p. 47). Additional hard adaptation options are recommended by Derbiel and Kasei (2012), including 'improved market infrastructure', 'community seed banks', and 'solar seed driers'.

**Table 3 'Hard' versus 'soft' composition of agricultural adaptation strategies *recommended* in northern Ghana**

| Type of Adaptation | # of instances recommended | % of total adaptations |
|---|---|---|
| **Hard Adaptation** | 13 | 42% |
| **Soft Adaptation** | 18 | 58% |

Source: Author

Authors recommending hard adaptations interventions often consider local adaptive capacity insufficient to eliminate climate vulnerability (Derbile and Kasei 2012), although this is not universal. Notably, three authors recommended the 'documentation and utilization of local and indigenous knowledge' as a key adaptation in the region which is not included among observed interventions (Eguavoen 2013; Armah et al. 2011; Nyantakyi-Frimpong 2013a). Nyantakyi-Frimpong (2013a), for example, argues that 'high resource' adaptation solutions (hybrids, synthetic fertilizer, and carbon-heavy machinery) are not appropriate for smallholders in northern Ghana, and that that indigenous and local knowledge must be better incorporated in to national climate change adaptation policies[23].

Several neoliberal market-oriented interventions were also introduced in this literature sample. 'Improved access to credit', for example, was promoted by several authors (Wossen et al. 2014; Wossen and Berger 2015) and did not appear among observed adaptations.

[23] It is problematic to assume that all academics share in the neoliberal bias purported to exist in Ghana's business as usual agricultural development regime. Authors like Nyantakyi-Frimpong (2013), Armah et al. (2011), and Eguavoen (2013) have emerged not holding, but *in response to,* a purported neoliberal, techno-fix bias in adaptation policy. If we remove these authors from the 'recommended' adaptation literature, then the neoliberal and hard adaptation bias becomes stronger.

Similarly, 'adjusted land tenure arrangements' (Antwi-Agyei et al. 2015), and 'improved access to seed markets' (Derbile and Kasei 2012) were newly introduced. Still, these neoliberal interventions accounted for only 19% (6 of 31) of the total recommended interventions. A summary of the analysis of both observed and recommended adaptation interventions in the literature is provided in Table 4.

**Table 4 Summary analysis of 'observed' versus 'recommended' adaptation interventions in northern Ghana**

| | No. of authors | No. of unique adaptations | Total no. of adaptations | No. of 'hard' adaptations | No. of 'neoliberal[24]' adaptations |
|---|---|---|---|---|---|
| Observed | 13 | 18 | 47 | 14 (30%) | 3 (6%) |
| Recommended | 14 | 19 | 31 | 13 (42%) | 6 (19%) |

**Discussion**

We can conclude from this analysis that both observed and recommended adaptations actions in northern Ghana tend to widely support soft measures that are not predominately neoliberal nor market-based. Indeed, Cobbinah and Anane (2015), researching in the Brong-Ahafo region, suggest that government-proposed strategies of expansion of irrigation facilities and drought tolerant variety adoption have not been widely implemented in the research area. That being said, the bias towards hard and neoliberal interventions is more pronounced among recommended adaptation literature—that is, among so-called adaptation 'experts'. This is consistent with the work of Antwi-Agyei et al. (2014a), who, in identifying barriers to climate change adaptation in Upper East Ghana, find that only 28% of households in the study villages cited technological barriers to adaptation, while 46% of papers systematically-reviewed identified technology as a major constraint. It can be said, if only faintly, that there is disagreement between what is being done and what is being recommended in terms of agricultural climate change adaptation in northern Ghana.

*Real interests*

This underlying trend notwithstanding, an analysis of 'observed' adaptation serves as a dubious proxy for the true ('real' or 'objective') interests of small scale farmers in the region, to evoke Lukes (2005, 1974). In the context of vast resource deficits, poverty, and hunger can

[24] 'Neoliberal adaptations include the following: 'improved access to credit', 'adjusted land tenure arrangements', 'improved access to seed markets', 'improved market infrastructure', 'cash cropping', and 'crop and livestock insurance'

we assume observed adaptations to be equivalent to preferred adaptations? As Ndamani and Watanabe (2015) demonstrate, farmers themselves—despite widely implementing soft adaptations—rank 'improved crop varieties' and 'irrigation expansion' as the most important types of adaptation interventions. That is to say, while soft adaptation reigns in northern Ghana, this is not necessarily reflective of farmers' true interests, and is perhaps simply the product of socio-economic constraints and the rationalizing away of otherwise desirable options— what John Elster would refer to as 'adaptive preferences' (1983).

Conversely, farmers' stated interest in improved varieties and irrigation may simply be reflective of their perception of the researchers' (or practitioners) ability to readily provide these particular resources (Mosse 2004). Cooke and Kotharti, in their book *Participation: the New Tyranny?* (2001), summarize David Mosse's work with Indian farmers, suggesting "local need was actually shaped by local perceptions of what the agency in question could legitimately and realistically be expected to deliver. Indeed, participatory planning may more accurately be viewed as the acquisition and manipulation of a new planning knowledge, rather than the incorporation of people's knowledge by projects" (p. 8). This phenomenon might also be consistent with the writing of James Scott who suggests the seemingly powerless are in a constant state of 'everyday resistance', and are best conceived of as 'tactical' and at times accepting domination for their own strategic advancement (1992).

In yet another interpretation that might be referred to as outright 'preference shaping', Lukes, with regard to Scotts' interpretation of the misleading 'public transcript', states that "[Scott] considers, only to dismiss it, the alternative claim that those obliged by domination to act a mask will eventually find that their faces have grown to fit the mask" (p 131). That is, under this interpretation, farmers have actively adopted a vision of agriculture based on a hegemonic Western model that would promote improved or genetically modified crop varietals and artificial irrigation infrastructure. In the words of Lukes, "they can see or imagine no alternative to it, or… they see it as natural and unchangeable (2005 p. 28).

While the question of whether farmers' adaptation interests are in fact their own may be unresolvable, it is safe to say that farmers decisions are shaped, knowingly or unknowing, intentionally or unintentionally, by the 'D3.b prevailing rationalities' third dimension of power.

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# Paper 5: Decision making, agenda setting, and preference shaping in Ghana's agricultural climate change adaptation policy regime: a political ecological perspective

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**Abstract:** The study of adaptation policy in Ghana begins in contradiction: while climate change adaptation is politically charged and highly contested at international levels, it remains outwardly devoid of politics at the national level. Adaptation policy development has been effectively 'rendered technical' in Ghana, eroding the need for active participation from non-experts in policy decision making, and leading to the neglect of important underlying political forces that shape adaptation outcomes. The political ecology of adaptation in Ghana is thus not revealed through stark differences in formal policy decision making forums, but in less visible manifestations of power. This paper applies Steven Lukes' three dimensional framework of power to Ghana's agricultural climate change adaptation regime. In semi-structured interviews at national, regional, and local levels, we demonstrate the features of Ghana's adaptation regime that allow certain actor groups to exercise power over smallholder farmers. We argue that this depoliticized context cloaks power in a false consensus, thereby allowing it to play out in more covert dimensions. Specifically, we find that power manifests within the regime in (1) highly visible settings: formal policy outcomes, participatory forums, and executive branch authority; (2) in instances of non-decision making: decentralization without true devolution of power, non-funding and non-implementation of adaptation initiatives, and the extreme autonomy of non-governmental organizations; and (3)—most insidiously— in covert preference shaping settings: a set of pervasive narratives and discourses that frame farmers as 'victims' and 'non-experts', a prevailing neoliberal rationality that privileges certain adaptation interventions over others, and systemic institution bias that elevates the power of traditional authorities and facilities 'political service delivery' to politically aligned communities. Ultimately, it can be said that the rendering technical of adaptation simultaneously undermines the decision making authority of political actors while providing them depoliticized cover to exercise power more or less covertly through policy implementation. Considering Lukes' dimensional framework as a truly three dimensional 'power space' of wholly interdependent dimensions contributes to an improved understanding of depoliticization and the anti-politics of adaptation, and responds to seminal failures among power scholars to determine how dimensions or sources of power relate to one another.

**Keywords:** Climate change, agriculture, Ghana, power, political ecology

## 1. Introduction

Decision makers in Ghana widely agree that climate change will impact their country, and knowledge of climate change is generally high among opinion leaders (BBC 2010). National newspapers consistently print lofty calls to action, parliamentarians have signed on in support of climate smart agriculture interventions (Zougmore 2014), and, most recently, Ghana has developed a National Climate Change Adaptation Strategy (NCCAS) (Government of Ghana 2012b) and a National Climate Change Policy (NCCP) (Government of Ghana 2014a), both approved by the Cabinet.

The political consensus on display in Ghana contrasts with the highly divisive nature of domestic climate change policy in developed countries—particularly in the United States—and climate adaptation policy in UNFCCC negotiations (Gupta 2012; Weiler 2012; McCright and Dunlap 2010). The study of adaptation policy in Ghana, then, can be said to begin in contradiction: while adaptation is politically charged and contested at international levels, it remains outwardly devoid of 'the political' at the national level. Adaptation policy development has been effectively 'rendered technical' in Ghana, eroding the need for active participation from non-experts in policy decision making, and leading to the neglect (intentional or otherwise) of important underlying political forces that shape adaptation outcomes[25]. The distinction between 'politics' and what might be termed 'the political' is of consequence here. In Ghana, to borrow a phrase from Ferguson (1990), the state machinery has overt policies, but not overt politics. In fact, Sova et al. (2014) find that Ghana's main agricultural climate change policies cross-reference over 190 separate state policies.

In a study of influential actors within Ghana's agricultural adaptation policy regime, Sova et al. (2016) find that political groups in Ghana are not perceived as relevant or highly influential within the regime. Instead, adaptation policy is driven by an 'adaptation establishment', or dominant group of power holders made up of government and international technical experts. Sarpong and Anyidoho suggest that "repeatedly, interviewees stated that climate change is 'a highly technical issue' and a 'science'" (2012 p. 9), while BBC data suggests that climate change is made further inaccessible to laypersons through language

[25] William Easterly (2013) writes of "The Tyranny of Experts" in international development arguing that "the conventional approach to economic development, to making countries rich, is based on a technocratic illusion: the belief that poverty is a purely technical problem amenable to technical solutions". Instead, Easterly suggests that this approach ignores what he assumes to be the "real cause of poverty—the unchecked power of the state against poor people without rights" (p. 6). While I do not reach the same insidious view of the state in this thesis—in fact, I argue that in the agricultural climate change adaptation context the state has been largely co-opted by non-state actors— Easterly's work remains timely and salient to this dissertation.

barriers: "Climate change terminology is poorly understood and does not have standard translations in Twi and Dagaare[26]. The language of climate change is not accessible to most Ghanaians…" ( 2010). Depoliticization, then, can ultimately lead to adverse impacts on the adaptive capacity of smallholders because it limits true democratic participation in adaptation decision making, rending development a purely technical exercise (Marino and Ribot 2012). More insidiously, however, depoliticization cloaks power in a false consensus, thereby allowing it to play out in more covert dimensions.

This paper asks, 'how might we study power in a depoliticized environment?" and if not in formal political settings "in what ways does power manifest in Ghana's climate change adaptation regime?" We apply Steven Lukes' dimensional view of power (Lukes 2005, 1974) to Ghana's agricultural adaptation regime to demonstrate that the political ecology of adaptation is not revealed through stark differences in formal policy decision making forums, but in less visible manifestations of power— mainly, the ways in which actor groups can successfully deviate from stated policy agendas, and the way in which certain actors are denied access to their own preferences in adapting to climate change (i.e. are made subjects of the adaptation regime). Improving our understanding power can lead to the enhanced position of vulnerable and systematically disadvantaged groups, especially smallholder farmers. While Lukes' framework has been applied in the adaptation context at the international level in UNFCCC negotiations by Sova et al. (2015b), this study constitutes the first high-resolution national use of the dimensional view of power in climate change adaptation literature.

What follows is an introduction to 'depoliticization' and 'power' in adaptation and development literature. Then, in section 4, we discuss Lukes' analytical framework for the study of power within the regime, and in section 5 we introduce the paper's semi-structured interview methodology. Section 6 provides results, organized according to Lukes' dimensions. Section 7 discusses a-politicization within the regime and offers a modified conceptual framework based on a truly three dimensional 'power space'. Section 8 offers concluding thoughts.

**2. Depoliticization**

Increasingly, climate change literature has been criticized for its apolitical approach to the study of adaptation (Schulz and Siriwardane 2015; Davoudi 2012; Tanner and Allouche 2011; Tanner et al. 2015; Marino and Ribot 2012; Cameron 2012; Brown 2012; Cannon and Muller-

[26] Dagaare is the language spoken in Orbili Village, and widely across Lawra District and the Upper West Region.

Mahn 2010; Stephan et al. 2014; Eguavoen et al. 2015). This phenomenon is sometimes referred to as the 'post-political' condition, and is the results of the depoliticization of climate change adaptation and the prevalence of consensus-oriented and technocratic development regimes (Swyngedouw 2011; Schulz and Siriwardane 2015). The anti-politics of adaptation has become so pervasive that it has led some theorists to suggest that political scientists have been absent from the climate change adaptation discussion altogether (Javeline 2014).

'Depoliticization' —sometimes referred to as 'a-politicization'— can be defined as "deliberate tactics that are deployed by political actors to maintain the status quo of existing power relations and to deflect attention from specific aspects of risk and vulnerability that stand in conflict with their desires, values and interests" (Schulz and Siriwardane 2015 p. 12). To be sure, while 'depoliticization' of adaptation has been largely criticized in the literature (Schulz and Siriwardane 2015), there are those that suggest it to be a positive phenomenon, as a way to reach consensus in politically divisive environments (Fawcett and Marsh 2014; Flinders and Wood 2014). The concept first emerged in development literature with James Ferguson's seminal work, *The Anti-Politics Machine*, chronicling the development industry in Lesotho (1990). There, Ferguson suggests that the development apparatus perpetuated the idea of a "neutral, unitary, and effective national government … perfectly responsive to the blueprints of planners" (Ferguson and Lohmann 1994 p. 178), all the while effectively denying political realities. The result was the expansion of bureacratic state power and consistent failure of development initiatives, or what Ferguson refers to as "the anti-politics machine".

Importantly, depolticization is often linked with what Murray Li refers to as 'rendering technical' (2007), or as reposing political questions in technical terms. This is referred to by Dreyfus and Rabinow as taking "what is essentially a political problem, removing it from the realm of political discourse, recasting it in the neutral language of science" (1982 p. 196). Technocratic development is the subject of a wide body of work in development literature (Bardhan 1993; Reddy and Heuty 2008; Crush 1995; Stiglitz 2000; Bryld 2000; Wilson 2006). In a technocratic regime certain individuals assign themselves trusteeship through expertise, making certain courses of action more easy and others more difficult (Murray Li 2007). What courses of action are considered appropriate and intelligible— or rendered 'legible' to use James Scott's language (1998)—are often dependent upon what the expert has to offer, resulting in prescription before diagnosis, and 'best practice' over 'good fit' (Fritz et al. 2014; Rodrik 2010). Murray Li suggests that expert analyses remove any question that they do not have an answer to, explaining why in many cases, the dilemma in development is not getting the wrong solution, but getting the right solution to the entirely wrong problem

(Ackoff 1974).

In agricultural climate change adaptation regimes, the related concepts of depoliticization and technocentrism (i.e. technocratic development) are especially pronounced given the extreme uncertainty associated with climate impacts and adaptation responses (Sova et al. 2016; Sova et al. 2015b). These concepts, in effect, have considerable impact on who determines what the adaptation problem is, and what courses of action desirable.

**3. Power**

Political ecology can be broadly understood to address the condition and change of socio-ecological systems, with explicit consideration of relations of power (Robbins 2011). That is, PE accepts the notion that the costs and benefits from change in socio-ecological systems are distributed asymmetrically among actors, contributing to political and economic inequalities and altered power relations (Bryant and Bailer 1997; Bryant 1998). Yet power is an understudied topic in adaptation (Chaffin et al. 2014; Biermann et al. 2010) and in SES research more broadly (Clement 2013; Mermet 2011) given the lack of analytical tools to decipher this 'essentially contested', 'overburdened term' (Sayer 2012)

This is especially true in a depoliticized context where the study of power as it is traditionally understood (i.e. purely behaviorally) is inherently constrained. For example, outwardly, Ghana's adaptation regime offers widespread opportunity for smallholder participation through local planning processes, and decisions are derived through widespread consultation. Yet both development and adaptation deficits persist in Ghana, especially in the Upper West Region, despite the integration of adaptation into development planning and myriad climate and development projects. A purely behavioral view of power (i.e. simply observing who 'wins', or in this case, who 'participates') in Ghana's depoliticized adaptation regime would assuredly demonstrate the regime to be consensus-driven, pluralistic and favorable to smallholders. After all, in the absence of overt conflict, consensus on the alignment of values between actor groups is widely assumed (Bachrach and Baratz 1970). However, it is in such "deceptively peaceful settings in which consent has been manufactured and dissent vaporised" (Biermann et al. 2009 p. 67) where more insidious power is on display. Previous authors have cited 'managerial containment' by adaptation practitioners designed to direct stakeholders toward predetermined outcomes (Few et al. 2007), among just one example.

Depoliticization works to maintain the status quo of existing power relations, doing so through the use of hegemonic discourses, the maintenance of ambiguous 'empty signifiers'

(i.e. boundary objects like 'resilience', 'vulnerability'), and making certain development rationalities seem natural and inevitable (e.g. neoliberalism); that is to say, depoliticization works through invisible manifestations of power (Schulz and Siriwardane 2015; Ferguson 1990; Sova et al. 2015b; Levi-Strauss [1950] 1987). With these forces in operation the important question of "how do we bring back power in to the equation" (Shulz and Siriwardane 2015 p. 14), remains at the forefront. A more nuanced understanding of power is necessary to adequately capture these less visible manifestations. Steven Lukes' seminal work, *Power: A Radical View* (2005, 1974), introduces a three dimensional view of power that holds significant explanatory potential in this regard.

**4. Analytical framework**

Political ecology has taken criticism from some authors who state that the PE community of practice often overcompensates for a perceived absence of politics in environmental studies. These critics argue that a singular focus on politics is a recipe for "question-begging research" where certain factors are assumed to be important in advance. Indeed, Paul Robbins (2011), a prolific PE scholar, further admits that the weakest and least compelling accounts in political ecology emerge when scholars or investigators "go in search of concepts used in political ecology and subsequently 'discover' them in the field" (p. 151). This paper aims to contribute a more rigorous framework for the empirical analysis of political forces (i.e. power) that assuages concerns over confirmation bias that can plague political ecology.

Lukes' three dimensional framework for power contributes to a contemporary debate among political scientists as to "how to think about power theoretically and how to study it empirically" (2005 p. 1). The dimensional view takes an expansive approach, suggesting that power is at its most insidious when it prevents visible conflict from occurring the first place. That is, there is a so-called third dimension of power beyond visible decision making (Dahl 1961; Polsby 1980) and non-decision making (i.e. agenda setting) (Bachrach and Baratz 1962) that constitutes the "shaping the perceptions, cognitions and preferences of subordinates in such a way that they accept their role in the existing order of things or imagine no alternative to it" (Lukes 2005 p 28). Lukes' dimensional framework is presented in Table 1.

**Table 1 Lukes' three dimensional framework of power**

| One-Dimensional view of power [D1 -Decision making] | Two- Dimensional view of power [D2 -Agenda setting] | Three- Dimensional view of power [D3 -Preference shaping] |
|---|---|---|
| Behavioral, focus on:<br>(a) behavior<br>(b) Decision making<br>(c) (key) issues<br>(d) Observable (overt) conflict<br>(e) (Subjective) interests, seen as policy preferences revealed by political participation | (Qualified) critique of the behavioral focus. Focus on:<br>(a) decision-making and nondecison-making<br>(b) issues and potential issues<br>(c) observable (overt or covert) conflict<br>(d) (subjective) interests, seen as policy preferences or grievances | Critique of behavioral focus. Focus on:<br>(a) decision making and control over agenda (not necessarily through decisions)<br>(b) Issues and potential issues<br>(c) Observable (overt or covert), and latent conflict<br>(d) Subjective and real interests |

Source: Lukes (1974, 2005)

Apart from positing the existence of a third dimension of power (an assertion affirmed by Lukes' contemporaries and even critics), Lukes and subsequent authors provide little direction for analysts to determine which features of a system of interest contribute to the shaping of subjective preferences (Sova et al. 2015b). Sova et al. suggest three interrelated sources of third dimension preference shaping in adaptation regimes that are adopted here. They include 'dominant discourses and narratives', 'prevailing rationalities of government' and 'systemic institutional bias' (ibid). Collectively, these sources of preference shaping power provide a lens with which to explore trends that lie outside of the explanatory scope of first and second dimension power. Table 2 defines the sources of third dimension preference shaping explored here.

**Table 2 Sources of third dimension preference shaping**

| D3.a Dominant narratives and discourses | D3.b. Prevailing rationalities of government | D3.c Systemic Bias |
|---|---|---|
| Preference shaping occurring through an ensemble of ideas, concepts, categories, and systems of thought through which meaning is given to social and physical phenomena and 'truths' established | Preference shaping occurring through the perpetuation of taken-for-granted notions and 'technologies' of government that predetermine system boundaries, bias problem identification, and make specific outcomes more possible than others, or seemingly inevitable. | Preference shaping occurring through the unintentional result of collective action and extensive webs of interaction and historical precedent beyond the capacity of an individual element, manifesting through systems of representation, multi-level and 'polycentric' governance through which meaning is negotiated and transformed. |

Source: Sova et al. (2015)

What Lukes' describes in his three dimensional framework is closely aligned with the concept of depoliticization. After all, that subjects might accept "the existing order of things" is the primary concern of depoliticizing agents. Yet Lukes' third dimension of power goes a step further to consider unintentional acts that contribute to the shaping of actor interests and preferences. That is, "power does not […], when it is at work, need to involved deliberate and strategic manipulation" (Lukes 2006 pg 171). For its ability to capture less visible sources of power derived from both agent-based and structural factors, Lukes' framework can shed light on the complex power interactions that occur in multi-level, multi-actor regimes like that of climate change adaptation in Ghana.

**5. Methods**

Semi-structured interviews with stakeholders across actor levels serve as the principal data collection method applied in this research. Semi-structured interviews allow for the collection of partial, perspective-based views from a variety of actors and is particularly appropriate and effective when intricate problems need to be unraveled, and when in-depth information cannot be expected from representative surveys of respondents (Tremblay 1957). This study uses 80 semi-structured interviews, conducted at three administrative levels in Ghana's agricultural adaptation regime: national (Accra), regional (Wa, Upper West Region), and District (Lawra). Data was collected between March 2013 and April 2014. Respondents were selected based on their diverse role in Ghana's adaptation regime, identified with support from a key informant from the University of Ghana, and through snowball sampling. The focus of this study is on the public policy regime, yet non-governmental actors were included. Interviews were transcribed and uploaded in to NVIVO Computer Assisted Qualitative Data Analysis (CAQDAS) software. There, respondent data was assigned to each transcript so that queries could be run for operational level (national, regional and local) and respondent type (i.e. government, civil society, multi/bi lateral donors). A complete list of respondents is provided in Annex 4. A partial grounded theory approach to transcript coding was used, applying open coding to identify key power-laden (1) themes and events within the transcripts and later to organized these themes in to a shorter list of (2) emerging nodes (NVIVO 'categories' or 'containers') and (3) finally in to Lukes' three dimensions of power: decision-making, agenda setting, and preference shaping and proposed third dimension sub-categories (narratives and discourse, prevailing rationalities, and systemic bias).

Before beginning the true analysis phase of the semi-structured interviews used in Paper 5, I spent considerable time re-engaging with the data. This was important given that the original interviews were conducted in mid-2013, and a second round in early 2014, and significant

time had passed between data generation and analysis. Re-familiarization—occurring from July 2014 to March 2015—took the form of transcribing audio interviews using ExpressScribe software, and verifying the accuracy and content of the interviews that had been outsourced to a third party for transcription. I fully transcribed 40 interviews, completed partial transcriptions of 5 interviews, and outsourced the remaining 35 interviews. While transcribing, I included non-verbal occurrences in brackets, including indicating when interruptions occurred, long pauses, and signaling when the respondent laughed or joked. I was assisted in this by my field notes, and the notes of a research assistant from the University of Ghana. Each of the completed transcripts was loaded in to NVIVO. I chose NVivo as my preferred tool since it was supported by the department, my college, and IT Services. I attended an IT Services training course with the anticipation of working with the software (NVivo 9: Introductory Workshop, and Advanced Qualitative) and was given a brief introduction to NVivo in my Advanced Qualitative Research (AQR) course.

I completed two 'rounds' of coding practice with printed transcripts to determine the most appropriate strategy for extracting relevant data. First, I sought to directly apply Lukes' dimensional framework to the text. I underlined key sections of the text marking them with 'decision making', 'agenda setting', 'preference shaping'. After this practice round of coding I determined that the dimensions were too vague or ambiguous to code directly and that using the a-priori themes were biasing my review of the data. This is captured in my journal entry from June 5th, 2014. :

> "The biggest challenge thus far in the coding process has been identifying a-priori themes to use alongside Lukes' dimensional framework…I have had two rounds of coding practice, the first with the printed transcripts and the second with an NVIVO trial. In both instances, I started with the dimensions as a-priori themes, but I kept adding emerging themes to the extent that they node list became unmanageable. (Journal, June 5, 2014)"

Adjusting to this bias, I decided instead on a partial grounded theory approach within NVIVO, applying open coding to identify key power-laden (1) themes and events within the transcripts and later to organized these themes in to a shorter list of (2) emerging nodes[27] and (3) finally in to Lukes' three dimensions of power: decision-making, agenda setting, and preference shaping and proposed third dimension sub-categories (narratives and discourse, prevailing rationalities, and systemic bias).

[27] The word 'node' is used in NVIVO to describe a 'container' for similar content. It is synonymous with 'category' or 'theme' used in traditional coding language.

**Thematic nodes:** In each transcript, I coded data for themes that I determined to be relevant (according to literature and my own experiences) to challenges and constraints in the agricultural sector (e.g. bush burning, communication, capacity, participation, decentralization, financing, agricultural extension, fertilizer, land tenure, market access, mechanization, urbanization, etc), common discourses regarding agricultural climate change (e.g. 'climate change is…', 'farmers know everything/nothing', 'technology' , 'expertise', 'the north is…', etc), discourses around governance (e.g.' government is…', 'partisanship', 'leadership', 'colonialism', etc), and policies and processes (e.g. 'climate policy integration', 'planning and budgeting', etc), among other considerations. Here, and in grounded theory more broadly, the constant comparison method (CCM) was applied. That is, Glaser and Strauss suggest "while coding an incident for a category, compare it with previous incidents in the same and different groups coded in the same category " (1967, p. 106). Comparison, as described by Tesch:

> "[Is] the main intellectual tool [in qualitative research and grounded theory]… The method of comparing and contrasting is used for practically all intellectual tasks during analysis: forming categories, establishing the boundaries of the categories, assigning the segments to categories, summarizing the content of each category, finding negative evidence, etc. The goal is to discern conceptual similarities, to refine the discriminative power of categories, and to discover patterns" (1990 p. 96).

Consistent with the guidance of Glaser and Straus, this comparison of thematic nodes was done based on memory alone. In total, 58 thematic nodes were created, along with a node for each actor group.

**Emerging nodes:** As suggested by Glaser and Strauss, "as incidents begin to be compared to properties of the categories rather than to other incidents, rudimentary rules for each category [can be] established" (1967 p. 108). It was at this phase that thematic nodes were removed, added or simply renamed (down to 46 nodes from 58) allowing me to naturally cluster the thematic nodes in to 'families' (emerging nodes). I was in search of, in the words of Glaser and Strauss, "parsimony of variables and scope in the application of the system to a wide range of situations" (1967 pp. 110-111). A total of 11 emerging family nodes were created including 'policy outcomes, 'executive power', 'discourse around the capacity of farmers', neoliberal rationality etc. Each emerging node was then defined. 'Policy outcomes', for example, refers to an "emphasis on mitigation within climate policy facilitated by the dominance of development partners, and limited domestic ownership". Thematic nodes contributing to this family included 'climate policy integration', 'policies', 'climate change is…', 'adaptation Vs. mitigation', 'neoliberal rationality', and 'ownership'. As several of the emerging nodes are interrelated (so too are Lukes' dimension), some thematic nodes

contribute to multiple family nodes. The node 'climate change is…' (i.e. when you hear the words climate change, what do you think of?), for example, contributes not only to 'policy outcomes', but to 'discourses of uncertainty', and 'discourses around climate change as deforestation' family nodes.

**A-priori nodes:** In a final step, the family nodes identified from the myriad thematic nodes were grouped according to Lukes' dimensions. When clustering emerging nodes, I asked: (1) Does the power-laden theme, activity, or concept reflect observable preferences as revealed in formal political settings?; (2) if not, does the power-laden theme, activity or concept reflect observable preferences? (i.e. is there visible conflict at all?); and (3) if not, is this power-laden theme, activity or concept captured by one of three sources of third dimension power (narrative or discourse, prevailing rationality, or systemic bias)? This heuristic was not without limitations, however. The family node 'executive power', for example, contained elements of observable conflict playing out in both formal and informal settings (i.e. non-decision making). This node was grouped as D1/2, pertaining to both decision making and agenda setting dimensions. Other family nodes were more clear-cut. 'Narratives of uncertainty', for example, was a conflict-free manifestation of power belonging to D3.b dominant narrative or discourse.

This three-tiered analysis process served to produce the outline and content for this paper. Table 3 outlines the 'emerging' and 'thematic' nodes behind each of Lukes' dimensions of power.

**Table 3 A-priori, emerging, and thematic nodes resulting from coding process**

| A-priori Node: | Emerging (family) Node (11): | Drawing on thematic node (46): |
|---|---|---|
| D1 Decision making | + Policy Outcomes | + Climate Policy Integration + Policies (NCCP, NCCAS, Manifestos, GSGDA) + "Climate Change is…" +Adaptation Vs. Mitigation + Neoliberal Rationality + Ownership |
| | + Policy Participation and Inclusiveness | + Participation + Ownership +Consultation +Planning and Budgeting |
| | + Executive Power | + DCE +President + Parliamentary Oversight +Political Service Delivery +Partisanship +Staff Transfers +Leadership +Legal Authority +Charisma |
| D2 Agenda Setting | +Actor autonomy and accountability | +INGOs +Autonomy +Expertise +Resources +Communication + "Government is…" |
| | +Selective Funding (non-funding) and implementation | + Implementation + Financing + DACF/Common Fund + Partisanship + Political Service Delivery +Donors + President +DCE +Planning and Budgeting |
| | +Decentralized planning, "decentralization without devolution" | + Decentralization + Participation +Ownership +DCE +President +Planning and Budgeting |
| D3 Preference Shaping | + Narratives around Farmer Capacity | + Farmers + "Farmers Know everything/nothing.." + Capacity +Literacy + Ownership +Participation + "The North is.." |
| | + Punctualization: Government, Civil Society and Politics | + President + Political Parties + Partisanship + "Government is…" + Relationships (clientalism/ patronism) |
| | + Narrative of Uncertainty | +Expertise + "Climate change is.." +Participation + Ownership +Consultation + "Technical…" |
| | +Narrative of climate change as deforestation | + "Climate change is" + Environment |
| | +Neoliberal Rationality | + Neoliberalism + Policies (NCCP, NCCAS, Manifestos, GSGDA) + Market Access + "Government is…" |
| | + Cultural Derivation of Authority | + Traditional Authorities + President + Seniority + Charisma + Indirect Rule +Gender |

Source: Author

## 6. Results

The results of semi structured interview analysis have been divided in to three sections pertaining to Lukes' dimensional framework: a. decision-making, b. agenda setting, and c. preference shaping. The results seek to demonstrate how power manifests in each of these dimensions within Ghana's agricultural adaptation regime, and to identify the impacts on smallholder farmers. Each section provides a brief introduction to the dimension being examined and a table outlining the sections' content. Multiple quotes from semi-structured interviews are provided to demonstrate the range of cross-level perspectives and to allow the reader to fully interpret the results.

### *6.1 The first dimension of power: decision making*

Decision making, Lukes' first dimension, "focuses on behavior in the making of decisions on issues over which there is an observable conflict of (subjective) interests, seen as express policy preferences, revealed by political participation" (Lukes 2005 p. 19). Instances of formal decision making in Ghana's agricultural adaptation regime derived from interview data include: NCCP policy outcomes; the participation and inclusiveness of policy planning procedures; and the relative strength of the executive branch in Ghana (see Table 4).

**Table 4 First dimension power in Ghana's agricultural adaptation policy regime**

| Manifestation | Description | Anticipated impact on adaptive capacity | Cross-dimension links |
|---|---|---|---|
| **Policy Outcomes:** Emphasis on mitigation within climate policy facilitated by the dominance of development partners, and limited domestic ownership | The content of formal climate change policies (NCCP) represent the type of express policy preferences reached through political participation that Lukes' describes in his first dimension | NCCP promotes interventions preferred by international agents, especially emissions reductions (mitigation) within the agricultural sector | Link to 'D3.a.b discourse of climate change as deforestation'; to 'D3.b neoliberal development rationality' |
| **Participation and Inclusiveness:** General perception among respondents that adaptation policy and planning institutions are inclusive of local needs and | Formal planning institutions in Ghana serve as the basis for political participation, bringing stakeholder preferences out and, at times, in conflict with other actor groups. This manifestation of power through the formal | Strong bottom-up planning, and climate policy integration in to sectoral and district plans promotes active participation of 'local' units (e.g. farmers and district agents) in adaption planning. Inclusive, bottom-up | Link to third dimension 'D3.a.c narratives around the capacity of farmers'; to 'D2 Selective Funding (non-funding) and implementation'; to 'D2 decentralization without devolution'; to 'D3.c Punctualization of government and politics' |

| | | | |
|---|---|---|---|
| preferences, but lack implementation | development planning mechanism constitutes first dimension, decision making power | planning promotes diverse and locally appropriate adaptation strategies | |
| **Executive Power:** The strength of Executive relative to the Legislature branch in Ghana's development and adaptation planning regime | The executive and legislative branches interact in formal, first dimension political settings, and their ability to fulfill or defer their decision making (or non-decision making) and oversight responsibilities suggests second dimension agenda setting power | The inability (unwillingness) of legislators to hold the executive branch in check regarding policy and funding decisions results in the elevated influence of the President leading to unilateral decision making and the undermining of participatory planning in Ghana. Resources for locally appropriate adaptation can be diverted at "source" towards presidential and party priorities | Link to 'D2 Selective Funding (non-funding) and implementation'; to 'D3.c. Cultural derivation of authority'; to 'D1. Policy outcomes' (i.e. manifestos); to 'D2 decentralization without devolution'; to 'D1 policy outcomes'; to 'D3.c Punctualization of government and politics' |

Source: Author

**Policy outcomes (D1)**

First, decision making power within Ghana's adaptation regime is most visible in the proportional allocation of mitigation and adaptation strategies within the NCCP, facilitated by the perceived dominance of development partners with regard to the climate policy agenda in the country. Domestic respondents generally—although not exclusively (see 'D3.a environment as deforestation' below)—preferred a focus on adaptation initiatives within the NCCP given Ghana's minimal contribution to global greenhouse gas emissions. In defending this position, respondents generally cited commonly advanced arguments for climate justice, like 'polluters pay' and 'common but differentiated responsibilities'. On the whole, however, respondents cited a bias toward mitigation in actual climate change spending and program implementation. In the second annual civil society review of the environment sector in Ghana CSO representatives state that "government's priority should be more on local adaptation mechanisms and not too much of the mitigation agendas being pushed by some developed countries" (Civil Society Organisations 2011).

> "Ghana Goes for Green Growth". And I said no that is too limited. We are not only doing mitigation!" (Interview, National, 14, 2013).

> "I can show you where the money is coming from if you do a tracking of the list of funding sources coming in, I can tell you a lot of them is going in to areas that one can easily say are more mitigation than adaptation." (Interview, National, 35, 2013)

> "I think adaptation comes first, you know, [but] they are not doing that according to what I hear." (Interview, National, 7, 2013)
>
> "If they are going to fund adaptation it will be very small. (Interview, National, 32, 2013)
>
> "…our policy objective is adaptation first, social development second, and mitigation third. So we have three key policy objectives... and it's ironic that the international community is always interested in mitigation." (Interview, National, 30, 2013)

That mitigation should be so visible within Ghana's policy regime despite the preference for the country to prioritize adaptation suggests the alignment with international interests, and questionable domestic ownership over the climate policy development process. This despite the fact that a MESTI representative familiar with the NCCP development process insists that the policy is entirely 'Made in Ghana': "The good thing is that all the consultants are Ghanaian and they are here, and we are working with them everyday. This document is a 'Made in Ghana' document. There is no consultant from outside the country that was part of this. They are all Ghanaians" (Interview, National, 31, 2014). Another MESTI functionary similarly states: "we consulted about 3000 stakeholders all over the country….so the policy is not a policy for anybody, it is a policy for Ghana" (Interview, National, 30, 2013). More broadly, however, donor climate change priorities were not perceived to be in line with that of Ghana, a sentiment reflected by a host of respondents suggesting the climate agenda to be 'pushed', 'sold' or 'brought':

> "I think there was a big push by donors, especially the [country name], selling that [climate change] agenda." (Interview, National, 25, 2013)
>
> "…our projects tend to aggravate and distort by simple fact that—especially for donor-driven programs it's even more acute—you can really distort government priorities. When you say to them you are going to put money for climate change…" (Interview, National, 25, 2013)
>
> "It's now become a big issue most of the time everybody trying to talk about climate change, climate change, climate change… these projects also try to push most of the activities on climate change (Interview, Regional, 55, 2013)
>
> "So whatever [climate change] innovations donors are bringing the people are mainstreaming them in to their plans." (Interview, Regional, 51, 2013)
>
> "…some of your donors and development partners they want to say the [words] climate change adaptation, but I don't believe that this is the real way to go" (Interview, National, 34, 2013)
>
> "Whenever we make a proposal there is always something you have to talk about climate change." (Interview, National, 12, 2013)

> "Once you are a beggar to some extent you have no choice…I have my money and I'm bringing it and I'm saying if you are going to do food security just put in some component of climate change" (Interview, National, 38, 2013)

> "…why do you spend your [money] doing things that are not priority to Ghana, and publish them in international magazines as if you are doing something good?" (Interview, National, 30, 2013).

> "Of course everyone thinks about win-win [with donors], but I think somehow they have to make us win better." (Interview, National, 3, 2013).

> "…they are just pushing these things [climate projects] with money." (Interview, National, 32, 2013)

First dimension decision making power, then, manifests in policy outcomes that favor mitigation despite domestic preferences for adaptation, a phenomenon driven by the often-cited donor intervention and the accompanying reduced domestic ownership of adaptation plans[28]. The OECD tracked 'climate-related development finance' in Ghana and determined that a total approximately US$ 220 million in climate sensitive ODA commitments were made in 2014. The majority (US$ 167 million) was aimed at climate mitigation, while the remaining constituted both mitigation and adaptation, or adaptation alone (US$ 39 million) (2015). This tension constitutes among the only overt conflict of competing interests within the adaptation policy regime. Ghana has been described by some as a 'donor darling' given its stable political and legal institutions relative to other West African nations[29]. It should come as no surprise, then, that external agendas have been key in shaping the policy agenda in Ghana and in the developing world more broadly (Cameron 2011; Næss 2014).

**Participation and inclusiveness (D1)**

A second area of first dimension decision making power within Ghana's adaptation regime is captured by the extent of stakeholder participation in formal planning procedures. First dimension power, after all, constitutes those conflicts that play out overtly in formal political settings. This requires that, in the first instance, we consider which actor groups are deemed important stakeholders in the policy development process (i.e. those that have access), with special attention to the role of smallholder farmers.

[28] Duus-Otterstrom (2015) refers to domestic ownership of climate change goals and finances as 'recipient control'; a counter to 'donor control'.

[29] A figure cited by several respondents is that "upwards of 40% of Ghana's national budget is provided by bi-lateral and multi-lateral donors" (Interview, National, 38, 29, 13, 2013). In reality, donor budget support amounts to less than 5% of the GoG annual budget, but this reoccurring statistic speaks to the perceived power of these international agencies.

Climate change adaptation is mainstreamed in the decentralized district planning process in Ghana, facilitated by planning guidelines issued by NDPC, budget guidelines provided by MoF and a results-based funding mechanism called the Functional Organizational Assessment Tool (FOAT), which includes a climate change indicator in its assessment metrics. These measures, it is thought, effectively hold the DA accountable for the inclusion of climate change adaptation planning in medium term and annual action plans.

Generally speaking, respondents find that adaptation policy planning procedures in the district to be robust and bottom-up in nature, with district level actions derived from community consultation. Area Councils and Zonal Committees serve to capture the needs of farmers for the District Assembly, and the District Department of Agriculture also conducts community needs assessments for the development of their sectoral plans before they are integrated with the DA to develop the four-year Medium Term Development Plan (MTDP).

> "There is no policy or anything that can be done in the DA policy [ ] without due consultation at the local level. Whatever document we come up with starts at the zonal level." (Interview, Region, 49, 2013)
>
> "If you take for instance a lot of government projects you cannot get funding if the documentation has not come around saying that you have done the due consultation." (Interview, Regional, 51, 2013)
>
> "We went into the communities to let them draw their own community action plans and then we incorporated them into the assembly action plan…" (Interview, Local, 77, 2013)
>
> "We don't want to become the problem for them thus we have to tap the information from them." (Interview, Local, 72, 2013)
>
> "…the national level is not just sitting in the offices here, we come down [to the community]…you go to the chief or the opinion leader, you sit with them a day, half a day and listen to indigenous things" (Interview, National, 38, 2013)
>
> "You know now we don't do that top-down planning. What we do is bottom-up." (Interview, National, 29, 2013)
>
> "So it's not like we sit in Accra and decide what should be done. It is informed by information we gather from the districts" (Interview, National, 32, 2013)
>
> "We go to communities, because in order to inform policy, I think you need to do a little bit of ground work to understand what people perceive to be their challenges." (Interview, National, 14, 2013)
>
> "…de-centralization has actually brought voice to the voiceless. Now every unit committee they have a representative in district assembly you understand where they articulate their view…" (Interview, Regional, 43, 2013)

The outcomes in local, formal decision making forums around adaptation in Ghana would seem to elevate the power and influence of farmers themselves. Yet, as noted by a range of respondents, the District Assembly and MoFA rarely interact with the community in practice, given their perennial District Assembly Common Fund (DACF) budget delays and severely limited extension resources, respectively[30].

> "I mean the planning officers were supposed to go to the communities, but the fact is that they don't have the capacity." (Interview, Regional, 44, 2014)
>
> "They will never be in the field and then write their report about a farmer…" (Interview, Local, 79, 2013).
>
> …at the [Orbili] community level it seems they have no interaction with the district or the assembly man." (Interview, Local, 78, 2013)
>
> "…people in collecting data most of them are not, sits in the comfort of their offices, take documents that are written…they have never gone back to the people for any consultation." (Interview, National, 14, 2013)
>
> "Most of the time many of these planning officers [at the district] do not have the requisite knowledge in participatory methodologies. And it makes it difficult for them to engage people and collect information for planning" (Interview, Regional, 44, 2014)

Consequently, while planning institutions theoretical supply decision making power to smallholders in formal settings, this can be curtailed by second dimension, non-decision making. Debrah (2014) rightly notes that there are no formal channels for public participation in the budgeting and expenditure process at the district level, only during the plan development process. This means that in the event of inevitable budget shortfalls, re-prioritization of community interventions is undertaken by the DA's budget committee and finance and administration sub-committee, without public consultation. Notwithstanding, for the majority of respondents, agricultural climate change policy development in Ghana does not want for ideas or for participation, but for implementation and enforcement, the subject of 'D2. Selective funding (non-funding) and implementation'.

**Executive Power (D1/2)**

[30] In an analysis of community connectivity by Chaudhury et al. (Forthcoming), only nine community members in Orbili reported 'recent' interactions with their zonal council member: "Interestingly, the two formal governance actors responsible for community administration and development, the district government represented by its elected representative and the traditional authority of the paramount chief are ranked bottom at 12th and 14th with limited direct edges [connections] with only 9 and 1 community member(s) respectively. This lack of interaction is despite Orbili's being very close to the district center, which implies that the district assembly fails adequately to capture the needs of the local community".

Executive power in Ghana is derived from combined decision making and agenda setting power manifestations. The executive branch, we find, most often wins out in formal decision making settings in Ghana, establishing development objectives through their party manifesto, enacting budget source deductions for priority initiatives, and exerting influence across actor levels through presidential appointments. The president's ability to exercise this explicit power, however, comes from less visible sources including patronage and a widely-cited lack of accountability (i.e. non-decision making) imposed by Parliament. These powers notwithstanding, it can be said that the strength of Ghana's modern day executive branch is challenged only by traditional authorities, also explored in this section.

Stated simply, "between the parliament and the presidency, the later is more powerful" (Oxford Business Group 2012 p. 19). This tendency is the result of colonial, among other influences, explored in greater detail in 'D3 Cultural derivation of authority'. As noted by Fukuyama, "in the wake of independence, politics centered around the figure of the president or Big Man (virtually all African postcolonial political systems were presidential rather than parliamentary, and all presidents were male), to whom individuals owed loyalty" (Fukuyama 2014 p. 288). In Ghana, the president chooses half of his cabinet from within the legislature, what Lindberg suggests can lead to executive overreach and influence over parliament and the breakdown in the separation of powers (2009). Members of Parliament, according to several respondents, are unlikely to hold the executive in check because of anticipated 'reward' of a ministerial position.

> "My personal opinion of Ghana is that if the big man takes an interest in something that's what happens and that's what happens quickly." (Interview, Regional, 48, 2014)

> "…you know, executives are also the members of the legislature. Most of the ministers are the members of Parliament, you understand… it's not like, what I read may be from America [or] UK [where] they call executive to task and all that—no it's not like that [here]." (Interview, National, 7, 2013)

> "…you see, people love to dance to the tune of the executive because of the gains that come with that. So they will allow the President to wield that clout, they will dance to his rhythm and perhaps be rewarded by Ministerial appointment or something else."(Interview, National, 17, 2013)

'Dancing to the tune of the executive' means prioritizing interventions that adhere to the President's election manifesto, which exists alongside Ghana's formal Medium Term National Development Framework (NMTDF), produced by the NDPC. A separate respondent representing the NDC political party remarked that there should never be tension in planning priorities between the NDPC and the party in power (i.e. manifestos) given that the NDPC chair is selected by the President in the first instance: "A: Interestingly, this problem that you

have mentioned it should not exist because the NDPC is led by somebody appointed by the president who tows the line of the President and for that matter his party" (Interview, National, 10, 2013). While political manifestos are not legal planning documents, they do outline the executive branch's intended development plan for the duration of their term. Short-term political goals can effectively undermine long (and even medium) term visions, and render the country's planning system a tool for vote grabbing and political patronage[31]. As one respondent describes, "I wouldn't' rule out the fact that sometimes they [the ruling party] push everything aside and they follow their own priority interests, it's very prominent." (Interview, National, 29, 2013). Several respondents from Ghana's planning system suggest that given the politiczed nature of the planning process, there is little impetus for long term planning for climate change in Ghana. One respondent in particular suggests: "The other point is that we're supposed to have what we call national development plans—but eh—in this country I have yet to see one, because all that we do is just medium term, medium term. But a long term national development plan, we have yet to get that" (Interview, Regional, 45, 2014). Given the power of the executive branch in Ghana, the content of party manifestos is of great importance to the country's climate change agenda.

The president also exercises power through regional and district executive appointments across Ghana, which are later confirmed—with limited scrutiny— by the RCC and DA. This is the subject of 'D2 Decentralization without devolution'. This arrangement allows the president to exert power across administrative levels, what might be referred to as 'the strategic deployment of scale' (MacKinnon 2011). A functionary from the Ministry of Local Government and Rural Affairs, for example, when discussing the local election of District Chief Executives (a potential forthcoming reform within the decentralized system), provides a rather profound insight in to the cross-level power of the President: "…if we cut off that link by making the assembly totally autonomous, there becomes a challenge to [the] President, because if you are President and you do not nominate your party to be the DCE and [they are] elected by my people from there, then [they] take instruction from electorate and not from you" (Interview, National, 36, 2013). That it is considered problematic that the local executive should "take instruction from the electorate" (and not a distant President or ruling party) is reflective of the strength of the President and his cross-level reach in Ghana.

[31] A U.S. national living the in Lawra, Upper West region remarks on the power the executive in Ghana: "imagine if in the U.S. everything was determined by the administration in power —well in some ways it is [laughing]—fortunately we have some checks and balances on that so the important things keep going. So you don't suddenly lose the fishing ministry because a new administration comes in to power. It's crazy." (Interview, Local, Janet, 2013)

> "…the governing party has a lot of influence on whatever happens at the community level. Because they are the one that has selected the DCE" (Interview, National, 11, 2013)
>
> "If you look at our structure, the DCE who is the [representative] of the president…must make sure that we deliver on the mandate of the president…" (Interview, Local, 70, 2014)
>
> "…the DCE, he is appointed by the president to make policy work in this district, to see that his ambition is achieved in the district" (Interview, Local, 71, 2013)

The combined scalar power of the president and DCE is held in check by the colonial artefact of indirect rule in Ghana. This has set the stage for visible, first dimension power tensions between 'modern' democratic institutions led by the president and the DCE and traditional authorities (i.e. Chiefs). While information and resource flow are critical areas of influence afforded to the chief (discussed in detail in 'D3.c Cultural derivation of authority'), it is the chiefs' broader mandate for development that is the cause of conflict between the district's formal and traditional regimes:

> "One of key things that makes Ghana different from other West African countries is the fact that the British ruled through indirect rule. So our traditional social institutions are still in tact. So a Chief in Ghana here I dare say is more popular than the President…In terms of traditional governance the Chief is still supreme" [Interview, National, 30, 2013]
>
> "If you get an NGO to come and build a clinic for you and you don't interact with the DA and therefore the health people and they are filling the structure, they are going to tell them don't staff it— don't mind it. Even if I fight and get it, I still have to make them part." (Interview, Local, 63, 2014)
>
> "So now you have two powers. You have the district Chief Executive who is big authority man and you have the chief, sitting down with the people. So it depends upon the relationship between the DCE and the chiefs for anything to move." (Interview, Local, 63, 2014)
>
> "[The] DCE feels that he's big. The Paramount chief also feels that he is also big. Who is now moving to whom? So they have to look at that. And they now said they also have to look at seniority. Who came to the Earth first? Is that the traditional or politics? If it is politics, then OK, politics is the highest. If it is traditional, then tradition is the highest. So they have to link tradition and politics to see which one came first, politics or tradition. So you give what belongs to Cesar to Cesar and to God to God." (Interview, Local, 79, 2013)

It is clear that the executive branch in Ghana wields considerable first dimension decision making power, facilitated by an unwillingness to enforce checks and balances on the part of the legislature, the fulfillment of the short term manifesto goals over medium term planning frameworks, and an appointment system that allows the president to exert influence across

levels. This power is balanced, to a certain extent, by traditional authorities at the community level.

*Towards a second dimension of power*

The role of powerful international interests in shaping adaptation outcomes in the developing world (Cameron 2011; Næss 2014), limited stakeholder participation for marginalized groups in adaptation planning, (Cooke and Kothari 2001; Few et al. 2007; Polack 2008; Sherman and Ford 2014), and the importance of high-level political buy-in are explored by a host of authors in adaptation literature. That is to say, these sorts of first dimension manifestations of power are ubiquitous in the literature for the precise reason that they are easy to identify. Yet the gap between powerful actors in climate adaptation regimes is not merely a product of domestic or international balances of power or a lack of available participatory forums. After all, farmers in Ghana, knowing that their livelihoods are at risk, do participate in local planning processes and their voices are shared at the international level through a host of government and civil society organizations. The more nuanced decisions (and non-decisions) and factors that determine whether a policy—or which components of that policy—are implemented belong to the realm of second dimension power and are explored in the next section.

### *6.2 The second dimension of power: agenda setting*

Lukes' second dimension of power, agenda setting, "allows for the consideration of the ways in which decisions are prevented from being taken on potential issues over which there is an observable conflict of (subjective) interests, seen as embodied in express policy preferences and sub-political grievances" (Lukes, 2005, p. 25). This second dimension addresses so-called 'non-decision making', manifesting through decentralization without devolution, selective funding and implementation, and actor autonomy and accountability (see Table 5).

**Table 5 Second dimension power in Ghana's agricultural adaptation policy regime**

| Manifestation | Description | Anticipated impact on adaptive capacity | Cross-dimension links |
|---|---|---|---|
| **Decentralization without devolution:** Political decentralization that does not devolve power to the district, but vests power in a DCE appointed by president | Ongoing decentralization efforts in Ghana that fail to effectively devolve power to local authorities constitutes a type of second dimension agenda setting power described by Lukes[32] | Decentralization in name only does not increase the autonomy of local agencies and the decision making power of smallholders. It does, however, increase the discretion of the DCE who is the DA spending officer and is appointed by the President. Adaptation pathways supported by the executive are likely to prevail and can be concentrated within communities loyal to the party in power | Links to 'D1/2 Executive power'; to 'D2 Selective Funding (non-funding) and implementation'; to 'D3.c Punctualization of government and politics' |
| **Selective Funding (non-funding) and implementation:** Perennial delays and cuts to district funding limits DA autonomy from central government facilitated by executive source deductions, and paralleled by selective funding of the NCCP by development agents | Resistance to fiscal decentralization, source deductions by the executive branch, and policy design of the NCCP each facilitate the selective funding of adaptation interventions constituting second dimension 'non decision making' | Selective funding by the executive branch leads to delays (and source deductions) in time-sensitive payments to DA's for agricultural inputs and service provision. Similarly, donors can choose segments of the climate change policy to fund, leading to a bias towards the implementation of donor-supported adaptation pathways | Links to 'D2. Actor autonomy and accountability'; to 'D1/2 Executive power'; to 'D2 decentralization without devolution'; to 'D3.b Neoliberal rationality'; 'D3.a.c narratives around the capacity of farmers' |
| **Actor autonomy and accountability:** Extreme autonomy of non-governmental organizations driven by mistrust, and poor coordination between government and non-governmental agencies | The extreme autonomy of non-governmental organizations in Ghana's adaptation regime implies that the decisions that these groups take fall outside of formal political forums. Conflict between government and INGOs constitutes second dimension agenda setting power | In a context of complete autonomy from government planning structures, the adaptation preferences of INGOs prevail over local alternatives captured in DA medium term and annual action plans. This can lead to duplication of efforts or an undermining of the inclusive adaptation planning process | Links to 'D2 Selective Funding (non-funding) and implementation; to 'D3.b Neoliberal rationality' |

Source: Author

[32] "Decentralization without devolution" differs from "selective funding (non-funding) and implementation" in that decentralization is a legal structure or institution that is subverted not through selective funding but through a lack of devolution of power and the strategic usage of scalar politics by the executive branch.

**Decentralization without devolution (D2)**

In Ghana, decentralization has been a work in progress since 1988 when Metropolitan, Municipal and District Assemblies (MMDAs) were first established. Recently, decentralized technical departments (including agriculture) were placed under the jurisdiction of MMDAs and a composite budget and planning system was implemented. Respondents in this study, however, suggest that decentralization has been effectively 'managed' by central level actors in support of the status quo regime that have been slow to devolve power.

The continued district 'bondage' to the central government is personified in the relationship between the central government and the DCE, a product of *political* decentralization. The District Chief Executive (DCE) is appointed by the President to reflect the interests of the ruling party at the district level. The power of the DCE is so pervasive that one respondent suggests "when we refer to the DA, we are referring to the DCE" (Interview, Local, 62, 2013), while another states "I've noticed whatever the DCE wants to do will get done… (Interview, Regional, 48, 2014). The DCE approves spending in the district[33], and, as such, wields considerable influence over which initiatives are funded and which communities benefit. Under the newly instated composite budgeting system (2012), funding for decentralized technical agencies like the District Department of Agriculture passes through the MMDA for spending approval by the DCE, with the regional and district directors of agriculture forfeiting a degree of power to the district. Respondents describe the DCE's 'political pull', 'control', and 'power' within the district:

> "So you can even go to some districts and you realize that about 40 or 50 percent of their projects fall outside of their annual action plan…So that is the political pull of the DCE." (Interview, Regional, 51, 2013)

> "The DCE has almost 80-90% control over those [district] funds, because you are the political head. He represents the president in the constituency." (Interview, Local, 65, 2013)

> "So they can have their medium term development plan, but that plan can be pushed aside for reasons best known to whichever government is in power" (Interview, National, 14, 2013)

[33] The DCE's spending discretion extends to the District Assembly Common Fund (DACF), designed for development initiatives but often re-directed to recurrent expenditure in the absence of sufficient internally generated funds to cover district operating costs: "But, for years, local assemblies have been diverting their share of the Fund to pay for projects not originally intended by the guidelines governing the use of the fund, a situation said to have retarded development projects in most Assemblies" (Newspaper, Daily Graphic, March 2013)

> "And once the funds are released they [decentralized departments] cannot spend if they don't pass the request through us [the DA]. [We can] force them to fall in line with our agenda." (Interview, Local, 70, 2014)

> "So when they go to the district for instance, they prepare the budget nicely, and everything is nicely on the paper approved, everything is nice. When the money comes, then the DCE now prepares a different list, forget about this one for the meantime, and different things happen." (Interview, National, 37, 2013)

Importantly, the DCE arrangement has also been known to create tension between the chief executive and area Member of Parliament (MP) in a micro-display of the broader tension between parliament and the executive in Ghana. In cases described by respondents, the DCE is often motivated to earn an MP position to represent the district in Accra[34]. The MP position is considered more prestigious and the compensation greater, and importantly, is not linked to the President or current administration. As the district spending officer, the DCE has been known to refuse release of the MP common fund assets—a small development fund for use by the MP within the District —in an effort to "torpedo" the MP and be voted in to his position in the next election cycle. This is especially true in instances when the MP (locally elected) represents a different political party from that of the DCE (presidentially appointed).

> "The MP somehow feels higher than the DCE, and would want to issue instructions for the DCE. Then, somewhere along the line monies that [were] meant for the MP's common fund…is under control of the DCE….So eventually you [the DCE] torpedo him [the MP]." (Interview, Regional, 51, 2013)

> "…there have been occasions where MPs fight with DCEs because the DCE will not sign the cheque… I will not sign the check for you to release so you will go and use it to campaign against me." (Interview, Regional, 43, 2013)

> "Ideally there is not supposed to be a conflict between the DCE and MP. Ideally. But here are two people who are all trying to outcompete themselves and to shine for the same purpose…The DCE wants to shine and become the next MP, so that is where the conflict emanates" (Interview, National, 17, 2013)

> "[MP's] can be very rude to the DCE, or the DCE also can be very rude to them…Very very bitter—like the devil and Jesus. [Laughing]" (Interview, Local, 68, 2013)

Second dimension power, then, manifests in the ability of the DCE to determine the development trajectory of the district through non-decision making and discretionary spending[35], successfully deviating from medium term and annual action plans developed

[34] The current MP for the Lawra District was previously the Lawra DCE, for example.

[35] Discretionary spending that disadvantages the agricultural sector can be assuaged to a certain extent by the appointment of a DCE with a favourable view of agriculture. This is noted of the new DCE for Lawra district, who was formally a field agent for the Northern Rural Growth Project (NRGP), and who is described as a "native son", an "agriculturalist", and someone who will "appreciate" what the district director of agriculture decides (Interview, Local, 68, 2014).

through community consultation. The power of the DCE contributes to the first dimension power of the executive branch through presidential appointment and 'strategic deployment of scale' (MacKinnon 2011). In a micro display of national level executive-legislative tension, the DCE and MPs power conflict also represent a key instance second dimension non-decision making that further politicizes the adaptation and development regimes.

**Selective funding (non-funding) and implementation (D2)**

Agenda setting through non-decision making is also evident when funds fail to arrive at the district level for local actors to carry out their 'autonomous' mandates. This is captured in the context of Ghana's ongoing *fiscal* decentralization efforts. To date, the Lawra district has been plagued by insufficient funds combined with an inability to generate local revenue. Perennial delays in the District Assembly Common Fund and sector budgets[36] are cited by the majority of respondents in this study. Several respondents describe the impact of such delays and deductions on the autonomy of the district and on the agricultural sector, a time and climate-bound activity:

> "…in the long run it is expected that once the assembly will really have is their legal autonomy……what they don't have [at present] is resources to function autonomously .." (Interview, National, 36, 2013)

> "There is decentralization in the activity level but when it comes to the funds it is centralized." (Interview, National, 22, 2013)

> "…in some cases they [DAs] create their offices but their purse is in Accra. Where the farmer needs the help, the money is in Accra. They have decentralized physically, but not financially." (Interview, National, 13, 2013)

> "…the first quarter [of 2014] is over, but just yesterday we got a notice that the third quarter of 2013 common fund had been released. Because all of last year they released only two quarters." (Interview, Local, 73, 2014)

> "We allocate the sources of funding and the funds never come. So you may have a plan, you look at the annual plan, you want to do eight or nine projects in various communities and we have not done even three." (Interview, Regional, 54, 2013)

> "You look at last year for instance. Most of the fiscal projects we intended to undertake with our common fund, I think we were only able to initiate only one; that was the renovation of the DCEs bungalow." (Interview, Local, 73, 2014)

> "In fact if you are actually an extension worker you get frustrated at a point because what you plan to do you don't have the resources. In fact there are times, you even

[36] In the agricultural sector, $815,969 Cedis was budgeted for agricultural activities in 2012 in the Lawra district and only $291,662 was ultimately delivered (Lawra District 2013). Similarly, according to on district level functionary, "if you take a department like Social Welfare and Community Development, they were given a budget now about 7,000 Ghana Cedis, but what came was only 25 Ghana Cedis." (Interview, Local, 73, 2014)

> just feel like not even going back to the farmer. Because you send him a message "oh this is to be done at this time." And the time comes and you lack the resources, so what will you go back and tell the farmer. So when you see the farmer's face you start dodging." (Interview, Local, 62, 2013)

There are competing theories regarding district funding. Previous studies suggest that political parties have been even able to direct resources to their party constituencies by altering the DACF formula (Banful 2009): "Governments are able to achieve their tactical targeting of resources despite the formula-based system of sharing DACF resources…the ability to arbitrarily change the guiding formula may be an important loop-hole through which incumbent regimes can manipulate allocation and disbursement" (pp. 35-36). While this was not surfaced in the interview sample here, it is a plausible, second dimension power play. Still others suggest the district funding shortages to be due to low budget ceilings allocated to the agricultural sector by the MOF. Here, a MOF functionary describes the discretionary power that the Minister of Finance has in determining sectoral budget allocations that will be presented to the Cabinet and Parliament. "Performance-based budgeting" in this context can be understood literally, as a type of show or performance in the budget hearing room, with those sectoral ministers most able to convince the panel of their budget 'worthiness' receiving the greatest allocation: "So during the policy hearing, you have NDPC, chaired by the Chief Director, the Deputy Minister or sometimes the Minister himself of MOF. It depends on how best you are able to convince the panel of what you've proposed to do. So often you have ministers from the other ministries coming to sit in it. Especially when they see that it is the MOF minister himself that is sitting on the panel. So you have to play your cards well." (Interview, National, 29, 2013) Most frequently, however, respondents cite source deductions by the President for party initiatives for the district budget shortfalls. This is intrinsically linked to 'D1/2 Executive power' and the influence of short-term goals and political manifestos. Respondents describe money being 'shared', 'deducted', 'taken', and 'diverted' by national level actors before it reaches the district:

> "DACF money [is] deducted at source for departments or projects, so control at DA level is limited" (Interview, National, 22, 2013)

> "…the common fund, they share it in Accra before it comes [laughs]..." (Interview, Local, 63, 2014)

> "We don't actually know where that money goes to. But they deduct at source. At times you may see some funny funny deductions….Anytime they bring their budget we see a lot of deductions; this amount for this, this amount for this. Before you are aware it is left with some small a small amount for your budget" (Interview, Local, 73, 2014).

> "That's why we do not see much development in the district. Before the common fund gets down, 60% of the money [is taken by] national [actors]" (Interview, National, 10, 2013)

> "I can say that since I joined the assemblies, there has never been a year when they have transferred 100% [of the DACF]." (Interview, Local, 73, 2014).

> "So if you have a position of power and responsibly then nobody thinks anything, it's almost expected that there will be a certain amount of 'diversion', they call it diversion, where that 's why we don't get [it]" (Interview, Local, 66, 2013)

> "You see, the national policy—the policy of the ruling government—also counts….if you were here and observed for yourself the past four years, the national policy seemed to favor education more than agriculture[37]…The policy of the government in power sometimes tends to influence what happens at the district level. (Interview, Local, 68, 2013)

Donors and development partners also have a role to play in non-funding or selective funding of adaptation initiatives in that the NCCP allows donors to 'cherry pick' interventions from policy that best fit their interests[38]. 'Cherry-picking' of this variety is facilitated by the ambiguous nature of agricultural climate change policies. Policy items like 'promote and support agricultural diversification', for example, can meaningfully encompass any number of on-ground activities—diversification of livelihoods, diversification toward cash crops, etc. As suggested by Zaharaidis, "if ambiguity is pervasive and central to politics, manipulation is the effort to manage ambiguity. It is a political struggle to create winners and losers, to provide meaning and identity, and to pursue self interest" (2014 p. 29). This power of/from ambiguity contributes to the 'D2 autonomy of non-governmental agencies' and to 'D2 decentralization without devolution' by providing space for the DCE to pursue party interests while still operating within state policy objectives. With no central fund set aside for climate change in the country, the NCCP is subject to asymmetrical implementation resulting from donor discretionary spending:

> "First and foremost international donors can identify portions of the implementation plan and say that we want to implement this is [ ]…I want to look at health or I want to look at maybe this part of adaptation or disaster preparedness or whatever—maybe

[37] While Ghana is a signatory to the Maputo Declaration to invest 10% of its budget in agriculture (and 1% in agricultural research) and to achieve 6% annual sector growth rates, several respondents suggested that since the present government has not prioritized the sector, the country has fallen short of this commitment. "There was a convention that requires that every government should dedicate some percentage of their GDP to agriculture—the Maputo accord—you see 1% to research as well. If you happen to find yourself in the ministry you find out what is the current: we have not even met 0.3%" (Interview, National, 1, 2013).

[38] Barrett (2014) suggests that sub-national financial allocations in Malawi, for example, are based not on vulnerability alone, but on donor utility including project accessibility and cost minimization. Consequently, vulnerability assessments informing national adaptation plans that are intended to guide donor activity do not always achieve this goal.

> I want to look at mitigation or whatever. I should pick that component of the implementation document" (Interview, National, 31, 2014)

> "The idea is really to work around government program and try to select chunks that for one reason or another meet our understanding of the issues and kind of cherry pick—I don't like this word—but I mean cherry pick different parts of the program and funding." (Interview, National, 25, 2013)

Second dimension non-decision making is exemplified through the non-funding of district common fund and agricultural sector budgets. This limits DA autonomy and is facilitated by budget source-deductions in Accra, further contributing to first dimension executive power. Donors and development partners contribute to agenda setting by 'cherry picking' the sections of national climate change policy that suit their interests. This phenomenon is enabled by the extreme autonomy that non-governmental actors have within Ghana's adaptation regime, the next second dimension power manifestation discussed here.

**Actor autonomy and accountability (D2)**

Civil society organizations are frequently cited by respondents in this study as working 'invisibly' within the district, not reporting to the DA or RCC, despite the fact that "by the laws of this country any NGO operating in a district must be dully registered with the districts" (Interview, National, 32, 2013). Since NGO and development partner activity is often seen at odds with national mandates ('D1 Policy outcomes'), this can be considered a conflict occurring outside formal political forums, and thus a second dimension phenomenon. The extreme autonomy of development partners and CSOs has several implications:

> "…they don't' even talk to the district and just show up at communities because the community wants them to do that. I think the attitude is you just do your courtesy call at the district and you go to the community to do your work." (Interview, Regional, 48, 2014)

> "We are autonomous now because we're small still and we're a little bit below the radar, the more you become above the radar the less autonomous you become …When MoFA gives us a list of communities, we do our own research as well. For example we went to this community that MoFA gave us and when we went there, we realized that they were not that enthusiastic so we had to take our work somewhere else. So yes, MoFA is giving us a list but they are not forcing us to go there…we generally work in a place because it has the conditions for us to work there. And that's generally not about whether there is a government program there…" (Interview, National, 12, 2013)

> "…there are times too within the year and an NGO will come and want to do this. And your budget is already approved. So what we'll normally do is still take your activities… (Interview, Local, 73, 2014)

Several respondents cited an inherent mistrust between government and civil society, leading to a lack of engagement from both sides, effectively furthering the autonomy of CSOs:

> "…here has been a perception in this country over the years that NGOs only criticize government, they don't offer alternative to government policies…So there is that antagonistic relationship" (Interview, National, 14, 2013)

> "They say as civil society they only attack us so when they [government] are meeting we are supposed to be there they won't call you. They will go and call their friends, one or two people, and they will put in the document that civil society has been consulted." (Interview, National, 13, 2013).

> "…in the NGO community we find a lot of money being dissipated [ ] on things that are not of relevance to Ghana. Of course every NGO wants to prove, and when you meet them in international conferences, they say the civil servants are doing nothing, they don't' understand the issues involved. What work have you done? They haven't done anything." (Interview, National, 30, 2013)

Importantly, this tension is driven by the perceived expertise of NGOs and INGOs that attend international climate change conferences alongside and, sometimes instead of, government representatives:

> "…but when it comes to the local NGOs, or local government projects, they feel there is no need in filling the chiefs in...maybe he has not gone to school, I've been to school, I can read and write, and that person cannot read and write, why should I go and kneel before such person." (Interview, Local, 79, 2013)

> "I think they are also learning a lot from civil society because it is not all the people in the ministry that have attended these global, and bilateral sessions." (Interview, National, 13, 2013).

> "NGOs are very resourceful as far as information is concerned, specially the foreign NGOs. You know they have, they get lot of information from their partners outside the Ghana, that they could share with the local people." (Interview, National, 7, 2013)

When government budget shortfalls and non-funding are combined with NGO autonomy it creates a situation where MoFA is required to effectively contract out their services to non-governmental actors[39].

> "I'm not very familiar with the laws on how NGOs should operate within the country. But those who work in the agricultural sector…but most of them as far as I know work independently. And what happens is when they go on the ground they use the MoFA staff to implement their projects" (Interview, National, 32, 2013)

[39] This 'contracting' arrangement facilitates a virtual revolving door between NGO practitioners, government technocrats, and even politicians. The current Lawra DCE (2014), for example, is a former Northern Rural Growth Project agricultural agent.

> "So now, agric[culture] is virtually dead. Particularly with extension, and that is why if [the local extension agent] is honest, he will just tell you right now they don't have any program of their own. They act on other organizations that just bring their programs, "Oh do this for us, do this for us", but the ministry itself doesn't have any….So in your district if you don't have any NGO's coming with programs it means you are just there as an extension officer by name, but you have nothing to do." (Interview, Local, 62, 2013)

This final example of second dimension power in Ghana's agricultural adaptation regime explores the autonomy of development partners as a source of second dimension power. Here we see that NGO autonomy can be attributed to a variety of factors including a lack of bureacratic and administrative capacity to track non-governmental interventions, mistrust between NGOs/CSOs and the central government, and a sense of 'superiority' among NGOs in climate change realm due to access to international forums, all accentuated by funding delays and source deductions in government funding that create a virtual revolving door between CSOs, INGOs, and government agencies.

*Towards a third dimension of power*

The first and second dimensions of power discussed here represent key political ecological factors around climate change adaptation that are often discussed by adaptation theorists (although given the novel stage of adaption planning, rarely evidenced). In the first dimension, we have seen evidence of the power and influence of international donor's preference toward climate change mitigation in formal policy outcomes; the perceived effectiveness of decentralized, participatory forums that elevate the power of smallholders (at least on paper); and—in a shared first and second dimension phenomenon—we have indicated the supreme power of the executive branch in Ghana and the importance of the party manifestos in shaping the country's development objectives.

In the second dimension, we have evidenced non-decision making in the failure to truly devolve power to local district assemblies, manifesting in the intimate cross level relationship between the President and the District Chief Executive. Meanwhile, non-decision making in the second dimension is epitomized by the lack of funds transferred to districts because of source deductions for national (executive) initiatives, and the nature of adaptation policy that allows donors to 'cherry pick' interventions for funding. Finally, the extreme autonomy (power) of local and international NGOs driven by limited bureaucratic capacity of government, mistrust between NGOs and government, and non-funding of government agencies also contributes to second dimension agenda setting.

In each of these first and second dimension instances, conflict can be seen either overtly or covertly in a clash of competing interests, be it national versus international priorities (e.g. adaptation versus mitigation), short term political goals versus long term planning goals (e.g. manifestos versus NMTDF), or government versus non-government actors, among other dichotomies. Yet there are other factors that shape adaptation power dynamics that do not play out in these clearly visible settings. Guided by Sova et al.'s (2015b) three sub-species of third dimensional preference shaping power, the next section explores preference shaping as it is derived from 'narratives and discourses', 'prevailing rationalities', and 'systemic institutional bias'.

### *6.3 The third dimension of power: preference shaping*

The third dimension of power refers to the ways in which "potential issues or conflicts can be successfully kept out of politics – in both formal and informal venues—by shaping the perceptions, cognitions and preferences of subordinates in such a way that they accept their role in the existing order of things or imagine no alternative to it" (Lukes, 2005 p. 28). Lukes' third dimension addresses the ways in which issues and conflicts can be successfully kept out of politics, how and perceptions, cognitions and preferences are shaped. Here, based on the work of Sova et al. (2015) three sources of third dimension preference shaping are advanced: dominant narratives and discourses; prevailing 'rationalities' of governance; and systemic institutional bias. Specific manifestations of third dimension power highlighted in Ghana's agricultural adaptation regime include: narratives around uncertainty in adaptation planning, the capacity of farmers, and 'environment as deforestation'; an underlying neoliberal development rationality; historical trends in cultural derivation of authority; and the conflation of civil servants and politics parties (see Table 6).

**Table 6 Third dimension power in Ghana's agricultural adaptation policy regime**

| Manifestation | Description | Anticipated impact on adaptive capacity | Cross-dimension links |
|---|---|---|---|
| **Narrative of uncertainty:** Narrative of uncertainty, and adaptation as technical and expert-driven | Narratives and discourse of 'uncertainty' assigns trusteeship over decision making to qualified experts, predetermining systems boundaries and biasing problem identification and solutions to those held to be viable by trustees. This phenomenon | Elevates the status of international experts and domestic technical agents or those capable of overcoming the inherent 'uncertainty' simultaneously devaluing local agents, eroding the need for active participation by 'non-experts' and stifling the emergence of locally determined adaptation | Links to 'D2 Selective Funding (non-funding); to 'D1 Participation and inclusiveness'; to 'D3.a Narrative of uncertainty' |

| | | | |
|---|---|---|---|
| | belongs to third dimension of power, dominant narratives and discourse | measures | |
| **Narratives around the capacity of farmers:** Narratives around the capacity of farmers (particularly in the North) and the value of indigenous knowledge (i.e. "Farmers know nothing/everything"; "Farmers as victims"; "illiterates" versus the "educated") | Narratives and discourse that establish so-called 'truths' (perceptions) regarding the capacity of certain actor groups and thus rendering them 'subjects' or 'victims', belongs to the third dimension of power, mainly dominant narratives and discourse, but also systemic bias | Narratives around the low capacity of farmers (especially in the Upper West Region) devalue indigenous knowledge and traditional adaptation pathways. Farmers portrayed as 'victims' are policy takers, not active stakeholders in policy development and implementation. Consequently, locally acceptable or preferable adaptation options fail to emerge | Links to 'D3.a.c narratives around the capacity of farmers'; to 'D2 Actor autonomy and accountability'; to 'D2 Selective Funding (non-funding) and implementation |
| **Narrative of "environment as deforestation":** Discourse of climate change as 'Environment' and environment as 'deforestation' | The belief that climate change is an inherently environmental issue among local actors (i.e. not a development issue) biases problem and solution identification. This dynamic belongs to both dominant narratives and discourse and prevailing rationalities of the third dimension of power | The framing of climate change as an environmental issue as opposed to a development issue limits the scope of intervention to those measures deemed to belong to the realm of the 'environmental stewardship', including tree planting | Links to 'D1 Policy outcomes'; to 'D3. a.c narratives around the capacity of farmers' |
| **Neoliberal rationality:** Prevailing 'neoliberal' market-based, techno-fix rationality reinforced by negative perceptions of the state and existing development deficits | The prevalence of certain 'inevitable logics', or taken for granted notions in adaptation governance that privileges certain lines of policy intervention over others is a third dimension preference shaping manifestation of power, prevailing rationalities of government | A neoliberal d rationality active in business-as-usual development promotes adaptation interventions that are infrastructure or market based. Key actors within the DA who value infrastructure interventions for vote-getting purposes, and a general negative perception of government perpetuate this rationality. The result is a potential restricting of adaptation pathways available/presented to smallholders | Links to 'D1 policy outcomes'; to 'D2 Selective funding (non-funding) and implementation; to 'D2 actor autonomy and accountability'; to 'D3. Narrative of uncertainty' |
| **Cultural derivation of Authority:** Colonial history, "indirect rule" and | The historical and cultural deference of decision making and opinion leading to | Traditional authority elevates the status of chiefs as opinion leaders within the community, centralizing decision making | Links to 'D1/2 Executive power'; to 'D3.c Puncutalization of government and |

| | | | |
|---|---|---|---|
| the role of traditional authorities, strong man politics | traditional authorities, seniors, and 'big men', constitutes a systemic bias that shapes the preferences of local actors | processes within these individuals who hold power over land tenure. This can result in a reduction in long-term investment in land by community members (especially women) and related adaptation strategies | politics'; to 'D2 Decentralization without devolution' |
| **Punctualization of government and politics:** Adoption of traditional ruling structures for political ends, conflation of government and political parties, and 'political service delivery' | The dominant belief, particularly among the rural poor, that government (civil servants) and 'political parties' are one and the same—a belief perpetuated by the parties themselves — that leads to structural clientalism and patronage in adaptation service delivery. This is a third dimension preference shaping manifestation, derived from systemic bias | Conflation of civil servants with political parties elevates the status of political parties, creating a dominant short-termism in adaptation initiatives that is biased towards politically aligned communities, and that can undermine the established DA planning process and locally determined adaptation measures | Links to 'D1/2 Executive power'; to 'D2 Decentralization without devolution'; to 'D3.c cultural derivation of authority' |

Source: Author

**Narratives of uncertainty and expertise (D3.a)**

Narratives and discourse of extreme 'uncertainty' in the adaptation regime (i.e. uncertainty of impacts and uncertainty regarding appropriate response types) leads to the assigning of trusteeship over decision making in the regime to qualified 'experts'—mainly international agencies and technical government agencies—what Sova et al. (2016) refer to as the 'adaptation establishment'. This third dimension power manifestation predetermines system boundaries and biases problem identification and solutions to those held to be 'viable' by trustees. Uncertainty in the climate change regime is driven by references to 'computers and modelling', a 'lack of information', and the 'technical' nature of climate change:

> "Now that is not what is predicted for northern Ghana, again, is that model correct or not? God only knows. I don't know. These are guesses; educated guesses." (Interview, National, 12, 2013).
>
> "I don't think that information is really available. You have all these models, but for me they look like ..they have lots of work behind them, they are really like astrology. (Interview, National, 25, 2013)
>
> "…the perception of climate change was deemed to be very technical, and it might be comparable to the use of computers two decades ago." (Newspaper, Daily Graphic, July 2013).
>
> "I would say that in the agricultural sector, the issue of climate change is very prominent, but the capacity within the sector to deal with it is limited….Technically, I would say there is no one who is a specialist in climate change. (Interview, National, 32, 2013)
>
> "In EPA head office we research about the climate change that is the only source [of climate information] I am aware off." (Interview, Regional, 47, 2013)
>
> Q: "What comes to mind when you hear the words climate change?"
> A: "A lack of information…" (Interview, Local, 69, 2013)
>
> "…we don't have the technologies that are proper technologies that deal with climate effects. Europe has [it], America has [it], developed countries have [it]." (Interview, National, 13, 2013)
>
> "It will amaze you, when you get to villages and you hear elderly people telling you about their adaptation strategies that they have [ ]. But unfortunately, we think that because we went to school all that they know is rubbish….We think that we can sit in computers and things and write sentences and send it to them." (Interview, National, 14, 2013)

Among the most striking examples of the pervasiveness of the 'uncertainty/expertise' narrative emerging from the interview data is provided by a prominent multi-lateral lending agency in Ghana. Here, the respondent refers first to their organization's immense capacity, stating:

> "we are the single largest concentration of PhDs on the planet and second only to NASA I think, so we have all these brainy people, a very academic perspective."

Moments later, the respondent cites the exclusivity of climate change decision making:

> "…the real science behind it [climate change] is kind of for a very select group of people that are in to modelling—it's a bit like religion. You have these Brahmans that know the meaning of the rituals and then you have the poor guys like us [saying] "Ok, what do we do?" (Interview, National, 25, 2013).

To be among the most well educated and credentialed organizations in the world and still consider one's self among the 'poor guys' with respect to the climate data captures the penetration of the narrative. The rending technical of adaptation, then, is a truly multilevel phenomenon. Climate change decision making authority, in effect, is always perceived to lie with someone else qualified or capable of making those complex decisions. This creates a power vacuum within the climate change adaptation regime; a vacuum filled by those 'Brahmans' with preferred access to that elusive climate data.

This highly uncertain, expert-driven notion of climate change policy reduces the value (or utility) of consensus decision making, and in its place creates a necessary binary between experts and subjects, or policy makers and 'policy takers'. Decision making regarding climate change in this context is a virtual 'black box', what Latour describes as "the process of considering only the input and output of a complex phenomenon and thus conceiving its internal nature as immutable and unquestionable" (1987 in Clement 2010 p. 148)

The third dimension uncertainty and expertise discourse described here simultaneously elevates the status of international experts and domestic technical agents while devaluing local agents, eroding the need for active participation by 'non-experts' and stifling the emergence of locally determined adaptation measures. In Ghana's agricultural adaptation regime the technical is very much the political. So-called 'non-experts' are created, in part, through discourses around the limited capacity of farmers, the subject of the next preference shaping example.

**Narratives around the capacity of farmers (D3.a)**

The narrative of uncertainty and the privileged status of experts is driven, in part, by perceptions of the capacity of local actors in Ghana. Narratives regarding the low capacity of farmers (especially in the Upper West Region) render them 'subjects' or 'victims' within the adaptation regime, contributing to the further devaluation of indigenous knowledge and

traditional adaptation pathways. This is not to suggest that all respondents in this study explicitly undervalued the knowledge and capacity of farmers. In fact, interviews consistently demonstrated a divide between narratives of 'farmers know everything' and 'farmers know nothing'. These discourses can be divided in to two distinct themes: (1) climate change and its causes; and (2) the inherent capacity for smallholders to adapt to climatic changes.

In the first instance, regarding farmer's capacity to understand climate impacts, we see references to climate change as an 'elitist' creation, to the naivety of farmers associating climate impacts with supernatural forces, to the inability for farmers to establish causation between their actions and climate system, and of the seemingly misguided or backward practices passed down from through previous generations of farmers:

> "Climate change, climate change, climate change —it is a big term for the local people. What is climate change? [ ] Your terms are too big, they are urbanized, elitist terminologies…If I go and hold a conference on climate change in my constituency the people will go and say, they will leave, getting more confused than when they came" (Interview, National, 17, 2013)

> "[You] have some good percentage [of farmers] saying that we believe that climate change is caused by super natural forces. If their Chief agrees to that than it becomes common belief." (Interivew, National, 16, 2013)

> "Some of them say that they have not pacified their ancestors that the ancestors are annoyed with them." (Interview, Local, 75, 2013)

> "You go to my mother in the village, she is sweating, up and down, she doesn't know why she is sweating…She is not capable of connecting that warmth that she is currently experiencing with her activity." (Interview, Regional, 54, 2014)

> "Most of the problems they come across are due to their own [farmer] psychological issues and poor calculations." (Interview, National, 8, 2013)

> "I don't think people want to accept that the changing patterns have anything to do with their actions. Because most of them will tell you "ok, this is the way I did my great grandfathers cropping or raising animals". They have done that over so many years and they never had any problems. I don't think what is happening has got anything to do with me." (Interview, National, 1, 2013)

Eguavoen (2013) indicates that climate change in Northern Ghana is given lower priority relative to other 'manifestations of change' including infrastructure, human-spiritual, and social relations. The author suggests that climate change in this context is expressed more in local "social terms rather than based on global natural science knowledge" (p. 5). Weather conducive to planting and harvesting is considered reflective of community order, while bad weather as a punishment for disorder. This cultural model of blame extends to religious leaders who can be held accountable for "not performing ceremonies in the correct way" (p.

20). Regarding the inherent ability of farmers to adapt to climate change, we see differing perspectives from respondents. Interestingly, for example, it is local level actors that provide among the most critical statements regarding the inherent adaptive capacity of local farmers. Meanwhile, at the national level, among some key stakeholders there is more willingness to rely on autonomous adaptation given a more favorable opinion of local farmer's capacities. The common narrative in adaptation literature that national level actors alone are disconnected with the realities on the ground and thus undermine local traditional knowledge does not hold up in this setting. Here local level respondents are just as likely to discount traditional agricultural practices and adaptation capacities based on their perception of local famers as 'ignorant' and 'illiterate'.

> "I think that sometimes we underestimate the capacity of the communities. Because they know what is happening in the communities. They know how best to adapt." (Interview, National, 35, 2013).
>
> "Communities have been managing their environment before even schools were established. It will amaze you, when you get to villages and you hear elderly people telling you about their adaptation strategies that they have [ ]." (Interview, National, 14, 2013)
>
> "We always say that farmers are rational beings and they know their environment better than the outsider who is coming to their community. So you may suggest some technologies which from your point of view are good and sometimes easily adaptable, but on the ground it is a different story." (Interview, National, 32, 2013)
>
> "[Farmers] have capacity to adapt, it's just that sometimes issue of poverty makes it a bit difficult…they know it in their own way, they understand it in their own way…They know these things but they cannot explain them that changes are due to certain activities. So when it happens, they find their own strategies in their own way." (Interview, National, 7, 2013)
>
> "What people don't know is that even the illiterate traditional farmers they have sciences that informs them and some of these changes even though they may not be communicating in the way that we are doing" (Interview, Regional, 43, 2013)
>
> "How many of our local people are literate? How many of our local people know the intricacies of these farming practices? They don't know. So in tackling this one you need to tackle education first. They need to know and know the implications, know the nitty grities, all the intricacies, before they can forge ahead and do something positive." (Interview, Local, 59, 2013)
>
> "…the (capacity) level of the farmers, this side of the district, the farmers are more well-informed and they easily accept technologies. So that means it's a strength. But this side of the district to the east [farmers are] ignorant, and resist adoption, so that is a weakness." (Interview, Local, 68, 2014)

In this third dimension manifestation of power, narratives around the low capacity of farmers (especially in the Upper West Region) devalue indigenous knowledge and traditional

adaptation pathways. Farmers portrayed as 'victims' are policy takers, not active stakeholders in policy development and implementation. Consequently, locally acceptable or preferable adaptation options fail to emerge (i.e. a distinct lack of conflict). This can be considered an example of systemic bias driven by an underlying, pervasive narrative.

**Narrative of 'climate change as deforestation' (D3.a.c)**

Yet another third dimension narrative and discourse that directly shapes farmer's preferences is that of "climate change as environment", or, more specifically, "climate change as deforestation". This is consistent with BBC survey findings that suggest, "Ghanaians' understanding of the concepts of climate change and global warming is shaped by the importance they place on trees. Many people have a keen awareness of trees and their effect at a micro-climatic level, with everyone commenting that trees "attract rain", give out "fresh air" and "cool things down" (2010, p. 16). In Ghana, and especially in the UWR, there is a tension between perceiving adaptation as a development versus a purely environmental concept[40]. Often times, climate change in the UWR evokes images of pollution, environmental sanitation, and—most often— deforestation. The framing of climate change as an environmental issue inherently limits the scope of adaptation intervention to those measures deemed to belong to the realm of the 'environmental stewardship', including tree planting, and community cleaning (gutters and streets) interventions. This intervention bias is perpetuated by "trajectories of blame" (Eguavoen 2013) which implicate farmers themselves as the cause of localized climate change in the region through deforestation, bush burning, and the local charcoal industry (linked to 'D3.a Farmers know nothing/everything'). The 'trajectory of blame' in this case is especially strong against women who are considered the main agents involved with tree cutting and charcoal making in the UWR as this constitutes their main source of income. "Women in the district and a lot of people travel for about five to seven kilometers to get to this place. They want to earn money and of course for earning this money they are damaging their environment. You cannot answer on why you are damaging tomorrow's environment today." (Interview, Local, 70, 2013). As such, this third dimension discourse is especially pervasive at the local actor level:

> "And these rains do not come because our part of the country is not green. You understand. It's not green, the little bushes we have, we burn them, so our ecological practices are contributing to the fact that our rainfall pattern is not good here." (Interview, Local, 59, 2013)

[40] Sarpong and Anyidoho note, "despite the increased salience of agriculture in climate change policy discussions, the environment has been and continues to be a primary focus [of the NCCP]. This is, no doubt, related to the fact that environmental actors have been central at the outset in shaping the agenda on climate change in Ghana" (2012 p. 5).

Q: "What comes to mind when you hear the words climate change?"
A: "…We should plant trees in our areas." (Interview, Local, 69, 2013)

"Why don't we get [rain]? Because it is tradition that this period when the rains are about to come that we go and collect crop residues on the farm and set fire to them to burn…" (Interview, Local, 75, 2013)

"…[we] told [farmers] not to cut the trees… that will improve their environment. Farmers are not adhering to what we are saying as they are still cutting trees." (Interview, Local, 72, 2013)

"Like bush burning and you know, cutting down of trees etc. What can you do now that you realize that that is the cause of our problems?" (Interview, National, 17, 2013)

"When you talk about Ghana you know tree[s are the] focus areas [for] climate change" (Interview, National, 33, 2013)

"…we try to advize people not to cut forests. If we destroy the plants, that is why we now see very serious changes in climate." (Interview, Regional, 53, 2013)

"…they cut the trees. But it is not their fault. On market days we sit down and see the woman there they carry firewood more than three times to Lawra market to sell." (Interview, Local, 63, 2014)

Q: "What comes to mind when you hear the word climate change?"
A: "You see deforestation, rising temperatures, the fauna and flora and tree cover is not there…" (Interview, Local, 68, 2013)

This trend is further reflected in the interview data pertaining to common associations with climate change across actor levels. While "change in rainfall pattern" represents another consistent driver across actor levels, local respondents tend to place disproportionate emphasis on deforestation as a driver or impact of climate change, explaining the predominance of tree planting initiatives in the region including 'Greening Ghana', the Savannah Accelerated Development Authority (SADA), tree planting within the Ghana Social Opportunities Project (GSOP), and other efforts by NADMO. The discourse of 'climate change as deforestation' stems, in part, from a very localized view of the drivers of climate change. "There is a strong tendency for Ghanaians to hold themselves individually and collectively responsible for local changes in the weather. They believe that their own activities, such as cutting down trees and burning the bush, have directly brought about these changes. There is little awareness that climatic problems – now or in the future – are likely to have causes that extend beyond Ghana" (BBC 2010, p. 5). Similarly, in a study of farmer's perceptions of climate change in Mozambique, Patt and Schroter suggest that "while about half of survey respondents thought that pollution from outside the community might be a cause of climate change, only 1of 83 respondents was confident of this" (2008 p. 465).

Meanwhile at the national level, where a different causal mechanism for climate change is often identified (e.g. industrial GHG emissions), there is greater tendency for respondents to associate climate change adaptation more broadly with development, and a wider range of adaptation interventions. Here, the discussion of drivers extends to evoke supranational concepts like 'climate justice', 'international cooperation', 'carbon emissions', among others.

The third dimension localized belief among smallholders that climate change is an inherently environmental issue (i.e. not a development issue) driven by their local practices biases problem and solution identification. The framing of climate change as an environmental issue as opposed to a development issue limits the scope of intervention to those measures deemed to belong to the realm of the 'environmental stewardship', including tree planting. This suggests that the preference for mitigation over adaptation discussed in 'D1 Policy outcomes' is not the sole product of exogenous forces, but is also shaped by local preferences (driven by misconceptions of blame) for tree-planting interventions.

**Neoliberal development rationality (D3.b)**

Rationalities, or 'inevitable' logics, are established through a sustained preference for certain 'technologies of government' over others (Foucault 1988). It is argued by some authors, and prevalent within the data here, that climate change responses in Ghana—and in the developing world more widely—are shaped by a prevailing neoliberal rationality (Keskitalo et al. 2012; Okereke 2008; Fieldman 2011) combined with a widely acknowledged bias towards 'techno-fix', hard adaptation interventions at the expense of broader, more inclusive behavioral-based, soft approaches (Thornton and Manasfi 2010; IPCC 2014a; Massey 2015)[41]. This neoliberal rationality is perpetuated by the supposed role of the private sector and business-oriented agriculture in Ghana, the taken-for-granted notions regarding the role and capacity of the state, and key actors within the DA who value infrastructure interventions for vote-getting purposes.

Most overtly, that agriculture should be treated as a business is a narrative consistent across the actor levels interviewed in this analysis. While business-oriented agriculture is not in itself indicative of neoliberal rationality (or inconsistent with sustainable development), high-input, export oriented development, I argue in Paper 4, is. Scoones and Thompson (2011), for example, suggest that the often cited 'African Green Revolution' purported by national and regional programs like AGRA, CAADP and NEPAD emphasizes 'market led technology adoption' at the expense of important and "almost completely forgotten …political,

[41] The neoliberal bias present in Ghana's agricultural sector and resulting climate change portfolio is discussed in detail in Paper 4.

institutional, and social dimensions of designing and implementing a new Green Revolution for Africa" (p. 3).

> "[Donors say] I have my strategy and I have my money. To make you better, I expect you to modernize agriculture, I expect you to work on your infrastructure. [ ] I expect you to look for markets even outside of your districts, [even] foreign markets." (Interview, Regional, 51, 2013)

> "…how many of them [farmers] consider agriculture as a business? Maybe probably less than ten percent. So for me I should only work with these less than 10 percent and forget about the rest." (Interview, National, 20, 2013)

> "[teach] the farmers…in terms of inputs, like fertilizer, seeds and maybe some money from other financial institutions that will enable farmers to actually embark, take agriculture as a business." (Interview, Local, 79, 2013)

> "Now we are trying to make them see [farming] as a business even if it is on the small scale. You can still do business as a small-scale producer." (Interview, National, 7, 2013)

> "It works like this; we view our farmers as businessmen…(Interview, Local, 64, 2013)

A consistent perception of government as 'inept' further facilitates the neoliberal development rationality, justifying the exclusion of the state from certain development interventions. Young (1994) suggest that it is especially true of ex-colonial nations that the state is perceived as 'tyrannical' and an 'arbitrary monster'. The image of civil servants in Ghana described by respondents is of underpaid, low capacity, bureacratic functionaries. Respondents frequently cite development partners' perceived desire to work around government and implement projects directly, contributing to the further autonomy of bilateral agents and INGOs (D2. Actor autonomy and accountability). A member of the NDC political party suggest that working in government "is an alternative of last resort. So the smart people [ ] are thinking of private sector or other areas in the corporate world." (Interview, National, 17, 2013). This view is supported by actors across levels in Ghana:

> "Instead of the Ministry of Food and Agriculture, we name it the Ministry of Frustration and Agony. So all the people over there are very frustrated on what will not happen, they are very aggressive because government are not looking at them." (Interview, Local, 79, 2013)

> "The difference between the public sector and the private sector is that there is [more] seriousness in the activities of the private sector than the public sector." (Interview, National, 42, 2013)

> "The government makes policy statements and [they] have to include the various climate change and adaptation issues. They do say a lot on it but do a little about it." (Interview, National, 15, 2013)

> "I think one of the problems in the past has been people expecting government to be able to do things that it just can't do...government cannot be the engine of development and growth…I mean what is that that everything has to go through government? To me that's nonsense. That's assuming that governments are the be-all and end-all of development and that's not true. It's never been true. (Interview, National, 12, 2013)

> "So first and foremost [adaptation] responsibility lies on the national government, but do they have the capacity? No, they don't have the capacity because of other competing needs." (Interview, National, 13, 2013)

> "I have lost all my confidence in government agriculture extension services." (Interview, National, 20, 2013)

Two additional combined forces propel the neoliberal bias in the district. Mainly, the District Assembly in the face of severe development deficits see their primary role as a provider of key infrastructure, and political interests that dictate the supremacy of infrastructure investments as key vote-getting measures for MPs, DCEs and assemblypersons:

> Q: "And when you think about your major strengths as an organization?"
> A: "I would say our ability to provide physical infrastructure to the community is one of our strongest areas…" (Interview, Local, 70, 2013)

> Q: "What do you see as the role of the DA in Lawra?"
> A: "Their role? Their major role as I see it, is to impact on the infrastructure of the community. (Interview, Local, 60, 2013)

> "It is not [the DA's] fault because development budget that is used at the district level are very small and most of this budget goes to infrastructure development." (Interview, National, 19, 2013)

> "Development doesn't mean coming to build houses, screws and what not. What about our stomachs? Stomachs should be the first priority…Today it is not like that." (Interview, Local, 75, 2013)

> "So [as] an MP…you want to credit that development to you. Because the people are only going to vote for you based on the fact that you have built two classrooms, five schools…" (Interview, National, 14, 2013)

> "Climate change is not… there are just more about let me say politics. You see, every other person like the DCE that comes, what he's thinking of the next four years [is] "will I be retaining office, so what do I need to do?" But issues like this, climate change, which of course is having effect on all of us, you know they don't see that linkage for him. All is about today and like my [ ] I will say "Give us today our daily bread" and that's it. So he's looking at one thing, physical thing that I can show at the end of my tenure (Interview, Regional, 45, 2014)

The collective impact of the neoliberal rationality, especially active in business-as-usual development, is the promotion of adaptation interventions that are infrastructure and market based. This is facilitated by a perception of agriculture as a market oriented business, the

diminished role of the state, and a focus on district level infrastructure development[42] over other soft adaptive measures.

**Cultural derivation of authority (D3.c)**

Conflict-free, taken-for-granted power dynamics within Ghanaian society are responsible for third dimension systemic bias that consistently favours some individuals (groups) over others in the adaptation decision making process. This is most apparent in traditional authorities in Ghana, but exits also in the patriarchal nature of the Ghanaian society more generally. Indeed, "since the era of colonization, Ghanaian governments have struggled with how to use traditional authorities to achieve their own objectives without making chiefs more powerful than themselves" (Hoffman 2010 p. 5). Traditional authorities are considered 'symbols of unity' among the people, the keepers of culture, opinion leaders, negotiators of access to communities, custodians of the land, and, importantly, are responsible for the development of their people. As a critical 'thought leader' and intermediary, traditional authorities serve as key devices for third dimension decision making:

> "When you go to a village you always have a village Chief, and you learn from the very beginning neither to challenge your father or [your] chief. What they are doing is correct; you are not supposed to question them" (Interview, National, 26, 2013)
>
> "Now of course even though we are modernized, they are still the custodians of our culture [ ] and control of the land in some areas…So they easily mobilize the community for developmental projects…We also use them to get our message across to the people when it comes to development…They also have a job to maintain our cultural heritage. (Interview, Local, 70, 2014)
>
> "If their Chief agrees to that than it becomes common belief." (Interview, National, 16, 2013).
>
> "The traditional people are the custodians, they are the links between the gods and the living. So they can best consult the dead or whosoever the ancestors, to request from them where they are going to build the school whether the place is going to be good…The chief in a way can bring the downfall of the project, but as soon as the chief is part of the stakeholder he can sit down and instruct others, and they are going to obey it." (Interview, Local, 79, 2013)
>
> "[Chiefs] actually mobilize the people. They are role models that are able to influence the attitudes of people. One you get the traditional authorities to accept what programs or strategies you have on 60% of your problem is solved. If they oppose then you forget about it." (Interview, National, 19, 2013)

[42] Olwig discusses the way that local development practitioners in the Upper East Region (UER) adopt international 'rationalities' related to climate change vulnerability. He concludes, although "the local development practitioners, by using the words that justify the preferred donor policies, in effect strengthen the policies' legitimacy and thereby the donor organizations' dominance" (2013 p. 441). This phenomenon is also true of local actors that 'speak the language' of the neoliberal, high modern agricultural model.

With authority vested in the chief (and the hierarchical structure that the chief is involved in), traditional authorities wield considerable power in determining what resources including information ultimately reach the community. This is especially true of land:

> "Because the people have a lot of reverence for their chiefs. And if you wanted to put up a project they are the same people who have to give you the land." (Interview, Local, 70, 2013)

> "…of course they [traditional authorities] own the land" (Interview, Local, 74, 2013)

> "The traditional chiefs are also corrupted due to the money that is given to them for land" (Interview, National, 2, 2013)

> "Many times the traditional leaders play a very vital role as far as land issues and environment areas are concerned. So you can not develop maybe proper mitigation structures without involving these traditional chiefs." (Interview, Regional, 29, 2013)

> "Some of the chiefs, we have very good relationship with them, they are like friends, you know, and they even promise come we will give you more land, you know, they work with us very well." (Interview, National, 7, 2013)

Control over land systematically disadvantages women, in particular. In the UWR and across Ghana, women are described as 'marginalized', and 'uneducated'. Without direct access to land themselves, they rely on men to prepare and 'leave' the land for them to practice agriculture[43]:

> "But unfortunately the women here have no land—land here is a problem for women." (Interview, Local, 69, 2013)

> "Another area that needs a lot of work is the role of women in agriculture because a lot of them don't have right to land when they are 50% of the workforce." (Interview, National, 2, 2013)

> "And gender issues those are being done by women, you get to the North and the farmers are women. Then men they just leave the land to them." (Interview, National, 30, 2013)

> "I can give you land now and ask you to use and return it from you that does not encourage investment of farmers on land, so, that is critical issue for women they also have access but they don't have control on land" (Interview, National, 11, 2013)

[43] Chigbu (2015) explores the role of women in 'gender unresponsive cultures' in a village in Nigeria. He suggests that women there have effectively repositioned themselves in this patriarchal society by developing an 'invisible matriarch'. That is, they have played unacknowledged but prominent roles in the community, and sometimes "contribute to their own disempowerment by playing weak and dependent even when they are more efficient than or as efficient as men within their households are" (p. 345). This work sees parallels in Scott's 'everyday resistance' and 'invisible transcript' power concepts (1990).

> "My father had his first farm there and every year he would send some of his wives to go there and they were there to farm for the whole farming season, harvest and come back. Then the next group of women would go back. And if your mother was selected to go it means you were also exiled [laughs], you had to go with your mother." (Interview, Local, 63 2014)

> "I haven't seen people of that caliber—especially a woman —it is not easy to get woman... let me say in Ghana here to educate herself up to this far." (Interview, Local, 79, 2013)

Traditional authority elevates the status of chiefs as opinion leaders within the community, centralizing local decision making processes within these individuals who hold power over land tenure, an institution of particular importance to agricultural adaptation of women. Chiefs, as brokers of information and resources serve central preference shaping role in Ghana's climate change adaptation regime as their power is unchallenged, unquestioned, and inevitable.

**Punctualization[44] of government and politics (D3.c)**

Partisanship is a key driver in third dimension preference shaping in Ghana, motivated by the adoption of traditional structures for political purposes and the conflation of 'government (civil servants)' and 'political parties' in the eyes of community members. Partisanship manifests in what we refer to as 'political service delivery', and can determine where government allocates resources (i.e. to which communities). Prescription to one political ideology over another is the subject of third dimension preference shaping, codified by systemic bias emerging from political patronage and cronyism.

First, continuing from 'D3.c Cultural derivation of authority', political groups utilize the ability of chiefs to mobilize communities and shape local preferences without conflict to extend their power base in communities. As cited in a national newspaper article: "despite being banned from participating in partisan politics[45], our traditional rulers continue to ruffle feathers as they take sides and actively display their political bias, which violates the constitutional ban imposed on them." (Bokor 2012). Within our own data, the political utility of chiefs is described by several respondents:

> "…the traditional ruler is supposed to also have a union that would enable them to also control the people within themselves. Having control them, now the political

[44] 'Punctualization' is a term used by John Law to describe how large organizations and agencies can become so-called 'single point actors' where individual actors or characteristics are concealed from view by the greater entity (e.g. 'the government').
[45] Section 1, Article 276 of the Republic of Ghana Constitution prohibits traditional authorities from engaging in politics (Government of Ghana 1992).

parties can now come in and talk to them." (Interview, Local, 79, 2013)

"…the law says chiefs should not involve themselves in politics... but all the politicians that come to the district goes to them. And what package they give them and they talk to the people, no one will see, but we are aware. We suspect." (Interview, Local, 69, 2013)

Q: "And do you find that the chiefs have a political affiliation?"
A: "It's there, of course, it's there. The last election we experienced something like that. They allowed us inside, they allowed us to speak to their masses…" (Interview, Local, 65, 2013)

"Politically, and constitutionally, traditional councils are not supposed to go in to politics. It is very unfortunate in that it is not the practice. Rather, chiefs go in to politics… He talks to the people to [ ] vote for a particular party." (Interview, Local, 60, 2013)

In the Lawra district, this sort of political partisanship is matter of everyday life. The logos of parties are painted on the sides of countless buildings in towns and villages, on billboards along main thoroughfares, and on purpose-built covered concrete platforms designed for party meetings and rallies. There is considerable effort made to brand initiatives with a political party rather than simply a government project. As a result, there is a tendency among local community members to refer to government as a direct extension of political parties, without distinguishing between elected officials and civil servants:

"…those of us who are educated, we have failed to educate the people that there is a difference between government and party…the resources that the government is using does not belong to their party— it belongs to the state, and that they are beneficiaries." (Interview, National, 14, 2013)

"Civil servants and government practitioners in general.... we are supposed to be loyal to the government of the day. So we call [ourselves] prostitutes in coats, if I can use that word loosely. If the government of the day is in power, say the NDC, we owe allegiance to them" (Interview, Local, 70, 2013).

"So those that are educated will tell the illiterates what they are not supposed to tell them…that this [government project] belongs to NDC they will forever hold that it belongs to NDC…To be honest with you, [SADA] has been perceived as an NDC project." (Interview, Regional, 56, 2013)

Facilitated by such mental conflations between civil servants and partisans, political parties often offer services directly to communities outside of (and in conflict with) the development plans of the district in vote-getting campaigns. These one-off political interventions serve to undermine local development plans, and reduce the uptake of poorly-resourced government-led development interventions. Political service delivery is especially effective in districts with severe development deficits, where equity in process is considered secondary to

outcomes of any sort. It also constitutes a means by which political parties can direct services to party-loyal communities:

> "Sometimes when the political parties can go and dump items and cash on the local people… If you as a technocrat have a project there you don't have money to give to the farmer, they don't pay attention. They think you are coming to give items too, at the end of the day they are not getting the direct benefit and they withdraw themselves from the project." (Interview, Local, 68, 2013)

> "You see that [political parties] go about giving something small, small, small, small to the communities to say "wow, this party is doing this" but in the reality, after the election you see that they run away and you continue to suffer until it's time for elections again." (Interview, Local, 60, 2013)

> "So when [political parties] promise, you're raising the illusions of the people but it is not in consultation with the local authorities…We are going to do this to you, and then they find that the funding for that activity is not there" (Interview, Regional, 49, 2013)

> "When you are in power, you can go to any community and do anything at any time. People take advantage, maybe other parties, they took advantage of those things, they can go to any community and say we will give you electric poles, so they could give you bore holes, but they are not in power." (Interview, Local, 59, 2013)

> "That disconnect from what is happening at the grassroots—because your realize that some of the things there is not what the poor people at the community level are looking for, but yet because they think that for cheap political points or what have you these are [ ] so they will have to go about trying to brainwash [laughs] those at the grassroots to want to agree to what they are doing." (Interview, Regional, 45, 2014)

> "The other issue being the fact that we see at the district level sometimes they try to introduce some kind of politics where political leaders want such projects go to the benefit of their party foot soldiers or their cronies." (Interview, Regional, 45, 2014)

> "If this government is in power you don't follow it they will bypass you with electricity..... [ ] they read the figures. People who voted more, and suggest where services should go. Behind the scenes, but it is part of life in Ghana." (Interview, Local, 68, 2013)

> "[Political service delivery], well it is happening. It is happening, we are aware. But our neutrality will not allow us to know where the sources are coming from. All that we know during the elections, a lot of things happen and some [communities] are even hurt." (Interview, Local, 69, 2013)

> "…sometimes [political parties] go direct to the fields, promise people and at the end of the day those promises often fail and we are always [left] interacting with them [the communities] and it becomes a problem." (Interview, Regional, 29, 2013)

> "The other issue has to do with this tribalism. If one man from a community is a DCE if you ask him he will tell that he strictly voted for the party and the party made him DCE…Development is skewed sometimes." (Interview, Regional, 56, 2013)

> "I would say by and large, certain communities from where the DCE comes from benefits more than other communities." (Interview, National, 11, 2013)
>
> "That is one of the biggest challenges in the community…if you come and look at it there are some factions in the community that feel that those picked [for the project] belonged to a certain political party. That rang true, I'll be honest with you, it rings true." (Interview, Regional, 56, 2013)

Partisanship manifesting through the co-opting of traditional authorities as political agents, the conflation of civil servants and political parties, and political service delivery, is an important third dimension preference shaping force that has led to a systemic bias codified in political patronage and asymmetrical service delivery in communities.

*Power in the third dimension*

Here, we have seen how power manifests in third dimension preference shaping in Ghana's agricultural adaptation regime. With regard to D3.a, dominant narratives and discourses, we have seen that the perpetuation of climate change as 'highly uncertain' allowing expert trustees to co-opt the decision making process, effectively de-valuing the role of 'non-expert's in the regime. In a related discourse, narratives around the low capacity of farmers (especially in the Upper West Region) serve to further devalue indigenous knowledge and traditional adaptation pathways. Farmers are portrayed within the adaptation regime as 'victims', or' policy takers', and thus not active stakeholders in policy development and implementation. In a third narrative, the framing of climate change as an environmental issue at the local level limits the scope of intervention to those measures deemed to belong to the realm of the 'environmental stewardship'—especially tree planting—perpetuating the first dimension policy outcomes that elevate mitigation over adaptation within the regime. Regarding D3.b, 'prevailing rationalities of government', we have seen how a neoliberal development rationality active in business-as-usual development promotes adaptation interventions that are infrastructure or market based, promoted by a negative perception of government, and existing development deficits that privilege infrastructure development. Finally, D3.c 'systemic institutional bias' manifests in a patriarchal structure of traditional authority that elevates the status of chiefs as opinion leaders within rural communities, centralizing decision making processes within these individuals who hold power over land tenure. In another instance of systemic bias, the conflation of civil servants with political parties creates a dominant short-termism in adaptation initiatives that is biased towards politically aligned communities, and that can undermine the established DA planning process and locally determined adaptation measures.

These third dimension exercises of power are notable for the distinct lack of conflict associated with them. In each instance, there exists no space for opposition, only widespread acceptance that the established phenomenon is natural and inevitable. That is, that climate change belongs to the realm of experts, that farmers are 'victims', that climate change is caused by local degradation of forests, that growth in agriculture is best facilitated by market processes and investment in infrastructure, that the chief's opinion is without reproach, and that development success in rural communities is intimately linked to voting behaviour. These insidious forces shape adaptation outcomes in ways that visible decision making and agenda setting cannot account for. These third dimension forces are simultaneously manifestations of the depoliticization of the regime, and underlying causes of depoliticization.

## 7. Discussion

Lukes' dimensional framework of power and the sources of third dimension preference shaping offered by Sova et al. (2015b) provide great insight in to Ghana's multi-level agricultural adaptation regime. Viewed holistically in this way, the results of semi-structured interviews provide an understanding of the cross-dimensional power features of the regime and the complex interaction between structure and agency that contribute to power relations. Here, we discuss how the depoliticized nature of Ghana's adaptation policy development regime draws our attention away from acts of politics manifesting in policy implementation, and how considering Lukes' dimensional framework as a truly three dimensional 'power space' may contribute to an improved understanding of depoliticization and the anti-politics of adaptation.

### *Political establishment*

The conceptual framework offered here shines light on the emerging political ecological concept of depoliticization. In this regard, it can said that there are two dominant, power-laden forces shaping adaptation outcomes in Ghana: the so-called 'adaptation establishment' *and* the political establishment, hiding in plain sight. That is, what appears a-political and technocratic in Ghana's agricultural adaptation regime can be—and, in fact, is—underpinned by a host of less visible political forces.

To be sure, the data provided in this study speaks to the depoliticized, expert-driven nature of the regime through 'D1 Policy outcomes' that favour mitigation over adaptation, 'D2 actor autonomy and accountability' that allows development partners to set their own agendas, and 'D3.a Narratives of uncertainty and environment as deforestation' as well as 'D3.b Neoliberal

rationality' that collectively serve to establish adaptation 'experts' and privilege their preferred courses of action over others. Sova et al. (2015b) refer to the actor groups that contribute to such a-politicization as the 'adaptation establishment' in Ghana, consisting primarily of technical agencies of the state (e.g. MoFA, MESTI, EPA, etc) and international organizations. Within the regime, political groups and non-technical state agencies—at least outwardly— are afforded minimal influence. That is to say, "the only priests allowed in to the temple of environmental decision making are scientists, engineers, economists and lawyers" ( Brown 2004 p. 111). Similarly, Sova et al. (2015a) demonstrate that political parties are deemed 'of little importance' to the National Adaptation Plan (NAP) development process in several developing countries, and that expert trustees have co-opted the decision making process, leading to so-called 'common and non differentiated' (i.e. homogenous) adaption options available to smallholders.

Yet as Paul Robbins (2012) rightly maintains, "politics is inevitably ecological and that ecology is inherently political" (p.3). It might also be said that what is political in Ghana's adaptation is its technical nature, and that what is technical in adaptation is inherently political. Concentrating on the image of a malevolent expert regime in adaptation allows politics-as-usual to continue unaltered. Lukes' framework simultaneously reveals that in this depoliticized, technocratic space there are a host of overtly political acts underpinning and sometimes subverting adaptation decision making. This includes 'D1/2 Executive power', 'D2 Decentralization without devolution', and 'D2 Selective funding (non-funding) and non-implementation', which serve to subject the development regime to the will of the executive and ruling party, and 'D3.c Cultural derivation of authority' and 'D3.c Puntualization of government', which contribute to the view of the ruling party as a paternalistic patrons and facilitates political service delivery. Importantly, it can be said that such a-politicization of adaptation simultaneously undermines the decision making authority of these political actors while providing them depoliticized cover to exercise power more or less covertly (i.e. if adaptation is a purely technical process, what space remains for political actors?). That is, the rendering technical of adaptation draws our attention —or 'elides' to borrow a term from Ferguson — away from acts of politics within the regime, focusing us instead on the neutral science of adaptation. Just as Ferguson's 'anti-politics machine' had unforeseen consequences on state bureacratic power in Lesotho, so too does the adaptation establishment on the Ghanaian political mechanism.

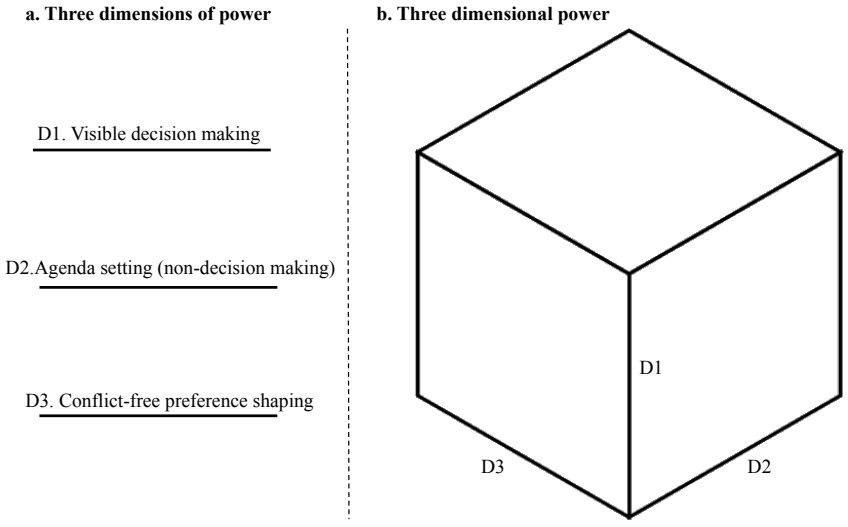
Political agents like the DCE, the president, political parties, and local chiefs, while not considered among the adaptation establishment—or 'priests'— in Ghana, are as important in shaping adaptation outcomes as technical or international agencies. It is these political actors,

through forms of popular representation—when truly decentralized—that ensure the regime allows for diverse stakeholder participation and downward accountability (Ribot 2003; Few et al. 2007) and facilitates the integration of indigenous and local knowledge (Cameron 2012; Leonard et al. 2013; Nyantakyi-Frimpong 2013a; Nyong et al. 2007). By perpetuating this a-politicization, experts and politicians alike can focus more on the capacity of the poor than on the practices through which one social group impoverishes another (Murray Li 2007; Ribot 2011). To successfully deliver adaptation results for smallholders, the amendments to Ghana's regime must be primarily political, not technical (this is further explored in the conclusion of this thesis).

*Power Space*

The three dimensions of power explored in Ghana's agricultural climate change adaptation regime are intimately linked. Yet there exist, to-date, few explicit examples of dimensional interplay (Haugaard 2003; Gaventa 2007). This is, in part, due to ambiguity in Lukes' defining of the dimensions and their interactions (as noted in thesis section 3. Conceptualizing Power in Complex Systems). Recall that Lukes refers to his dimensions as separate "views", "faces", or "three conceptual maps" in some instances, and in others, as truly interrelated, inclusive dimensions. This distinction can be referred to as the (a.) 'three dimensions of power' versus truly (b.) 'three dimensional power', as illustrated in Figure 1.

**Figure 1 'Three dimensions of power' versus 'three dimensional power'**



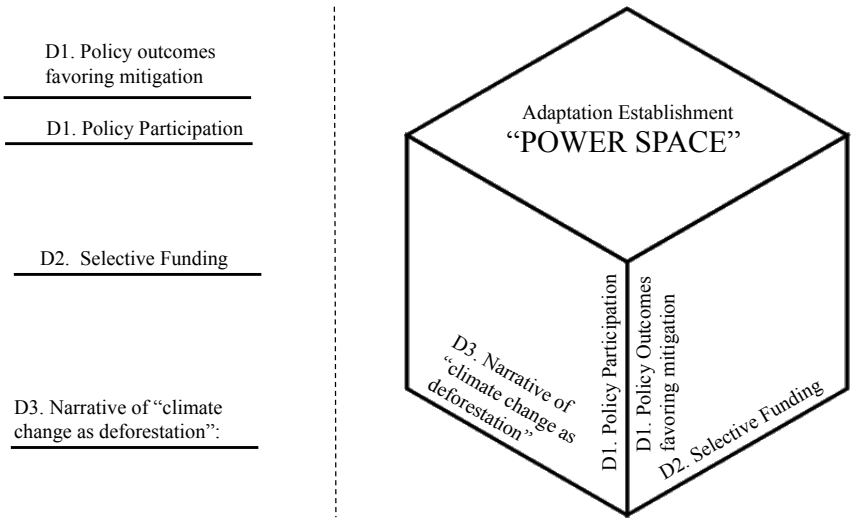

I assert here, however, that just as power-over is a subspecies of power-to, the dimensions of power are wholly interdependent. While we can talk about each dimension individually and

articulate examples as I have done in Paper 5, a more useful approach is to consider the dimensions in physical space (as vectors), a feature implied by the very language Lukes has chosen to describe his "dimensions". That is to say that Lukes' 'species of power' are not truly dimensional until the three are considered together to form a 'power space'. From this perspective the dimensions of power are not separate but combinatory in nature.

*'Adaptation establishment' power space*

Take, for instance, the example of policy outcomes (D1) favouring mitigation over adaptation in Ghana's climate change regime. This first dimension manifestation of power in formal policy environments is strongly linked with third dimension discourses (D3.a) and a prevailing rationality (D3.b) among smallholders that places blame (and responsibility) for environmental degradation on local actors, leading to a preference for tree-planting and other mitigation interventions at this level. Participatory processes (D1) for national climate change policy development that capture localized perception of environmental change will ultimately prioritize mitigation over adaptation (thereby reinforcing international priorities), even if national level domestic functionaries prefer adaptation measures alone because of climate justice considerations. Furthermore, second dimension selective funding (D2) by development agents provides a means to further perpetuate the mitigation bias. In Sub-Saharan Africa where 47% of climate change projects are adaptation related, the total amount of funds approved for mitigation projects is three times that of adaptation (Afful-Koomson 2014). This is an example of donors 'cherry-picking' which portions of projects and policies get implemented. In this example, the linear dimensions (D1, D2, and D3) are perhaps better considered as working in unison, or in a combinatory manner to produce what might be referred to as a truly three-dimensional 'power space' for adaptation establishment actors (government and international technical agents defined in Paper 2) to promote mitigation over adaptation (see figure 2).

**Figure 2 Adaptation establishment power space with respect to preferred adaptation strategies**

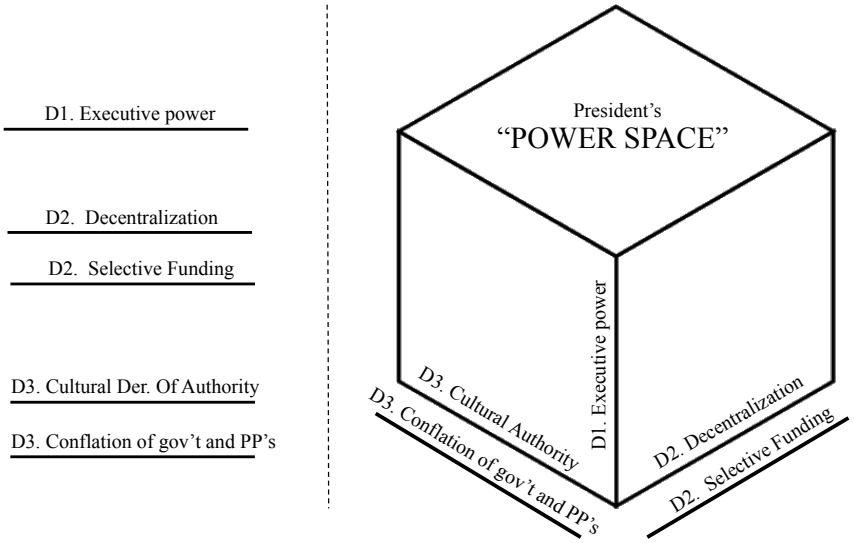



*Executive power space*

In another notable example, executive branch strength in Ghana can be considered a linchpin for several dimensions of power in Ghana's adaptation regime. In a first dimension, decision making sense the perception that "what the big man wants will happen[46]" contributes to consistent executive branch victories of the sort tallied by Dahl (1961), Polsby (1980) and other pluralist scholars. This is facilitated, however, by second dimension 'decentralization without devolution' (D2), which places a loyal agent—the DCE— at the district level to do the President's bidding and tow the party line. The DCE and the President can, through second dimensions non-decision making (D2), subvert district plans in favour of goals contained in the ruling party manifesto. Third dimension punctualization of government and political parties (D3.c) further allows the President and ruling party to perpetuate its power locally, using the civil service to deliver resources to 'party-loyal' communities. Additionally, the historical importance of strong man, patriarchal figures in Ghanaian (and African more broadly) political history (D3.c) contribute to the President's referent power base. Perhaps most importantly, however, the failure of Parliament to hold the executive branch in check (D2) because of the potential reward of ministerial appointment facilitates this entire series of events. These individual dimensions working in unison might create the following three dimensional power space as depicted in Figure 3.

[46] The Mohama administration, for example, has generally prioritized education over agriculture, contributing to quantifiable budget shortfalls that manifest in the District Agricultural Development Office.

**Figure 3 President's power space with respect to preferred adaptation strategies**

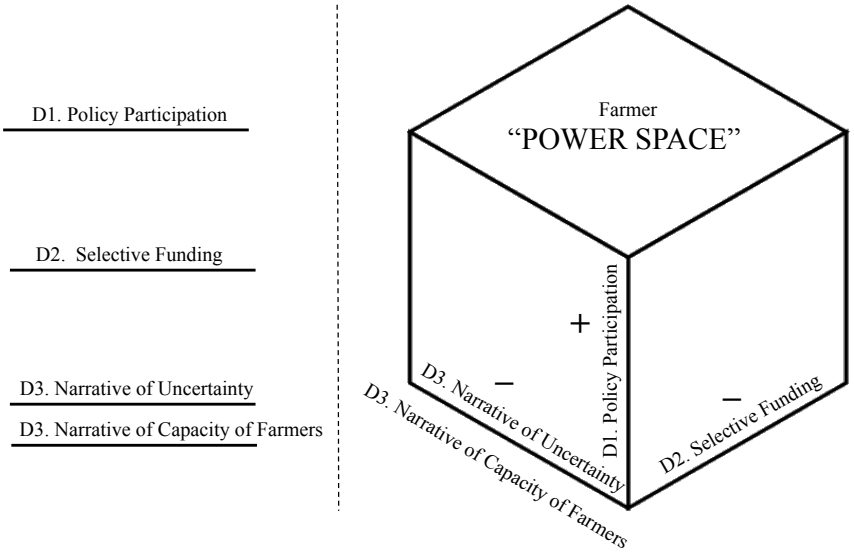



The interrelated, combinatory nature of the three dimensions of power can be demonstrated with any actor group within Ghana's adaptation regime.

*Expanding and contracting power spaces*

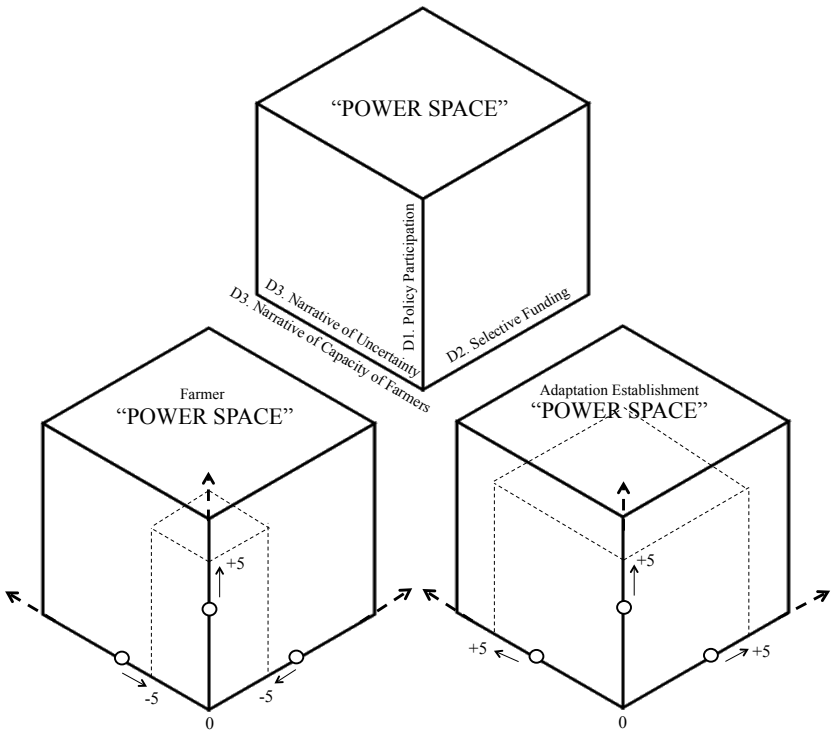
It is clear that any visible power play is bolstered by less visible (and even invisible) manifestations of second and third dimension power, and vice versa. I would suggest, however, that these three dimensions are not always working toward the same end. That is to say, the factors that contribute to the power spaces are not always positive and contributory, and can also work to undermine each other. Consider the example of first dimension participation in formal planning processes (D1) for farmers—widely considered robust in Ghana because of decentralized planning. This power play, which appears to advantage smallholders by providing them a voice in adaptation planning, can be undermined by selective funding (D2) by the DCE and international agents (i.e. cherry picking of sector wide plans), effectively subverting community interests captured in the district and national medium term plans. This is facilitated by narratives of uncertainty (D3.a) and of the limited capacity of farmers (D3.a) that justify deviation from community-determined policy measures on the basis of their perceived limited expertise. This is depicted in Figure 4.

**Figure 4 Farmer power space with respect to stakeholder participation**




These second and third dimension factors serve to contract (-) the power space for smallholders to participate in adaptation decision making (they are negative contributors). Ultimately, the power space is always perspective-dependent. Consider this same power space from the perspective of establishment actors, for example. Robust first dimension policy participation for smallholders (or the illusion of it) contributes to the legitimacy of the power space for the establishment in Ghana's adaptation regime. This is consistent with a similarly positive contribution (+) for smallholders. However, the adaptation establishment *benefits* from profound uncertainty, perceived limited capacity of farmers, and its ability to selectively fund the country's climate policy in a way dictated by its own interests. For these actors, D1, D2, and D3 power manifestation each contribute positively towards the establishment's power space. If we consider the vectors for each power dimension as a continuum, then the resulting relative power spaces for these two actor groups may look like the depiction in Figure 5 below. The white circle on each vector serves as a baseline from which to demonstrate expansion or contraction of the power space. The magnitude of the expansion or contraction (+/- 5) is arbitrary in this example, but could be more precisely quantified in future research.

**Figure 5 Relative power space of farmers and adaptation establishment with respect to stakeholder participation**




Ghana's adaptation regime might be best considered as a mosaic of competing power spaces of different sizes, focussed on different outcomes. Adopting a truly three dimensional, vector-based illustration of power provides a conceptual framework for the deeper, more nuanced exploration of a given power manifestation. For each visible instance of power, for example, the 'power space' approach encourages the analyst to investigate second and third dimensions of power that contribute to that outcome. Similarly, a second or third dimension instance of non-decision making or preference shaping should be examined for its outcome on visible decision making. This approach responds to seminal failures among power scholars to determine how dimensions or sources of power relate to one another, and demonstrates the interactions between power as it manifests in agency and in structure. Finally, it corrects the ambiguity—if only in semantics— in the 'three dimensions of power' as described by Lukes, and is an area ripe for continued research.

## 8. Conclusion

According to the traditional, behavioural perspective, power is most easily studied through instances of overt conflict where winners and losers can be readily identified. Yet Ghana's climate change adaptation policy development regime has been defined more by consensus than by conflict, at least outwardly. Climate change policies have been adopted in Ghana with near universal consensus from key stakeholders, technical and political. Moreover, farmer participation in adaptation policy development is widely considered robust given Ghana's decentralized planning system. The political ecology of adaptation in Ghana is thus not revealed through stark differences in formal policy decision making forums, but in less visible manifestations of power. In applying Lukes' dimensional framework we have seen the ways in which power plays out in visible decision making and agenda setting as well as in third dimension preference shaping within Ghana's agricultural adaptation regime. From 'formal policy outcomes favouring mitigation' to 'decentralization without true devolution of power', to 'narratives and discourses that frame farmers as 'victims' and 'non-experts', both adaptation and political establishment actors have been able to assert their dominance on the regime. These power manifestations, we argue, are facilitated by the depoliticization and technical rendering of the policy development regime. It can be said that the rendering technical of adaptation simultaneously undermines the decision making authority of political actors while providing them depoliticized cover to exercise power more or less covertly through policy implementation. Considering Lukes' dimensional framework as a truly three dimensional 'power space' of wholly interdependent dimensions contributes to an improved understanding of depoliticization and the anti-politics of adaptation, and responds to seminal failures among power scholars to determine how dimensions or sources of power relate to one another.

# 5. Conclusions

> *"Ghana is not poor. If we can stop this politicization of issues and really come together as one as a nation to look at issues genuinely and pursue them on their merits, within the next ten years you will marvel at what kind of country we have."*
>
> Regional Interview (2014)

Throughout this thesis I have argued that power is an understudied topic in agricultural climate change adaptation literature. While the concept is mentioned heavily in a cursory fashion, explicit studies of power in adaptation are limited, with even fewer offering overt methodologies for power's empirical study. Furthermore, the existing literature tends to focus on only one face of power, 'power-to', concentrating on the ability of smallholders to adapt to climate change without regard to higher-level processes that can shape adaptation outcomes. This focus has arisen, in part, from adaptation's close relationship with socio-ecological systems research that has historically favoured institutional design factors over considerations of power and conflict. These collective trends allow powerful actors, I argue, to focus centrally on the capacity of farmers rather than the inequality-producing structures of the adaptation regime.

The neglect of power as a rigorous subject of analysis is due, in part, to the fact that the term is conceptually unwieldy, and that power lacks analytical frameworks for its empirical study. Power can be considered an 'essentially contested' concept with a weakly structured definition in common use and more precise meanings only in its individual application. Consequently, I have argued— in the spirit of Critical Systems Thinking (CST)— that to truly facilitate the empirical study of power in this setting efforts should be made to identify manifestations of power rather than applying a single, inherently value-laden definition to the term itself. Steven Lukes' three dimensional view of power does just this, and was adopted here.

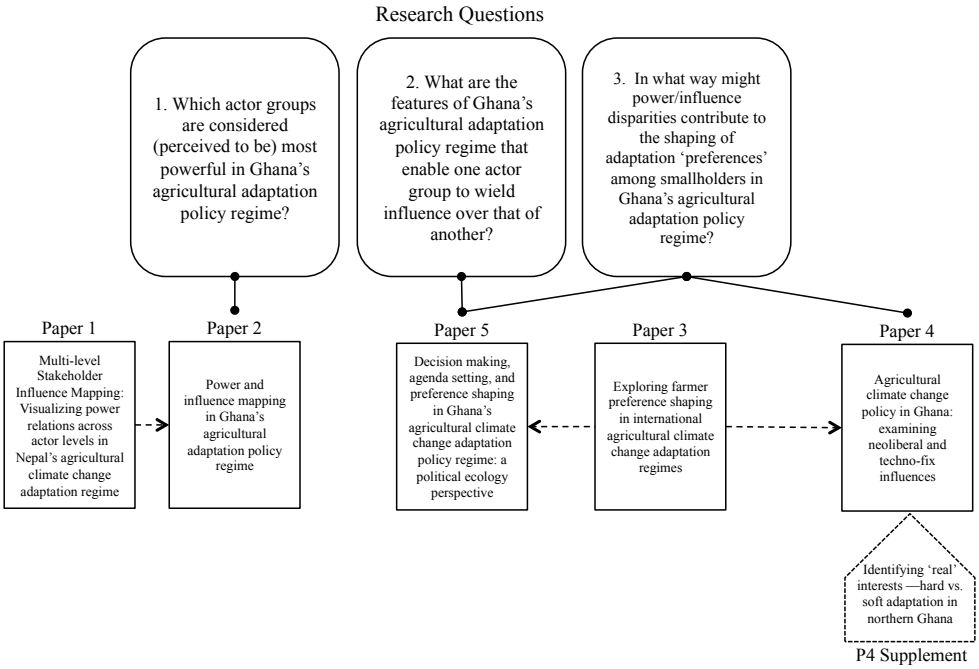
Lukes' 'dimensional' view distinguishes between power in decision making, agenda setting, and preference shaping, focusing exclusively on power-over, or power-as-domination. Relying on first and second dimension exercises (i.e. behavioral, visible power) alone can provide deceptive understanding of where power lies for the precise reason that these instances are easy to identify. It is Lukes' assertion that power is most insidious when it is at work in the third dimension; invisible, free of conflict, and unknown to those under its

influence. Here, power works to manipulate perceptions and cognitions in such a way that 'subjects' accept their existing role in the order of things or can imagine no alternative.

In a five paper compendium of power aimed at Ghana's agricultural climate change adaptation regime I have sought to contribute to the advancement of Lukes' dimensional framework and to provide new analytical tools for students of political ecology. I advanced three universal sources of third dimension preference shaping power —'D3.a dominant narratives and discourses', 'D3.b prevailing rationalities of governance', and 'D3.c systemic institutional bias'—and contributed to our understanding of inter-dimensional interplay, proposing a truly three-dimensional, vector-based 'power space' framework worthy of continued investigation.

Achieving these academic goals simultaneously delivered an improved understanding of where power is perceived to lie, how power is sourced, and its broad implications on adaptive capacity of farmers in Ghana— the research questions set out in this thesis. Specifically, I developed a novel methodology for mapping power in complex systems regimes. Paper 1 developed the MSIM methodology, and Paper 2 applies the methodology in the Ghanaian adaptation policy development setting. In Paper 3 I hypothesized and tested sources of third dimension preference shaping in international agricultural adaptation regimes, demonstrating the utility of Lukes' three dimensional view of power. Then, in Paper 4 I examined one preference shaping source in detail —D3.b prevailing rationalities of government— in Ghana's policy portfolio, exploring the impact of a neoliberal development rationality in agriculture and adaptation policy in Ghana. In a supplement to Paper 4, I attempted to ground the theory and policy analysis in farm-level analysis of adaptation strategies derived from literature focused on northern Ghana. Finally, I applied a modified three dimensional power framework to a multi-level case study of agricultural adaptation in Ghana in Paper 5, demonstrating both the features of the regime that allow one group to wield power over another as well as the implications on the adaptation preferences of smallholder farmers. A visual representation of how each of these papers contributed to the underlying goals of this thesis is provided in Figure 5.1 below. This is followed by a summary of each paper's conclusion.

**Figure 5.1. Visualization of the thesis structure and contributions by paper**




*Paper 1*

There are relatively few tools or methodologies allow analysts and decision makers to render explicit the power and relational dynamics present within a multi-scale, multi-level system of interest. Those that do exist collect perspectives regarding power dynamics in a focus group or decision group setting, making them susceptible to distortion due to obedience and intimidation from status-quo defenders and group composition biased towards central level actors. These characteristics of influence mapping techniques exacerbate two central dilemmas in decision-making; the ontological dilemma and the teleological dilemma. The ontological dilemma suggests that distortive boundary judgments in the problem formation stages of decision making can lead to the neglect of key factors influencing the system and ultimately lead to sub-optimization. The teleological dilemma refers to the normative bases of decision-making and recognizes that the different needs, interests and values of groups shape courses of action and definitions of system improvement, risking advocacy analysis. Both dilemmas center on the concept of boundary critique. The decision making dilemmas can be assuaged to a certain extent by 'sweeping in' as many perspectives as possible regarding the broader system and by engaging both system designers and those impacted regarding their perceptions of sources of motivation, control, expertise and legitimacy by actors within the system. The Stakeholder Influence Mapping methodology can be adapted to incorporate these principles. The application of Multi-level Stakeholder Influence Mapping (MSIM) in Nepal's agricultural climate change adaptation regime demonstrates that analysis with central level respondents alone risks both sub-optimization and advocacy analysis, and tends to focus discourse towards adaptation planning and financing and away from implementation. Using 'traditional' power mapping strategies, then, to identify key entry points or agents to lobby could risk adoption of sub-optimal on-ground adaptation responses, and be biased toward the interests of status-quo, central level interests. Yet local level power analyses alone do not offer a solution to the ontological and teleological dilemmas. Local level analyses can ignore important macro-structures that ensure access to central level

funding, and that allow for the organized scaling-up of appropriate adaptation options. Advocacy analysis also emerges at local actor levels, with micro-political and geopolitical considerations emerging in this case study. MSIM advances on existing power-elucidating techniques in that its individual interview style mitigates against group normalization and status-quo bias, its use of an elicitation object facilitates the sharing of sensitive information, and it serves as a useful technique in delineating system boundaries as perceived by different actor groups. MSIM offers a variety of 'lenses' through which to analyze power mapping data. It holds the potential to identify powerful but 'marginalized' actors and bridging agents, such as local traders or officials, who may be facilitating key adaptation processes, but which are not recognized by central level actors and institutions. Ultimately, it is argued here, without proper consideration of the role of power in agricultural climate change adaptation regimes, that the resulting interventions will be insufficient and potentially contradictory in moderating the negative impacts of climate change, as well as highly contested, less equitable, and ultimately less sustainable and effective. It is likely that the insights emerging from MSIM analyses can improve adaptive capacity of agricultural and other systems by highlighting the "disconnect" between levels of actors in carrying out adaptation and thereby facilitating the selection of more appropriate, resilient, and sustainable adaptation interventions according to genuine local needs and adaptation processes.

*Paper 2*

Rendering underlying power and influence dynamics visible among adaptation actors is an important step in improving the delivery of resources to those most vulnerable and assigning responsibility for outcomes in adaptation regimes. Multilevel Stakeholder Influence Mapping (MSIM) is applied here to Ghana's agricultural adaptation policy regime with diverse respondents from Accra, the Upper West Region, and the Lawra District. The study constitutes among the first efforts to empirically map power and influence in adaptation regimes. Through this analysis, MSIM provides insight in to the underlying power structure of the regime (i.e. elite-centred versus pluralistic orientations), and contributes to two key power-laden themes in adaptation: stakeholder participation and multilevel institutional design. Respondents in this study consider power in the adaptation policy regime in Ghana as bi-polar, or elite-centred. A distinguishable 'adaptation establishment' or dominant group of power elites made up of technical government and international agencies can be identified. This power orientation effectively renders adaptation planning technical and a-political, contrasting with traditional power structures in Ghana that elevate powerful executives and political parties. In fact, contrary to the hyper-politicized nature of climate change adaption at international levels, agricultural adaptation policy in Ghana would benefit from increased political engagement from the President, MPs, DCEs and other party leaders to facilitate improved decentralization, popular participation, and downward accountability. This would reduce bipolarity and cross level disconnect in the regime and make the policy process more adaptive to genuine needs. Achieving increased pluralism more broadly in the adaptation regime (including power distribution towards the private sector, civil society, academia, and farmers themselves) should also be a priority and will allow for system-wide, transformational adaption that the current homogenous, elite-centered power structure cannot accommodate. A more pluralized power structure would offer increased transparency, responsiveness and legitimacy within the regime, widening the portfolio of potential adaptation responses. MSIM results also reflect the challenges in multi-level institutional design of adaptation regimes. In particular, the disparity in power attributed to the district assembly, traditional authorities, and farmers between local and national level actors is especially detrimental to the cross-level performance of the regime. Potential bridging actors with high local level influence could be better engaged at higher levels of operation to improve understanding of and responses to adaptation needs, capacities, and delivery. This— in the case of traditional authorities— will require increased coordination between formal and informal institutions in which 'modern' and traditional governing structures are seen not as competing but complimentary institutions. Increased emphasis on developing informal

farmer-based organizations and national farmer associations will also help to assuage the effects of the 'adaptation paradox' and improve farmer representation across levels. While the results of this analysis are reflective of only one region in Ghana and do not trace the full scope of power networks or their dynamics, this study marks an important advancement in understanding which actor groups are considered influential within a given adaptation regime. The results highlight existing patterns of influence and bias in adaptation policy making, evidencing the concentration of power among technical agencies and the need for adaptive, agile, multi-level institutional networks. Achieving true 'polycentric', responsive multi-level governance cannot evolve through simple decentralization or scale linkage, but must build on a thorough understanding of power and influence dynamics among key players in the adaptation policy process, as identified here. Further research in to the underlying sources of these power dynamics can provide a basis for generating more inclusive, pluralistic adaptation policy regimes.

*Paper 3*

Steven Lukes' dimensional view of power contributes to the thinking of power theorists still today. Among the first frameworks to facilitate the empirical study of power, it has been applied in a variety of settings and the existence of a third, preference-shaping dimension has come to be widely accepted. The application of Lukes' framework in the context of the international agricultural adaptation regime constitutes a major theoretical advance on current power literature. Specifically, it offers the first application of the three dimensional view of power-over in multi-state and multi-level regimes, and provides a replicable typology of preference shaping sources. We argue that Lukes' power-over framing is an important lens through which to view climate change adaptation, a field dominated by power-to, capacity-based constructs. Through a literature review we demonstrated that Lukes' first and second dimensional views of power-over—visible decision making and agenda setting—fail to account for the ways in which the interests and preferences of smallholder farmers are unknowingly shaped and restricted, especially by national and subnational forces. That is, visible negotiating resources, the established balance of power between states, and the 'rules of the game' within the UNFCCC contribute to only a partial understanding of power dynamics within the regime. A third dimension is also needed. To advance on existing power literature we proposed a replicable typology of third dimension preference shaping power sources in the adaptation regime, and illustrated the plausibility of those sources through a questionnaire with select high-level technical and political decision makers at COP 19. By exploring dominant narratives, prevailing rationalities, and systemic institutional biases, we conclude that prevailing discourses of uncertainty and the perceived minimal capacity of farmers, the resulting privileged status of 'expert' decision makers, the predominance of neoliberal development rationalities, and the nation state as the principle unit of negotiation each facilitate exercises of power in adaptation regimes that lie beyond the explanatory scope of first and second dimensions. These third dimension forces help to explain why stakeholder (farmer) engagement in the UNFCCC and domestic adaptation decision making forums remains superficial and consultative (as opposed to truly participatory) and why adaptation responses in agriculture in developing countries are 'common and non differentiated', privileging technical, hard adaptation over ecosystem and community-based approaches. The third dimension manifestations of power and their impacts serve to disadvantage smallholders, leading to the shaping or distortion of their interests and preferences. Increased awareness of the prevalence of these insidious forces can lead to improved participation from marginalized stakeholders and to the increased diversity of adaptation options available to smallholders. More broadly, the power-over perspective advanced here can contribute to the improved attribution of responsibility for adaptation outcomes that extends beyond farmers themselves to the system features and actor groups that work to knowingly and unknowingly shape the adaptation outcomes of smallholders.

*Paper 4*

This article examined the claim that climate change adaptation policy tends to support techno-fix interventions derived from neoliberal development rationalities. In doing so, we analyzed a total of 531 policy actions from two separate climate change policies, and three medium-term agricultural development policies in Ghana. The first phase of analysis determined that the majority (approximately 75%) of adaptation interventions in the NCCP and NCCAS have been derived directly from Ghana's existing agricultural development portfolio. The agricultural sector priorities in Ghana, in turn, are aimed at 'modernizing' agriculture via enhanced commercialization and export-led development. Direct mainstreaming, then, leaves the adaptation policy portfolio vulnerable to the existing neoliberal trends, for better or for worse, in business-as-usual agricultural development. The second analysis phase determined that at the macro policy level Ghana's climate change adaptation portfolio supports a wide range of human dimensions of adaptive capacity, and is composed primarily of 'soft' capacity-based interventions and a balance of private and public adaptation actions. While the adaptation priorities do not necessarily favor 'hard' interventions, there remains a policy bias towards processes of exchange, rationing, and pooling, particularly knowledge exchange. The portfolio also emphasizes 'revitalization' through repeated reference to 'climate-smart' and 'climate resilient' agriculture. Processes of mobility are the least supported by the policy documents. This does not constitute an outright debunking of 'techno-fix' theories, rather is likely reflective of the 'novice' stage of policy development and unique characteristics of the agricultural sector. The authors highlight the key role that 'revitalization' plays in breaking with the status-quo regime and facilitating transformational adaptation. Climate-smart agriculture can be a catalyst for such revitalization provided it facilitates a shift in authority towards farmers and away from those forces that perpetuate the status quo regime. While this study provides a preliminary, theoretical look at the neoliberal and techno-fix bias, ex post analysis of budgeting and finance of these same policies are required to provide empirical assessment of the prevalence and implications of these trends.

*Paper 5*

According to the traditional, behavioural perspective power is most easily studied through instances of overt conflict where winners and losers can be readily identified. Yet Ghana's climate change adaptation policy development regime has been defined more by consensus than by conflict, at least outwardly. Climate change policies have been adopted in Ghana with near universal consensus from key stakeholders, technical and political. Moreover, farmer participation in adaptation policy development is widely considered robust given Ghana's decentralized planning system. The political ecology of adaptation in Ghana is thus not revealed through stark differences in formal policy decision making forums, but in less visible manifestations of power. In applying Lukes' dimensional framework we have seen the ways in which power plays out in visible decision making and agenda setting as well as in third dimension preference shaping within Ghana's agricultural adaptation regime. From 'formal policy outcomes favouring mitigation' to 'decentralization without true devolution of power', to 'narratives and discourses that frame farmers as 'victims' and 'non-experts'', both adaptation and political establishment actors have been able to assert their dominance on the regime. These power manifestations, we argue, are facilitated by the depoliticization and technical rendering of the regime. It can be said that the rendering technical of adaptation policy development simultaneously undermines the decision making authority of political actors while providing them depoliticized cover to exercise power more or less covertly through policy implementation. Considering Lukes' dimensional framework as a truly three dimensional 'power space' of wholly interdependent dimensions contributes to an improved understanding of depoliticization and the anti-politics of adaptation, and responds to seminal

failures among power scholars to determine how dimensions or sources of power relate to one another.

Across each of these papers, I have argued that whether or not we believe that interests can be intentionally (or unintentionally) manipulated, that climate change adaptation offers a unique manifestation of third dimension preference shaping power. That is, a decisive lack of conflict (i.e. depoliticization) over agricultural climate change adaption actions at the national level in Ghana is driven by powerful actors that assume trusteeship over decision making, justified by their unique ability to forecast impacts and manage uncertainty. This is further facilitated by the 'anticipatory' nature of climate change policy that seeks to adapt to and mitigate forthcoming impacts, posing a unique challenge for public policy that is historically reactive in nature. The third dimension of power in this context does not shape the preferences of smallholders, but can deny them all together through self-exclusion and deferral to expert judgement. Ghana's agricultural climate change adaptation regime is managed by an 'adaptation establishment' or dominant group of elite power holders made up of technical agencies of the state and a host of international agents. To be 'an authority' within Ghana's adaptation policy regime is often more preferable than being 'in a position of authority'. True to political ecology, then, the study of adaptation policy in Ghana begins in contradiction: while climate change is politically charged and contested at international levels, adaptation policy development it remains outwardly devoid of politics at the national and subnational levels.

The bias towards expert power within Ghana's adaption regime is perpetuated by third dimension narratives of climate change impacts and responses as 'highly uncertain' (and thus unattainable by non-experts), and the perceived low capacity of farmers to adapt to climate change without external intervention. Participation of smallholder farmers in decision making is, at times, intended only to grant legitimacy to the efforts of other actors who then behave autonomously of farmers' (and the state's) interests. The gap between powerful actors in climate adaptation regimes is thus not merely a product of policy outcomes or the availability of participatory forums. Instead, rendering technical of adaptation, I argue, biases problem and solution identification to those interventions supported by— and 'legible' to — the agricultural adaptation establishment. These are often neoliberal or techno-fix rationalities that steer interventions away from competing logics that may promote low-emissions agroecology, permaculture, community-based adaptation, and ecosystem-based adaptation, among other less capital and market-intensive alternatives (i.e. adaptation interventions are 'common and non differentiated'). This neoliberal bias is especially prevalent in Ghana's business-as-usual agricultural development regime in to which adaptation policy is to be

directly mainstreamed. Importantly, power dynamics can determine who or what is considered vulnerable and the viability of certain policy responses over others within the regime.

This depoliticized, expert-centered power composition, however, is not devoid of politics entirely. Political groups in Ghana, although not outwardly perceived as relevant or highly influential with regard to climate change adaptation policy, play important roles within the regime. The rendering technical of adaptation effectively draws our attention away from acts of politics focusing us instead on the neutral science of adaptation. Yet we have seen the deleterious effects of executive power in Ghana allowing the government of the day to effectively side-step national development planning objectives in favour of short-term political goals and projects. Similarly, the District Chief Executive is representative of an incomplete decentralization of power in Ghana and allows these appointed executives to determine local development priorities and recipient communities. All of this is facilitated by a system of patriarchal authority that elevates 'big man' politicians and traditional rulers.

It can be said, then, that the rending technical of adaptation simultaneously undermines the decision making authority of political actors in the regime while providing them depoliticized cover to exercise more or less covert power. There are effectively two dominant, and sometimes overlapping, power-laden forces shaping adaptation outcomes in Ghana: the so-called 'adaptation establishment', and the political establishment hiding in plain sight. Concentrating on the image of a malevolent expert regime in adaptation allows politics-as-usual to continue unaltered. The political shortcomings identified here are not necessarily new to the development literature in Ghana, yet linking their effects to climate change adaptation outcomes, however, can provide renewed impetus for change.

Paul Robbins rightly maintains that "politics is inevitably ecological and that ecology is inherently political". It might also be said that what is political in adaptation is its technical nature, and that what is technical in adaptation is inherently political. To successfully deliver outcomes for smallholders the amendments to Ghana's adaptation regime must be as political as they are technical. I believe that if we are to make progress for smallholders in agricultural adaptation we have to make sub-national debates more political, not less.

**Limitations**

There are several limitations worth reflecting on in this study that result from the multidisciplinary nature of the underlying thesis project and the novice stage of adaptation policy development and implementation in Ghana.

First, this thesis constitutes a virtual microcosm of the challenges in undertaking truly interdisciplinary research. In an effort to ground the trends observed in this thesis —the systematic exclusion of smallholders from decision making through depoliticization and rending technical— I relied predominantly on secondary literature related to climate change adaptation in the Upper West region of Ghana. In the original research design, however, this data would have been supplemented by detailed survey data from the community level. Yet because of university examination requirements, limits to intellectual property and data sharing, that data was ultimately not available. As such, while I did reach farmers in the multi-level interview process, I rely predominantly on 'Paper 4 Supplement: Identifying 'real' interests — hard vs. soft adaptation in northern Ghana' to answer the third question in this thesis, "in what way might power/influence disparities contribute to the shaping of preferences among smallholders?"

Second, this thesis was funded through a CCAFS project, meaning that the students involved in this work—myself included—were required to produce project outcomes along the way. This included reports, working papers, and journal articles. In order to deliver these project outputs, a division of labor and data collection uncommon to most DPhil studies had to be undertaken. The team divided the workload by level of operation: local, catchment, and regional/national. As the political lens in this work, the majority of my time was spent interacting with regional and national level actor groups. I relied on my colleagues and secondary data to inform me of local trends. That policy work is something that must be conducted at the highest level of government is a bias implicit to most political economy studies and that helps to perpetuate the findings I establish in this thesis—that there is a political deficit in adaptation policy development that obscures local acts of politics.

Finally, this thesis relies predominantly on perceptions-based data, owing to the fact that the climate change adaptation policies analyzed in this study have not yet been widely implemented in Ghana. Consequently, while I do attempt to draw in more positive analyses to ground and triangulate the research findings, much of the adaptation policy development regime is still taking shape. Similarly, adaptation implementation trends (in their infancy), in particular, are largely speculative and based on observed patterns in business-as-usual

agricultural development. To be sure, that the BAU agricultural development regime influences adaptation policy outcomes is of severe consequence to the results of this study. Yet it remains unclear to what extent the full implementation and funding of adaptation policies will change the way in which development is done in Ghana in the longer term. Certainly, as it stands, the underlying development model in to which adaptation is mainstreamed has not yet changed in a systemic or transformational way.

Each of these limitations contributes to an overall deficit in responding to the third research question in this study. That is, while I feel this thesis contributes considerably to the understanding of which actor groups are powerful within the adaptation regime in Ghana as well as the features of the regime that might facilitate such exercises of power, it provides relatively less insight in to the impacts of these power structures on the adaptive capacity of smallholders.

**Recommendations**

Depoliticization serves to maintain the status quo of existing power relations, so it should follow that repoliticization in the Ghanaian context requires the underlying political structure of the adaptation regime to change. That is to say, central to shifts in policy paradigms are parallel or triggering shifts in the locus of authority (Hall 1993). In order to transfer power within Ghana's agricultural adaptation regime to those most vulnerable — small scale farmers— the following amendments to the governance regime might be made: local elections of DCEs; and re-establishment of a long-term planning mechanism and obligatory political manifesto adherence. While there are constitutional constraints that stand in the way of remedying some of the power dynamics discussed in Paper 5 (e.g. D1/2 executive power derived from appointment of ministers), I believe that given the interrelated nature of the power manifestations discussed in this thesis that action on these two issues would have a profound impact on improving the adaptive capacity of smallholders in Ghana. These recommendations are based on ongoing trends and political developments in Ghana that will increase the likelihood of adoption.

*Local election of DCEs*

This thesis calls for the local election of District Chief Executives, consistent with the recommendations of other institutional and governance scholars in Ghana (Debrah 2014; Debrah 2016). Importantly, local elections for DCEs have been part of popular political

debate for almost ten years in Ghana, and the movement has gained support in the last few years —that is to say, this recommendation is grounded in a political reality (Debrah 2016). It is envisioned that local elections will contribute to a more complete decentralization in Ghana, build downward accountability by severing the link between the president and his local agent, and limit the potential for DCEs to subvert local priorities for political favour. The recommendation is based on the assessment that the primary challenge with decentralization in Ghana is that it has been thoroughly incomplete.

Decentralization is an increasingly common theme in environmental governance literature (Mapedza et al. 2016; Nagrah et al. 2016; Strauch et al. 2016; Sudhipongpracha and Wongpredee 2016; Warren and Visser 2016; Andersson et al. 2006; Andersson and Ostrom 2008; Brown et al. 2005; Clement 2010; Dressler et al. 2006; Fritzen and Lim 2006; Government of Ghana 2010a; Guri 2006; Larson 2003; Ribot 2003). Broadly speaking, decentralization refers to the redistribution of power away from a central authority. Decentralization theorists define several means by which powers are disseminated in a decentralized governance system. Sometimes these are referred to as administrative, fiscal, and political decentralization (Fritzen and Lim 2006). Other authors, meanwhile, refer to deconcentration, delegation, and devolution components of decentralization. While deconcentration and delegation do not shift the ultimate source of decision making authority, true devolution of power does. Samoff (1990) defines devolution as "the most extensive form of decentralization involving creating or strengthening independent levels and units of government through the direct assignment of decision making responsibility" (p. 528). Two common critiques of decentralization are presented here: elite capture and incomplete decentralization.

First, while decentralization is commonly associated with increasing the responsiveness and efficiency and downward accountability of government (Ribot 2003; Turner and Hulme 1997), theorists also note that some decentralized structures serve simply to replace top-down command and control regimes with local 'elite capture' that does not ultimately improve governance outcomes for local populations (Sherman and Ford 2014; Warren and Visser 2016; Wong 2010). Heller (2001), for example, notes that often times the decentralization of power is about accommodating local 'strongmen' than about opening up democratic spaces. Indeed, the notion "that if the spaces for decision making are local, and the rules for access and distribution fair, then all parties will potentially be able to participate and benefit" has been thoroughly dispelled in participatory resource management literature (Cleaver 2009 in Dodman and Mitlin 2013). This is true of both formal and informal decision making institutions. Yaro et al. (2014), discussing local and traditional institutions in Northern and

Upper East Regions of Ghana , suggest that some decentralized institutional rules can be maladaptive, preventing the less powerful from accessing key social and economic resources. This includes limited access by women to land and property with the authors citing "traditional institutions [that] may malfunction when modern interpretations of tradition are in the interests of custodians of traditions rather than the ordinary poor" (p. 235). It is important to note that elite capture is not inevitable. Wong (2010) argues that some "analyses of local power dynamics have over-simplified the relations between local elites and less powerful members of the community" (p. 648 in Dodman and Mitlin 2011).

Second, a similar critical body of decentralization literature speaks to what might be considered 'incomplete decentralization'. Marks and Lebel (2016), for example, examine disaster responses to the 2011 flooding in Thailand. They determine that the retention of power by the central government and the low capacity of local level administration led to incomplete decentralization, and limited the effectiveness of disaster relief. Studies of decentralization in Ghana have noted the poor performance record of District Assemblies given conflict between DCEs and MPs, perennial delays in common fund transfers from the central government, and minimal capacity of Assembly members and district field staff (Debrah 2014; Ahwoi 2010; Bazaanah 2012; Crawford 2004; Hoffman 2010; Lentz 2006; Mohan 1996). Perception of the capacity of local government is especially bleak, particularly among national level respondents. A study conducted by Ayee (2008) and supported by Debrah (2014) states that "of the projected 285,000 of overall Ghana's civil servants working at the local level, 60% lack the requisite expertise to perform their functions" (p. 21).

It is this second phenomenon that is especially relevant in the case of Ghana. Mohan (1996), for example, argues that decentralization from the beginning in Ghana was partial and ideological. "Development planning is", he states, "as it was in the past, a largely ideological discourse intended to give the semblance of social and moral responsibility" (p. 451); a way, in other words, to provide the semblance of democracy (and thus legitimacy), but ultimately failing to change the centralized nature of the Ghanaian state. In Ghana, administrative decentralization is enshrined in the Local Government Act (462) establishing MMDAs and the National Development Planning System Act (480) which defines MMDAs as autonomous planning agents; fiscal decentralization through the newly instated composite budgeting system; and political decentralization through local elections of district assemblypersons. In this framing, it can be said of Ghana's current decentralized development regime that administrative, fiscal and political responsibilities are deconcentrated and delegated, but are not truly devolved. This limited autonomy is stated in Ghana's decentralization policy framework document:

> "While the local government units are allowed the measure of "independence" that will permit them to deliver on their mandate of development and municipal services delivery, the central government should also be enabled to exercise the measure of supervision and control that will allow the unity and cohesion of the state to be maintained and that will enable the elected President to exercise his authority over the state and to implement his national policies and programmes." (2010a p. 12)

'Supervision' and 'control' is provided for, as described in 'D2. Decentraization without devolution', by the vertical linkage between the President and the appointed DCE[47]. The DCE is not electorally accountable in this regime, and is thus not incentivized to adhere to the outcomes of localized planning processes, mainly the MTDP and AAP. The president's usage of DCE appointment might be considered by MacKinnon as a 'strategic deployment of scale', or the purposeful utilization of multi-level structures to promote one's interests (2011). Local elections, by severing the link between DCE and the president, will inevitably lead to the improved political autonomy of MMDAs (i.e. D2 decentralization without devolution), a reduction in the extent of 'D1/2 Executive power' and 'D3.c Punctualization of government and political parties' in which DCEs can channel development resources to party-loyal communities.

*Re-introducing long-term development planning*

The relationship between political manifestos and medium and long term planning processes in Ghana is the product of 'D1/2 Executive power' and the subject of power manifestations in 'D2: Selective Funding (non-funding) and implementation', 'D2: Decentralization without devolution", and 'D3: Punctualization of government and politics'. It is in each of these power manifestations that short-term political objectives can displace medium and long-term adaptation goals. The NDPC is constitutionally mandated to support the President in establishing development plans for the country (Article 87 of the Constitution, Act 479, Act 480). This includes both short and long term planning. Yet the last long term plan in Ghana, "Vision 2020" (1996-2020), was terminated in 2001, and replaced by a series of medium term plans — currently GSGDA II (2014). Meanwhile, during every four-year election cycle, political parities develop their party platforms or manifestos. As we have seen in 'D2: Selective Funding (non-funding) and implementation', the content of party manifestos can serve as the motivation for source deductions that limit DACF transfers to districts. As such, whether manifestos influence the content of medium term plans or the medium term plans influence the content of manifestos is the subject of debate among respondents. For example:

[47] The ruling party also appoints up to 30% of MMDA assemblypersons (Debrah 2014)

> "Political manifestos… cannot be national goals and objectives. They are not national goals, they are for politicians, short term to influence people to gain power. It can be part of the national policy, but it cannot be [emphasis] the national policy" (Interview, National, 38, 2013)

> "I think…presidential aspirants should derive their manifestos from the national plan. We have a national plan, and then feed your manifestos in to it so you don't do a manifesto that is an offshoot of the national plan. And then you go and promise a [ ] where the national plan isn't'. And because it is your priority you want to go and put money there." (Interview, Regional, 46, 2013)

It is my assertion that long term planning (15+ years) should be reinstated in Ghana and political parties obliged to extract their manifesto goals from those plans. This will ensure that projects and programs will not be abandoned when the ruling party changes, and will provide greater assurance to MMDAs that their MTDP and AAPs will fall within the current governments' development priorities. The adoption of long term planning must also be accompanied by a restructuring of the NDPC to provide for more independent planning. At present NDPC is led by "somebody appointed by the president [to lead the NDPC] who tows the line of the president and for that matter his party" (Interview, National, Sebastian NDC, 2013). In this spirit, a long-term 40-year plan (2018-2057) is currently being explored by the NDPC in Ghana. A first phase of public consultation was completed in February 2016. The project includes four, 10-year plans that will be approved by Parliament and constitutionally binding to successive administrations. The NDPC describes the plan as "creating a level playing field for all political parties, whether in power or not, in preparation of their manifestos around a common national development vision" (Government of Ghana 2016).

Locally elected and responsive DCEs, guided by long-term, independently crafted development plans to establish medium term and annual action plans for MMDAs, I posit, will contribute to the improved adaptive capacity of smallholders in Ghana. These entry points will not suffice, however, to completely shift the locus of authority from the adaptation and political establishmentments to smallholders within the regime. Simultaneous efforts must be made to rebrand farmers as 'experts' rather than 'victims', and reconcile local and traditional knowledge systems with a previaling neoliberal development rationality, among other critical interventions.

## References


Abotchie C, Awedoba A, Odotei I (2006) Perceptions on Chieftaincy. In: Irene K, Odotei I, Awedoba K (eds) Chieftaincy in Ghana. Sub‐Saharan Publishers, Accra, Ghana, pp 103-144

Ackoff RL (1974) Beyond problem solving. General Systems 19:237-239

Adger WN (2001) Scales of Governance and Environmental Justice for Adaptation and Mitigation of Climate Change. International Development 13 (7):921-921

Adger WN (2003) Social Capital, Collective Action, and Adaptation to Climate Change. Economic Geography 79 (4):387-404

Adger WN, Agrawala S, Mirza MMQ, Conde C, O'Brien K, Pulhin J, Pulwarty R, Smit B, Takahashi K (2007) Assessment of adaptation practices, options, constraints and capacity. Climate change:717-743

Adger WN, Arnell NW, Tompkins EL (2005a) Successful Adaptation to Climate Change Across Scales. Global Environmental Change 15 (2):77-77

Adger WN, Arnell NW, Tompkins EL, Dessai S, Lu X, Risbey JS, Conway D, Thomas DSG, Twyman C, Noess LO, Bang G, Eriksen S, Vevatne J, Brooks N, Kelly PM, Haddad BM (2005b) Adaptation to climate change: perspectives across scales. Global environmental change 15 (2):77-176

Adger WN, Barnett J (2009) Four Reasons for Concern about Adaptation to Climate Change. Environment and Planning A 41:2800-2805

Adger WN, Dessai S, Goulden M, Hulme M, Lorenzoni I, Nelson DR, Naess LO, Wolf J, Wreford A (2009) Are there social limits to adaptation to climate change? Climatic Change 93 (3-4):335-354. doi:http://dx.doi.org/10.1007/s10584-008-9520-z

Adger WN, Paavola J, Huq S, Mace MJ (eds) (2006) Fairness in Adaptation to Climate Change. MIT Press, Cambridge, Massachusetts

Adger WN, Vincent K (2005) Uncertainty in adaptive capacity. Comptes Rendus Geoscience 337 (4):399-410. doi:http://dx.doi.org/10.1016/j.crte.2004.11.004

Adler E, Bernstein S (2005) Knowledge in power: the epistemic construction of global governance. In: Barnett MN, Duvall R (eds) Power in Global Governance. Cambridge University Press, New York,

ADP (2014) Report of the Ad Hoc Working Group on the Durban Platform for Enhanced Action. UNFCCC, Lima

Afful-Koomson T (2014) The Green Climate Fund in Africa: what should be different? Climate and Development:1-13. doi:10.1080/17565529.2014.951015

Agrawal A (2002) Indigenous knowledge and the politics of classification. International Social Science Journal 54 (173):287-297. doi:10.1111/1468-2451.00382

Agrawal A (2008) The Role of Local Institutions in Adaptation to Climate Change. Paper presented at the Social Dimensions of Climate Change, Washington, D.C., 5-6 March

Agrawal A (2010) Local institutions and adaptation to climate change. In: Mearns R, Norton A (eds) Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World. World Bank, Washington, DC, pp 173-198

Agrawal A, Ostrom E (2001) Collective action, property rights, and devolution of forest and protected area management. In: Meinzen-Dick A, Knox A, Di Gregorio M (eds) Collective action, property rights and devolution of natural resource management: Exchange of knowledge and implications for policy Food and Agriculture Development Centre (DSE). Feldafing, Germany, pp 73-107

Agrawala S, Carraro M, Kingsmill N, Lanzi E, Mullan M, Purdant-Richard G (2011) Private Sector Engagement in Adaptation to Climate Change: Approaches to Managing Climate Risks. Environment Working Papers.

Agriculture and Rural Development Day (2011) Open Letter. Agriculture: A Call to Action for COP17 Climate Change Negotiators. Durban, South Africa.

Ahwoi K (2010) Local Government and Decentralization in Ghana. Unimax Macmillan, Accra, Ghana
Albaum G (1997) The likert scale revisited: an alternate version. Journal of the Market Research Society 39 (2):331-348
Amankwah K, Klerkx L, Sakyi-Dawson O, Karbo N, Oosting SJ, Leeuwis C, van der Zijpp AJ (2014) Institutional dimensions of veterinary services reforms: responses to structural adjustment in Northern Ghana. International Journal of Agricultural Sustainability 12 (3):296-315. doi:10.1080/14735903.2014.909635
Amanor K, Pabi O (2007) Space, Time, Rhetoric and Agricultural Change in the Transition Zone of Ghana. Human Ecology 35 (1):51-67. doi:10.1007/s10745-006-9081-6
Amponsah SK, Oteng-Darko P, Kumi F (2012) Potential and constraints of agricultural mechanisation in Ghana-a review. International Agricultural Engineering Journal 21 (2):38-43
Andersson KP, Gibson CC, Lehoucq F (2006) Municipal politics and forest governance: Comparative analysis of decentralization in Bolivia and Guatemala. World Development 34 (3):576-595. doi:http://dx.doi.org/10.1016/j.worlddev.2005.08.009
Andersson KP, Ostrom E (2008) Analyzing decentralized resource regimes from a polycentric perspective. Policy Sciences 41 (1):71-93. doi:http://dx.doi.org/10.1007/s11077-007-9055-6
Antón J, Cattaneo A, Kimura S, Lankoski J (2013) Agricultural risk management policies under climate uncertainty. Global Environmental Change 23 (6):1726-1736. doi:http://dx.doi.org/10.1016/j.gloenvcha.2013.08.007
Antwi-Agyei P, Dougill AJ, Stringer LC (2014a) Barriers to climate change adaptation: evidence from northeast Ghana in the context of a systematic literature review. Climate and Development:1-13. doi:10.1080/17565529.2014.951013
Antwi-Agyei P, Dougill AJ, Stringer LC (2015) Impacts of land tenure arrangements on the adaptive capacity of marginalized groups: The case of Ghana's Ejura Sekyedumase and Bongo districts. Land Use Policy 49:203-212. doi:10.1016/j.landusepol.2015.08.007
Antwi-Agyei P, Stringer LC, Dougill AJ (2014b) Livelihood adaptations to climate variability: Insights from farming households in Ghana. Regional Environmental Change 14 (4):1615-1626. doi:10.1007/s10113-014-0597-9
Arendt H (1970) On Violence. Houghton Mifflin Harcourt, New York
Arku FS (2013) Local creativity for adapting to climate change among rural farmers in the semi-arid region of Ghana. International Journal of Climate Change Strategies and Management 5 (4):418-430. doi:10.1108/IJCCSM-08-2012-0049
Arler F (2001) Global partnership, climate change and complex equality. Environmental Values 10:301-329
Armah F, Odoi J, Yengoh G, Obiri S, Yawson D, Afrifa EA (2011) Food security and climate change in drought-sensitive savanna zones of Ghana. Mitigation and Adaptation Strategies for Global Change 16 (3):291-306. doi:10.1007/s11027-010-9263-9
Armitage D, de Loe RC, Morris M, Edwards TWD, Gerlak AK, Hall RI, Huitema D, Ison R, Livingstone D, MacDonald G, Mirumachi N, Plummer R, Wolfe BB (2015) Science-policy processes for transboundary water governance. Ambio 44 (5):353-366. doi:10.1007/s13280-015-0644-x
Arnall A (2014) A climate of control: Flooding, displacement and planned resettlement in the Lower Zambezi River valley, Mozambique. Geographical Journal 180 (2):141-150. doi:10.1111/geoj.12036
Arnstein SR (1969) A ladder of citizen participation. Journal of the American Institute of Planners (35):216-224
Asafu-Adjaye J (2013) The economic impacts of agricultural productivity losses due to climate change: estimates for Ghana and the Policy Implications. 5 (Special Issue on Climate change in ghana: impacts on agricutlure and the policy implications):69-87
Asamoah K (2012) A qualitative study of Chieftancy and local government in Ghana. Journal of African Studies and Development 4 (3):90-95

Asante A (2004) Assessment of food import and food aid against support for agricultural development: The case of Ghana. Food and Agriculture Organization, Accra
Asante FA, Bawakyillenuo S, Bird N, Trujillo NC, Tagoe CA, Ashiabi N (2015) Climate change finance in Ghana.
Ayelazuno JA (2014) Neoliberalism and Growth without Development in Ghana: A Case for State-led Industrialization. Journal of Asian and African Studies 49 (1):80-99. doi:10.1177/0021909613478787
Ayers J (2011) Resolving the Adaptation Paradox: Exploring the Potential for Deliberative Adaptation Policy Making in Bangladesh. Global Environmental Politics 11 (1):62-88
Ayers J, Huq S (2009) Supporting Adaptation to Climate Change: What Role for Official Development Assistance? Development Policy Review 27 (6):675-692. doi:10.1111/j.1467-7679.2009.00465.x
Ayers J, Kaur N, Anderson S (2011) Negotiating Climate Resilience in Nepal. Ids Bulletin-Institute of Development Studies 42 (3):70-79. doi:10.1111/j.1759-5436.2011.00224.x
Azar C (2000) Economics and distribution in the greenhouse. Climatic Change 47:233-238
Bachrach P, Baratz MS (1962) The Two Faces of Power. American Political Science Review 56:941-952
Bachrach P, Baratz MS (1970) Power and Poverty: Theory and Practice. Oxford University Press, New York
Bäckstrand K, Lövbrand E (2006) Planting Trees to Mitigate Climate Change: Contested Discourses of Ecological Modernization, Green Governmentality and Civic Environmentalism. Global Environmental Politics 6 (1):50-75. doi:10.1162/glep.2006.6.1.50
Badejo MA (1998) Agroecological restoration of savanna ecosystems. Ecological Engineering 10 (2):209-219. doi:http://dx.doi.org/10.1016/S0925-8574(98)00012-3
Bagdasaryan SD (2014) Research practice: The study of agrarian communities in the Russia's South 1920s-1930s. Bylye Gody 34 (4):655-665
Bahadur A, Tanner T (2014) Transformational resilience thinking: Putting people, power and politics at the heart of urban climate resilience. Environment and Urbanization 26 (1):200-214. doi:10.1177/0956247814522154
Banful AB (2009) IFPRI Discussion Paper: Do institutions limit clientelism?: A study of the district assemblies common fund in Ghana. Washington, D.C.
Bardhan P (1993) Symposium on Democracy and Development. The Journal of Economic Perspectives 7 (3):45-49
Barnett AJ, Eakin HC (2015) "We and us, not I and me": Justice, social capital, and household vulnerability in a Nova Scotia fishery. Applied Geography 59:107-116. doi:10.1016/j.apgeog.2014.11.005
Barnett MN, Duvall R (eds) (2005a) Power in Global Governance. Cambridge University Press, New York
Barnett MN, Duvall R (2005b) Power in international politics. International Organization (59):39-75
Barrett S (2013) Local level climate justice? Adaptation finance and vulnerability reduction. Global Environmental Change 23 (6):1819-1829. doi:http://dx.doi.org/10.1016/j.gloenvcha.2013.07.015
Barrientos S, Asenso-Okyere K (2009) Cocoa value chain: Challenges facing Ghana in a changing global confectionary market. Journal fur Entwicklungspolitik 25 (2):88-107
Bassett TJ, Fogelman C (2013) Deja vu or something new? The adaptation concept in the climate change literature? . Geoforum 48:42-53
Bawakyillenuo S, Yaro JA, Teye J (2014) Exploring the autonomous adaptation strategies to climate change and climate variability in selected villages in the rural northern savannah zone of Ghana. Local Environment:1-22. doi:10.1080/13549839.2014.965671

Bazaanah P (2012) Nature of Ghana's Inter-Governmental Revenue Transfer within the Decentralzied Structure of Governance: A Case of the District Assemblies Common Fund. Cape Coast, Ghana
BBC (2010) Ghana talks climate: the public understanding of climate change. Africa Talks Climate. London
Beddington J, Asaduzzaman M, Clark M, Fernández A, Guillou M, Jahn M, Erda L, Mamo T, Van Bo N, Nobre C, Scholes R, Sharma R, Wakhungu J (2012) Achieving food security in the face of climate change: Final report from the Commission on Sustainable Agriculture and Climate Change Copenhagen, Denmark
Bee B (2013) Who reaps what is sown? A feminist inquiry into climate change adaptation in two Mexican ejidos. ACME 12 (1):131-154
Belden C (2010) IFPRI discussion paper 01030: Examining relationships between customary and state institutions in Ghana's decentralized system. International Food Policy Research Institute (IFPRI), Washington, DC
Bello W (2001) The Future in the Balance: Essays on Globalization and Resistance. Food First Books, Oakland, CA.
Benin S (2015) Impact of Ghana's agricultural mechanization services center program. Agricultural Economics (United Kingdom). doi:10.1111/agec.12201
Berardi G, Green R, Hammond B (2011) Stability, sustainability, and catastrophe: Applying resilience thinking to U. S. agriculture. Human Ecology Review 18 (2):115-125
Berkes F (2010) Devolution of environment and resources governance: trends and future. Environmental Conservation (37):489-500
Berman R, Quinn C, Paavola J (2012) The role of institutions in the transformation of coping capacity to sustainable adaptive capacity. Environmental Development 2 (0):86-100. doi:http://dx.doi.org/10.1016/j.envdev.2012.03.017
Bernstein S (2002) International institutions and the framing of domestic policies: The Kyoto Protocol and Canada's response to climate change. Policy Sciences 35 (2):203-236. doi:10.1023/A:1016158505323
Biagini B, Bierbaum R, Stults M, Dobardzic S, McNeeley SM (2014) A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility. Global Environmental Change 25 (0):97-108. doi:http://dx.doi.org/10.1016/j.gloenvcha.2014.01.003
Biagini B, Miller A (2013) Engaging the private sector in adaptation to climate change in developing countries: importance, status, and challenges. Climate and Development 5 (3):242-252. doi:10.1080/17565529.2013.821053
Biermann F, Betsill MM, Gupta J, Kanie N, Lebel L, Liverman D, Schroeder H, Siebenhuner B (2009) Report 1 Earth System Governance: People, Places, and the Planet. Science and Implementation Plan of the Earth System Governance Project. . The Earth Systems Governance Project, Bonn
Biermann F, Betsill MM, Gupta J, Kanie N, Lebel L, Liverman D, Schroeder H, Siebenhüner B, Zondervan R (2010) Earth system governance: a research framework. International Environmental Agreements : Politics, Law and Economics 10 (4):277-298
Biggs EM, Tompkins EL, Allen J, Moon C, Allen R (2013) Agricultural adaptation to climate change: observations from the Mid-Hills of Nepal. Climate and Development 5 (2):165-173. doi:10.1080/17565529.2013.789791
Blackburn S (2014) The politics of scale and disaster risk governance: Barriers to decentralisation in Portland, Jamaica. Geoforum 52:101-112. doi:10.1016/j.geoforum.2013.12.013
Bobobee EYH, Agodzo SK, Seidu M (1998) Mechanised farming and soil and water management demands in the Savannah agro-ecological zone of Ghana. University of Science Technology and University of Ghana, Kumasi. Accra.
Bokor MJK (2012) Who else is politicizing chieftaincy but the chiefs themselves? (Part I). Modern Ghana,
Bond P (2013) Water rights, commons and advocacy narratives. South African Journal on Human Rights 29 (1):125-143

Boone C (1994) States and ruling classes in postcolonial Africa: the enduring contradictions of power. In: Migdal J, Kohli A, Shue V (eds) State power and social forces: domination and transformation in the Third World. Cambridge University Press, New York, pp 108-139
Boonstra WJ (2016) Conceptualizing power to study social-ecological interactions. Ecology and Society 21 (1). doi:10.5751/ES-07966-210121
Bourdieu P (1977) Outline of a Theory of Practice. Cambridge University Press, Cambridge
Bourdieu P (1979) Disctinction: A Social Critique of the Judgment of Taste (trans: Nice R). Harvard University Press, Cambridge, MA
Bourdieu P (1991) Language and Symbolic Power. Polity, Cambridge
Bourdieu P, Wacquant LJD, Farage S (1994) Rethinking the State: Genesis and Structure of the Bureacratic Field. Sociological Theory 12 (1):1-18
Bourne L, Walker DHT (2005) Visualising and mapping stakeholder influence. Management Decision 43 (5/6):649-660
Bowen KJ, Miller FP, Dany V, Graham S (2015) The relevance of a coproductive capacity framework to climate change adaptation: Investigating the health and water sectors in Cambodia. Ecology and Society 20 (1). doi:10.5751/ES-06864-200113
Boyd E, Ensor J, Broto VC, Juhola S (2014) Environmentalities of urban climate governance in Maputo, Mozambique. Global Environmental Change-Human and Policy Dimensions 26:140-151. doi:10.1016/j.gloenvcha.2014.03.012
Boyd E, Juhola S (2009) STEPPING UP TO THE CLIMATE CHANGE: OPPORTUNITIES IN RE-CONCEPTUALISING DEVELOPMENT FUTURES. Journal of International Development 21 (6):792-804. doi:10.1002/jid.1619
Brenton A (2013) 'Great Powers' in climate politics. Climate Policy 13 (5):541-546. doi:10.1080/14693062.2013.774632
Brockhaus M, Kambire H (2009) Decentralization and adaptation in Burkina Faso. In: Adger WN, Lorenzoni I, O'Brien K (eds) Adapting to climate change: thresholds, values, goverancne. Cambridge University Press, New York,
Brottem L (2014) Hosts, strangers and the tenure politics of livestock corridors in Mali. Africa 84 (4):638-657. doi:10.1017/S0001972014000424
Brown DA (2004) Environmental Ethics and Public Policy. Environmental Ethics (26):110-112
Brown JC, Desposato SW, Brown DS (2005) Paving the way to political change: decentralization of development in the Brazilian Amazon. Political Geography 24 (1):39-52. doi:http://dx.doi.org/10.1016/j.polgeo.2004.06.001
Brown K (2012) Policy discourses of resilience. In: Pelling M, Manuel-Navarrete D, Redclift MR (eds) Climate change and the crisis of capitalism. A chance to reclaim self, society and nature. Routledge, Oxford, pp 37-50
Brugnach M, Ingram H (2012) Ambiguity: the challenge of knowing and deciding together. Environmental Science & Policy 15 (1):60-71. doi:http://dx.doi.org/10.1016/j.envsci.2011.10.005
Bryant RL (1998) Power, knowledge and political ecology in the third world: a review. Progress in Physical Geography 22 (1):79-94. doi:10.1177/030913339802200104
Bryant RL, Bailer S (1997) Third World Political Ecology. Routledge, London
Bryld E (2000) The technocratic discourse: technical means to political problems. Development in Practice 10 (5):700-705
Bryson JC (1981) Women and agriculture in sub‐Saharan Africa: Implications for development (an exploratory study). The Journal of Development Studies 17 (3):29-46. doi:10.1080/00220388108421796
Bryson JM (2004) What To Do When Stakeholders Matter: A Guide to Stakeholder Identification and Analysis Techniques. Public Management Review 6 (1):21-53
Buchner B, Falconer A, Hervé-Mignucci M, Trabacchi C (2012) The Landscape of Climate Finance 2012. San Francisco
Burton I (2009) Climate change and the adaptation deficit. In: Burton I, Schipper ELF (eds) The Earthscan Reader on Adaptation to Climate Change. Earthscan, London,

Burton I, Lim B (2005) Achieving Adequate Adaptation in Agriculture. Climatic Change (70):191-200
Cameron C (2011) Climate Change Financing and Aid Effectiveness, Ghana Case Study. Agulhas Applied Knowledge,
Cameron ES (2012) Securing Indigenous politics: A critique of the vulnerability and adaptation approach to the human dimensions of climate change in the Canadian Arctic. Global Environmental Change 22:103-114
Campbell BM, Wamukoya G, Kinyangi J, Verchot L, Wollenberg E, Vermeulen S, Minang P, Neufeldt H, Vidal A, Loboguerrero Rodriguez AM, Hedger M (2014) The role of agriculture in the UN climate talks: how COP20 and COP21 can ensure a food-secure future. CCAFS Info Note. Copenhagen
Candel JL (2014) Food security governance: a systematic literature review. Food Sec 6 (4):585-601. doi:10.1007/s12571-014-0364-2
Cannon T, Muller-Mahn D (2010) Vulnerability, resilience and development discourses in context of climate change. Natural Hazards 55:621-635
Caretta MA (2014) "Credit plus" microcredit schemes: a key to women's adaptive capacity. Climate and Development 6 (2):179-184. doi:10.1080/17565529.2014.886990
Cash D, Adger WN, Berkes F, Garden P, Lebel L, Olsson P, Pritchard L, Young OR (2006) Scale and Cross-Scale Dynamics: Governance and Information in a Multilevel World. Ecology and Society 11 (2)
Castro Colina L, Sova CA, Martinez Baron D, Sravia D (2016) Mapeo de la influencia de los actores sociales de diferente nivel para Centroamérica: cambio climático y agricultura. Documento de Trabajo CCAFS No. 87. CGIAR Research Program on Climate Change, Agriculture and Food Security, Copenhagen, Denmark
CBD (2009) Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. CBD Technical Series No. 41. Montreal
Chaffin BC, Gosnell H, Cosens BA (2014) A decade of adaptive governance scholarship: synthesis and future directions. Ecology and Society 19 (3). doi:10.5751/es-06824-190356
Chambers R (1983) Rural development: putting the last first. Longman, London
Chapin FS, III, Sommerkorn M, Robards MD, Hillmer-Pegram K (2015) Ecosystem stewardship: A resilience framework for arctic conservation. Global Environmental Change 34:207-217. doi:10.1016/j.gloenvcha.2015.07.003
Chaudhury AS, Helfgott A, Thornton TF, Ventresca M, Sova CA (2016) The world through the eyes of the climate-vulnerable. A social network approach to mapping local adaptive capacity in agricultural systems in northern Ghana. Forthcoming
Chen H, Wang J, Huang J (2014) Policy support, social capital, and farmers' adaptation to drought in China. Global Environmental Change 24 (0):193-202. doi:http://dx.doi.org/10.1016/j.gloenvcha.2013.11.010
Chhetri N, Subedi M, Ghimire S (2013) Niche-based responses in addressing the climatic constraints to farm production: analogues to climate-change adaptation in Nepal. Climate and Development 5 (2):174-181. doi:10.1080/17565529.2013.789790
Chigbu UE (2015) Repositioning culture for development: women and development in a Nigerian rural community. Community, Work & Family 18 (3):334-350. doi:10.1080/13668803.2014.981506
Christoplos I, Anderson M, Arnold V, Galaz M, Hedger R, Klein JT, Le Goulven K (2009) The Human Dimension of Climate Adaptation: The Importance of Local and Institutional Issues. Stockholm
Churchman CW (1968) The Systems Approach. Dell, New York
Churchman CW (1971) The Design of Inquiring Systems: Basic Concepts of Systems and Organisation. Basic Books, New York
Churchman CW (1974) Philosophical speculations on systems design. The International Journal of Management Science (2):451-465
Churchman CW (1979) The Systems Approach and its Enemies. Basic Books, New York

Civil Society Organisations (2011) Second annual civil society review of the natural resources and environment sector in Ghana Modern Ghana,
Cleaver F (2009) Rethinking agency, rights, and natural resource management. In: Hickey S, Mitlin D (eds) Rights-Based Approaches to Development: Exploring the Potential and Pitfalls. Kumarian Press, Washington, DC, pp 127-144
Clegg SR (1989) Frameworks of Power. Sage, London
Clement F (2010) Analysing decentralised natural resource governance: proposition for a "politicised" institutional analysis and development framework. Policy Sciences 43 (2):129-156
Clement F (2013) For critical social-ecological system studies: integrating power and discourses to move beyond the right institutional fit. Environmental Conservation 40 (01):1-4. doi:doi:10.1017/S0376892912000276
Cobbinah PB, Anane GK (2015) Climate change adaptation in rural Ghana: indigenous perceptions and strategies. Climate and Development:1-10. doi:10.1080/17565529.2015.1034228
Cochran P, Huntington OH, Pungowiyi C, Tom S, Chapin Iii FS, Huntington HP, Maynard NG, Trainor SF (2013) Indigenous frameworks for observing and responding to climate change in Alaska. Climatic Change 120 (3):557-567. doi:10.1007/s10584-013-0735-2
Coirolo C, Rahman A (2014) Power and differential climate change vulnerability among extremely poor people in Northwest Bangladesh: lessons for mainstreaming. Climate and Development 6 (4):336-344. doi:10.1080/17565529.2014.934774
Coleman JS (1986) Social Theory, Social Research, and a Theory of Action. American Journal of Sociology 91 (6):1309-1335. doi:10.2307/2779798
Cooke B, Kothari U (eds) (2001) Participation: the new tyranny? Zed Books, London
Corneloup IdA, Mol APJ (2014) Small island developing states and international climate change negotiations: the power of moral "leadership". International Environmental Agreements-Politics Law and Economics 14 (3):281-297. doi:10.1007/s10784-013-9227-0
Cousins S (2013) UN Security Council: Playing a role in the international climate change regime? Global Change, Peace and Security 25 (2):191-210. doi:10.1080/14781158.2013.787058
Crawford G (2004) POLIS Working Paper No. 9 Democratic decentralisation in Ghana: issues and prospects. University of Leeds,
Crenson MA (1971) The Un-Politics of Air Pollution: A Study of Non-Decision-making in the Cities, Baltimore and London. The John Hopkins Press,
Crook RC, Asante K, Brobbey V (2010) Working Paper No. 14 Popular concepts of justice and fairness in Ghana: testing the legitimacy of new or hybrid forms of state justice. London
Crush J (1995) Power of development. Psychology Press,
Dahl RA (1957) The Concept of Power. Behavioral Science 2:201-215
Dahl RA (1958) A Critique of the Ruling Elite Model. The American Political Science Review 52 (2):463-469. doi:10.2307/1952327
Dahl RA (1961) Who Governs? Democracy and Power in an American City. Yale University Press, New Haven, CT
Dasgupta A, Baschieri A (2010) Vulnerability to climate change in rural ghana: Mainstreaming climate change in poverty-reduction strategies. Journal of International Development 22 (6):803-820. doi:10.1002/jid.1666
Davoudi S (2012) Resilience: A Bridging Concept or a Dead End? . Planning Theory & Practice 13 (2):299-307
Debrah E (2014) The Politics of Decentralization in Ghana's Fourth Republic. African Studies Review 57 (01):49-69. doi:doi:10.1017/asr.2014.5
Debrah E (2016) Decentralization, District Chief Executives, and District Assemblies in Ghana's Fourth Republic. Politics and Policy 44 (1):135-164. doi:10.1111/polp.12146

DeLeo RA (2016) Anticipatory policymaking: When government acts to prevent problems and why it is so difficult. Routledge, New York
Dellink R, den elzen M, Aiking H, Bergsma E, Berkhout F, Dekker T, Gupta J (2009) Sharing the burden of financing adaptation to climate change. Global Environmental Change 19:411-421
Depledge J (2008) Striving for No: Saudi Arabia in the Climate Change Regime. Global Environmental Politics 8 (4):9-35
Derbile EK (2013) Reducing vulnerability of rain-fed agriculture to drought through indigenous knowledge systems in north-eastern Ghana. International Journal of Climate Change Strategies and Management 5 (1):71-94. doi:10.1108/17568691311299372
Derbile EK, Kasei RA (2012) Vulnerability of crop production to heavy precipitation in north-eastern Ghana. International Journal of Climate Change Strategies and Management 4 (1):36-53. doi:10.1108/17568691211200209
Derman BB (2013) Climate governance, justice, and transnational civil society. Climate Policy 14 (1):23-41. doi:10.1080/14693062.2014.849492
Dietz T, Millar D, Dittoh S, Obeng F, Ofori-Sarpong E (2004) Climate and Livelihood Change in North East Ghana. In: Dietz AJ, Ruben R, Verhagen A (eds) The Impact of Climate Change on Drylands, vol 39. Environment & Policy. Springer Netherlands, pp 149-172. doi:10.1007/1-4020-2158-5_12
Dixit A, Thapa K, Devkota M (2011) Gateway systems analysis for assessing vulnerability and building local adaptive capacity to climate change impacts. LAPA Piloting and Designing Report. Institute for Social and Environmental Transitional-Nepal,
Dixon RB (1982) Women in Agriculture: Counting the Labor Force in Developing Countries. Population and Development Review 8 (3):539-566. doi:10.2307/1972379
Djoudi H, Brockhaus M (2011) Is adaptation to climate change gender neutral? Lessons from communities dependent on livestock and forests in northern Mali. International Forestry Review 13 (2):123-135
Djoudi H, Brockhaus M, Locatelli B (2013) Once there was a lake: vulnerability to environmental changes in northern Mali. Regional Environmental Change 13 (3):493-508. doi:10.1007/s10113-011-0262-5
Dodman D, Mitlin D (2013) Challenges for Community-Based Adaptation: Discovering the Potential for Transformation. Journal of International Development 25 (5):640-659. doi:10.1002/jid.1772
Dovers SR, Hezri AA (2010) Institutions and policy processes: the means to the ends of adaptation. Wiley Interdisciplinary Reviews: Climate Change 1 (2):212-231. doi:10.1002/wcc.29
Dressler WH, Kull CA, Meredith TC (2006) The politics of decentralizing national parks management in the Philippines. Political Geography 25 (7):789-816. doi:http://dx.doi.org/10.1016/j.polgeo.2006.07.005
Dreyfus HL, Rabinow P (1982) Michel Foucault: Beyond Structuralism and Hermeneutics. Harvester, Brighton
Dulal HB, Brodnig G, Thakur HK, Green-Onoriose C (2010) Do the poor have what they need to adapt to climate change? A case study of Nepal. Local Environment 15 (7):621-635
Dumenu WK, Obeng EA (2016) Climate change and rural communities in Ghana: Social vulnerability, impacts, adaptations and policy implications. Environmental Science and Policy 55:208-217. doi:10.1016/j.envsci.2015.10.010
Duus-Otterström G (2015) Allocating climate adaptation finance: examining three ethical arguments for recipient control. International Environmental Agreements: Politics, Law and Economics. doi:10.1007/s10784-015-9288-3
Dworkin R (1981) What is Equality? Part II: Equality of Resources. Philosophy and Public Affairs 10 (4):283-345
Eagleton T (1991) Ideology: and introduction. Verso, London

Eakin H, Lemos MC (2010) Institutions and change: The challenge of building adaptive capacity in Latin America. Global Environmental Change 20 (1):1-3. doi:http://dx.doi.org/10.1016/j.gloenvcha.2009.08.002
Eakin H, Lerner AM, Murtinho F (2010) Adaptive capacity in evolving peri-urban spaces: Responses to flood risk in the Upper Lerma River Valley, Mexico. Global Environmental Change 20 (1):14-22
Eakin HC, Lemos MC, Nelson DR (2014) Differentiating capacities as a means to sustainable climate change adaptation. Global Environmental Change 27 (0):1-8. doi:http://dx.doi.org/10.1016/j.gloenvcha.2014.04.013
Easterling WE, Aggarwal PK, Batima P, Brander KM, Erda L, Howden SM, Kirilenko A, Morton J, Soussana J-F, Schmidhuber J, Tubiello FN (2007) Food, fibre and forest products. In: Parry ML, Canziani OF, Palutikof JP, van der Linden PJ, Hanson CE (eds) Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. University Press, Cambridge, pp 273–313
Easterly W (2013) The Tyranny of Experts: Economists, Dictators and the Forgetten Rights of the Poor. Basic Books, New York
Eden C, Ackermann F (1998) Making Strategy: The Journey of Strategic Management. Sage Publications, London
Edvardsson Björnberg K, Hansson SO (2013) Gendering local climate adaptation. Local Environment 18 (2):217-232. doi:10.1080/13549839.2012.729571
Eguavoen I (2013) Climate change and trajectories of blame in Northern Ghana. Anthropological Notebooks 19 (1):5-24
Eguavoen I, Schulz K, De Wit S, Weisser F, Müller-Mahn D (2015) Political dimensions of climate change adaptation: Conceptual reflections and african examples. In: Handbook of Climate Change Adaptation. pp 1183-1199. doi:10.1007/978-3-642-38670-1_55
Elias N (2012 [1970]) What is sociology? The collected works of Norbert Elias. Volume 5. University College Dublin Press, Dublin
Ellis F (1998) Household strategies and rural livelihood diversification. The Journal of Development Studies 35 (1):1-38. doi:10.1080/00220389808422553
Elster J (1983) Sour Grapes: Studies in the Subversion of Rationality. Cambridge University Press, Cambridge
Emirbayer M (1997) Manifesto for a Relational Sociology. American Journal of Sociology 103 (2):281-317. doi:10.1086/231209
Eriksen S, Lind J (2009) Adaptation as a Political Process: Adjusting to Drought and Conflict in Kenya's Drylands. Environmental Management 43 (5):817-835. doi:10.1007/s00267-008-9189-0
Eriksen S, Silva JA (2009) The vulnerability context of a savanna area in Mozambique: household drought coping strategies and responses to economic change. Environmental Science & Policy 12 (1):33-52. doi:http://dx.doi.org/10.1016/j.envsci.2008.10.007
Fankhauser S, McDermott TKJ (2014) Understanding the adaptation deficit: Why are poor countries more vulnerable to climate events than rich countries? Global Environmental Change 27 (0):9-18. doi:http://dx.doi.org/10.1016/j.gloenvcha.2014.04.014
FAO (1993) Soil tillage in Africa: Needs and challenges. United Nations Food and Agriculture Organization, Rome
FAO (2010) “Climate-Smart” Agriculture: Policies, Practices and Financing for Food Security, Adaptation and Mitigation. Food and Agriculture Organization of the United Nations, Rome
Fawcett P, Marsh D (2014) Depoliticisation, governance and political participation. Policy and Politics 42 (2):171-188

Fazey I, Wise RM, Lyon C, Câmpeanu C, Moug P, Davies TE (2016) Past and future adaptation pathways. Climate and Development 8 (1):26-44. doi:10.1080/17565529.2014.989192
Ferguson J (1990) The Anti-politics Machine: Development, Depoliticization, and Bureaucratic Power in Lesotho. Cambridge University Press, Cambridge, New York
Ferguson J, Lohmann L (1994) The Anti-Politics Machine: "Development" and Bureaucratic Power in Lesotho. The Ecologist 24 (5):176-181
Ferguson R, Lovell S (2014) Permaculture for agroecology: design, movement, practice, and worldview. A review. Agron Sustain Dev 34 (2):251-274. doi:10.1007/s13593-013-0181-6
Few R, Brown K, Tompkins EL (2007) Public participation and climate change adaptation: avoiding the illusion of inclusion. Climate Policy 7 (1):46-59. doi:10.1080/14693062.2007.9685637
Fieldman G (2011) Neoliberalism, the production of vulnerability and the hobbled state: Systemic barriers to climate adaptation. Climate and Development 3 (2):159-174. doi:10.1080/17565529.2011.582278
Filippi ME, Hordijk M, Alegría J, Rojas JD (2014) Knowledge integration: A step forward? Continuities and changes in Arequipa's water governance system. Environment and Urbanization 26 (2):525-546. doi:10.1177/0956247814539233
Flinders M, Wood M (2014) Depoliticisation, governance and the state. Policy and Politics 42 (2):135-149
Flood RL, Romm NRA (1996) A typology of power supporting intervention. Systems Practice 9 (4):339-355
Folke C, Carpenter SR, Walker B, Scheffer M, Chapin T, Rockstom J (2010) Resilience thinking: integrating resilience, adaptability and transformability. Ecology and Society 4 (15)
Ford JD, Cameron L, Rubis J, Maillet M, Nakashima D, Willox AC, Pearce T (2016) Including indigenous knowledge and experience in IPCC assessment reports. Nature Clim Change 6 (4):349-353. doi:10.1038/nclimate2954
http://www.nature.com/nclimate/journal/v6/n4/abs/nclimate2954.html - supplementary-information
Fortier F (2010) Taking a climate chance: A procedural critique of Vietnam's climate change strategy. Asia Pacific Viewpoint 51 (3):229-247. doi:10.1111/j.1467-8373.2010.01428.x
Foster M, Brown A, Naschold F (2000) What's different about agricultural SWAps. Paper presented at the DFID Natural Resources Advisers Conference,
Foucault M (1980) The History of Sexuality (trans: Hurley R), vol 1. Random House, New York
Foucault M (1982) The Subject and Power. Critical Inquiry 8 (4):777-795. doi:10.2307/1343197
Foucault M (1988) Technologies of the Self (A seminar with Michel Foucault at the University of Vermont, October 1982). In: Martin LH, Gutman H, Hutton PH (eds) Technologies of the Self. A seminar with Michel Foucault,. University of Massachusetts Press, Amherst,
Foucault M (1991) Governmentality. In: Burchell G, Gordon C, Miller P (eds) The Foucault Effect: Studies in Governmentality. University of Chicago Press, Chicago,
Freidrich CJ (1941) Constitutional Government and Democracy. Little, Brown, Boston, MA
French JRP, Raven BH (1959) The bases of Social Power. In: Cartwright D (ed) Studies in Social Power. Institute for Social Research, Ann Arbor, MI, pp 150–167
Fritz V, Levy B, Ort R (2014) Problem-Driven Political Economy Analysis : The World Bank's Experience. World Bank, Washington, DC
Fritzen SA, Lim PWO (2006) Problems and Prospects of Decentralization in Developing Countries. In: Rabin Marcel J (ed) Encyclopedia of Public Administration and Public Policy. Dekker, New York pp 1-9

Fukuyama F (2014) Political order and political decay: From the industrial revolution to the globalisation of democracy. Profile Books Ltd., London
Funk C, Brown M (2009) Declining global per capita agricultural production and warming oceans threaten food security. Food Sec 1 (3):271-289. doi:10.1007/s12571-009-0026-y
Gabrielsson S, Ramasar V (2013) Widows: agents of change in a climate of water uncertainty. Journal of Cleaner Production 60:34-42. doi:10.1016/j.jclepro.2012.01.034
Gaillard JC, Monteil C, Perrillat-Collomb A, Chaudhary S, Chaudhary M, Chaudhary O, Giazzi F, Cadag JRD (2013) Participatory 3-dimension mapping: A tool for encouraging multi-caste collaboration to climate change adaptation and disaster risk reduction. Applied Geography 45:158-166. doi:10.1016/j.apgeog.2013.09.009
Gallie WB (1956) Essentially Contested Concepts. Proceedings of the Aristotelian Society 56:167-198
Gaventa J (1980) Power and Powerlessness: Quiescence and Rebellion in an Appalachian Valley
Gaventa J (2007) Levels, spaces and forms of power: analysing opportunities for change. In: Berenskoetter F, Williams MJ (eds) Power in world politics. Routledge, Abingdon, UK, pp 204-254
GEF (2013) Report of the Global Environment Facility to the Conference of the Parties. Paper presented at the Conference of the Parties, Nineteenth Session, Warsaw,
George S (1999) A short history of neoliberalism. Paper presented at the Conference on Economic Sovereignty in a Globalizing World, March 24-26
Gerst MD, Wang P, Roventini A, Fagiolo G, Dosi G, Howarth RB, Borsuk ME (2013) Agent-based modeling of climate policy: An introduction to the ENGAGE multi-level model framework. Environmental Modelling & Software 44:62-75. doi:10.1016/j.envsoft.2012.09.002
Gibson C, Ostrom E, Ahn TK (2000) The concept of scale and the human dimensions of global change: a survey. Ecological Economics 32 (2):217-239
Giddens A (1979) Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis. University of California Press, Berkeley, CA
Giddens A (1984) The Constitution of Society. Outline of the Theory of Structuration. Polity, Cambridge
Giddens A (1990) The Consequences of Modernity. Polity Press, Cambridge
Glasenapp M, Thornton T (2011) Traditional Ecological Knowledge of Swiss Alpine Farmers and their Resilience to Socioecological Change. Human Ecology 39 (6):769-781. doi:10.1007/s10745-011-9427-6
Glazebrook T (2011) Women and Climate Change: A Case-Study from Northeast Ghana. Hypatia 26 (4):762-782. doi:10.1111/j.1527-2001.2011.01212.x
Glin LC, Oosterveer P, Mol APJ (2015) Governing the Organic Cocoa Network from Ghana: Towards Hybrid Governance Arrangements? Journal of Agrarian Change 15 (1):43-64. doi:10.1111/joac.12059
Goldman AI (1977) Steven Lukes, "Power: A Radical View" (Book Review). Theory and Decision 8 (3):305
Goldman M (2005) Imperial Nature: The World Bank and Struggles for Social Justice in the Age of Globalization. Yale University Press, New Haven, CT.
Gomez-Echeverri L (2013) The changing geopolitics of climate change finance. Climate Policy 13 (5):632-648. doi:10.1080/14693062.2013.822690
Government of Ghana (1992) The Constitution of the Republic of Ghana. Accra
Government of Ghana (2007) Food and Agriculture Sector Development Policy II. Accra
Government of Ghana (2010a) Decentralization Policy Framework: Accelerating Decentralization and Local Governance for National. Accra
Government of Ghana (2010b) Medium Term Agriculture Sector Investment Plan Accra
Government of Ghana (2010c) Medium-term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA). Accra

Government of Ghana (2011) Ghana's Second Communication to the UNFCCC. Accra
Government of Ghana (2012a) 2010 Population and Housing Census: Summary Report of Final Results. Accra
Government of Ghana (2012b) National Climate Change Adaptation Strategy United Nations Environmental Program,, Accra
Government of Ghana (2014a) Ghana National Climate Change Policy. Accra
Government of Ghana (2014b) Ghana: Review of Ongoing Agricultural Development Efforts. Accra
Government of Ghana (2014c) Medium-term National Development Policy Framework: Ghana Shared Growth and Development Agenda (GSGDA) II. Accra
Government of Ghana (2014d) Poverty Profile in Ghana (2005-2013): Ghana Living Standards Survey Round 6. Accra
Government of Ghana (2016) Progress report to parliament: Long-term national development plan for Ghana (2018-2057). Accra
Government of Nepal (2010) National Adaptation Programme of Action (NAPA). Kathmandu, Nepal
Graetz MJ, Shapiro I (2005) Death by a Thousand Cuts: The Fight over Taxing Inherited Wealth. Princeton University Press, Princeton, NJ
Gramsci A (1973 [1947]) Prison Notebooks. Lawrence and Wishart, London
Granderson AA (2014) Making sense of climate change risks and responses at the community level: A cultural-political lens. Climate Risk Management 3 (0):55-64. doi:http://dx.doi.org/10.1016/j.crm.2014.05.003
Grasso M (2010) An ethical approach to climate adaptation finance. Global Environmental Change 20 (1):74-81. doi:http://dx.doi.org/10.1016/j.gloenvcha.2009.10.006
Grasso M (2011) The role of justice in the North-South conflict in climate change: the case of negotiations on the Adaptation Fund. International Environmental Agreements-Politics Law and Economics 11 (4):361-377. doi:10.1007/s10784-010-9145-3
Greene R, Elfrers J (1999) Power the 48 Laws. Profile Books, London
Group of 77 and China (2013) Statement on behalf of the Group of 77+ China to the 39th Session of the Subsidiariy Body for Scientific and Technological Advice. United Nations Framework Convention on Climate Change, Warsaw
Grove KJ (2014) Adaptation Machines and the Parasitic Politics of Life in Jamaican Disaster Resilience. Antipode 46 (3):611-628. doi:10.1111/anti.12066
Gupta J (2012) Negotiating challenges and climate change. Climate Policy 12 (5):630-644
Gupta J, Termeer C, Klostermann J, Meijerink S, van den Brink M, Jong P, Nooteboom S, Bergsma E (2010) The Adaptive Capacity Wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. Environmental Science & Policy 13 (6):459-471. doi:http://dx.doi.org/10.1016/j.envsci.2010.05.006
Guri B (2006) Traditional Authorities, Decentralization and Development: Strengthening the Capacity of Traditional Authorities for Good Governance and Development at the Local Level. Center for Indigenous Knowledge and Organizational Development (CIKOD, , Accra, Ghana
Guston DH (2001) Boundary organizations in environmental policy and science: an introduction. Science, Technology, and Human Values 26:399-408
Gwenzi J, Mashonjowa E, Mafongoya PL, Rwasoka DT, Stigter K (2016) The use of indigenous knowledge systems for short and long range rainfall prediction and farmers' perceptions of science-based seasonal forecasts in Zimbabwe. International Journal of Climate Change Strategies and Management 8 (3):440-462. doi:10.1108/IJCCSM-03-2015-0032
Ha ̈kansson H (ed) (1982) International marketing and purchasing of industrial goods: an interaction approach. Wiley, Chichester
Haalboom B, Natcher DC (2012) The Power and Peril of "Vulnerability": Approaching Community Labels with Caution in Climate Change Research. Arctic 65 (3):319-327

Habermas J (1981) The Theory of Communicative Action, Volume 1. Reason and the Rationalisation of Society. (trans: McCarthy T). Beacon Press, Boston
Hajer M, Versteeg W (2005) A decade of discourse analysis of environmental politics: Achievements, challenges, perspectives. Journal of Environmental Policy & Planning 7 (3):175-184. doi:10.1080/15239080500339646
Halbrendt J, Gray SA, Crow S, Radovich T, Kimura AH, Tamang BB (2014) Differences in farmer and expert beliefs and the perceived impacts of conservation agriculture. Global Environmental Change 28 (0):50-62. doi:http://dx.doi.org/10.1016/j.gloenvcha.2014.05.001
Hall PA (1993) Policy paradigms, social learning, and the state: The case of economic policy making in Britain. Comparative Politics 25 (3):275-296
Harriss J (2001) Working Paper: Social Capital Construction and the Consolidation of Civil Society in Rural Areas (or, Public Action and Rural Development). Development Studies Institute,
Harvey B, Burns D, Oswald K (2012) Linking Community, Radio, and Action Research on Climate Change: Reflections on a Systemic Approach. Ids Bulletin-Institute of Development Studies 43 (3):101-117. doi:10.1111/j.1759-5436.2012.00326.x
Harvey D (2005) A Brief History of Neoliberalism. Oxford University Press, Oxford
Haugaard M (2003) Reflections on seven ways of creating power. European Journal of Social Theory 1 (6):87-113
Hayward CR (1998) De-facing power. Polity 1 (31):1-22
Hazell P, Wood S (2008) Drivers of Change in Global Agriculture. Philosophical Transactions of the Royal Society B 363 (1491):495–515
Helfgott A (2011) Lecture Series. Resilience, Adaptation and Development. University of Oxford, Oxford
Heller P (2001) Moving the State: The Politics of Democratic Decentralization in Kerala, South Africa, and Porto Alegre. Politics & Society 29 (1):131-163. doi:10.1177/0032329201029001006
Heve WK, Olesen JE, Chirinda N, Adiku SGK (2015) Targeted management of organic resources for sustainably increasing soil organic carbon: Observations and perspectives for resource use and climate adaptations in northern Ghana. Acta Agriculturae Scandinavica Section B: Soil and Plant Science. doi:10.1080/09064710.2015.1081396
Heyward M (2007) Equity and international climate change negotiations: a matter of perspective. Climate Policy 7 (6):518-534. doi:10.1080/14693062.2007.9685674
Heywood A (2004) Political Theory: An Introduction (Third Edition). Palgrave Macmillan, New York
Higley J (2008) Elite theory in political sociology. University of Texas at Austin,
Hindess B (1982) Power, Interests and the Outcomes of Struggles. Sociology 16 (4):498-511. doi:10.1177/0038038582016004002
Hitch C (1953) Suboptimisation in operations problems. Operations Research (1):87-99
Hobbes T (2008 [1651]) Leviathan. Oxford World's Classics. Oxford University Press, Oxford
Hoffman B (2010) The political economy of decentralization in Ghana. Georgetown University, Washington, D.C.
Holman IP, Trawick P (2011) Developing adaptive capacity within groundwater abstraction management systems. Journal of Environmental Management 92 (6):1542-1549. doi:10.1016/j.jenvman.2011.01.008
Houssou N, Diao X, Cossar F, Kolavalli S, Jimah K, Aboagye PO (2013) Agricultural Mechanization in Ghana: Is Specialized Agricultural Mechanization Service Provision a Viable Business Model? American Journal of Agricultural Economics 95 (5):1237-1244. doi:10.1093/ajae/aat026
Humboldt A (1811) Politcal Essay on the Kingdom of New Spain. Longman, Hurst, Rees, Orme, and Brown, London

Hunter F (1953) Community power structure: a study of decision makers. University of North Carolina Press, Chapel Hill
Huntington E (1915) Civilization and Climate. Yale University Press, New Haven, CT
Huq S, Khan MR (2006) Equity in National Adaptation Programs of Action (NAPAs): The Case of Bangladesh. In: Adger WN, Paavola J, Huq S, Mace MJ (eds) Fairness in Adaptation to Climate Change. MIT Press, Cambridge, MA,
Huq S, Reid H (2003) The role of people's assessments. Tiempo 28:5-9
Huq S, Reid H (2007) IIED Briefing - Community-Based Adaptation: A Vital Approach to the Threat Climate Change Poses to the Poor. London
Ingram J (2011) A food systems approach to researching food security and its interactions with global environmental change. Food Sec 3 (4):417-431. doi:10.1007/s12571-011-0149-9
Intemann K (2015) Distinguishing between legitimate and illegitimate values in climate modeling. European Journal for Philosophy of Science 5 (2):217-232. doi:10.1007/s13194-014-0105-6
IPCC (2001) Climate Change 2001: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, New York, New York
IPCC (2007) Climate Change 2007: Impacts, Adaptation and Vulnerability (Working Group II contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change). Cambridge. New York.
IPCC (2013) Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge. New York.
IPCC (2014a) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge. New York.
IPCC (2014b) Summary for Policymakers. In: Field CB, Barros VR, Dokken DJ et al. (eds) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge. New York,
Islam MS, Lim SH (2015) When "Nature" strikes: A sociology of climate change and disaster vulnerabilities in Asia. Nature and Culture 10 (1):57-80. doi:10.3167/nc.2015.100104
Jain NK (2005) Organisational Behavior, Volume 1. Atlantic Publishers and Distributors, New Delhi
Jalloh A, Nelson GC, Thomas TS, Zougmore R, Roy-Macauley H (eds) (2013) West African agriculture and climate change: A comprehensive analysis. International Food Policy Research Institute, Washington D.C. doi:http://dx.doi.org/10.2499/9780896292048
Jamieson D (2001) Climate change and global environmental justice. In: Miller CA, Edwards PN (eds) Changing the Atmosphere: Expert Knowledge and Environmental Governance. MIT Press, Cambridge, pp 287-307
Javeline D (2014) The most important topic political scientists are not studying: adapting to climate change. Perspectives on Politics 12 (2):420-434
Jennings TL (2009) Exploring the invisibility of local knowledge in decisionmaking: the Boscastle Harbour flood disaster. In: Adger WN, Lorenzoni I, O'Brien K (eds) Adapting to Climate Change: Thresholds, Values, Governance. Univeristy of Cambridge Press, Cambridge, pp 240–254.
Jones PG, Thornton PK (2003) The potential impacts of climate change on maize production in Africa and Latin America in 2055. Global Environmental Change 13:51-59
Jones S (2008) Political Ecology and Land Degradation: How Does the Land Lie 21 Years after Blaikie and Brookfield's Land Degradation and Society? Geography Compass 2 (3):671-694. doi:10.1111/j.1749-8198.2008.00109.x
Kalame FB, Aidoo R, Nkem J, Ajayie OC, Kanninen M, Luukkanen O, Idinoba M (2011) Modified taungya system in Ghana: a win–win practice for forestry and adaptation to

climate change? Environmental Science & Policy 14 (5):519-530. doi:http://dx.doi.org/10.1016/j.envsci.2011.03.011
Kant I (1781) Critique of Pure Reason (trans: Kemp SN). Macmillan, London
Kates R (2000) Cautionary Tales: Adaptation and the Global Poor. Climatic Change 45 (1):5-17. doi:10.1023/a:1005672413880
Kates RW, Travis WR, Wilbanks TJ (2012) Transformational adaptation when incremental adaptations to climate change are insufficient. Proceedings of the National Academy of Sciences 109 (19):7156-7161. doi:10.1073/pnas.1115521109
Keeley J, Scoones I (2003) Understanding Environmental Policy Processes: Cases from Africa. Earthscan, London
Kepe T, Bissonnette J-F, Roberts DJ (2008) Commentary: Why are students attracted to political ecology? Environment and Planning A 40:2539-2543
Keskitalo ECH, Juhola S, Westerhoff L (2012) Climate change as governmentality: technologies of government for adaptation in three European countries. Journal of Environmental Planning and Management 55 (4):435-452. doi:10.1080/09640568.2011.607994
Khan MR, Roberts JT (2013) Adaptation and international climate policy. Wiley Interdisciplinary Reviews: Climate Change 4 (3):171-189. doi:10.1002/wcc.212
Khor M, Hormeku T (2006) The impact of globalisation and liberalisation on agriculture and small farmers in developing countries: the experience of Ghana
Kissinger G, Lee D, Orindi VA, Narasimhan P, Mutua King'uyu S, Sova CA (2014) Planning climate adaptation in agriculture: Meta-synthesis of national adaptation plans in West and East Africa and South Asia. Report No. 10.
Klinsky S, Winkler H (2013) Equity, sustainable development and climate policy. Climate Policy 14 (1):1-7. doi:10.1080/14693062.2014.859352
Knoke D, Yang S (2008) Social Network Analysis: Second Edition. Quantitative Applications in the Social Sciences. Sage Publications, Thousand Oaks, CA.
Kochin MS (1996) Decollectivization of agriculture and the planned economy. American Journal of Political Science 40 (3):717-739
Kok M, Metz B, Verhagen J, Van Rooijen S (2008) Integrating development and climate policies: national and international benefits. Climate Policy 8 (2):103-118
Konadu-Agyemang K (2000) The Best of Times and the Worst of Times: Structural Adjustment Programs and Uneven Development in Africa: The Case Of Ghana. The Professional Geographer 52 (3):469-483. doi:10.1111/0033-0124.00239
Kosamu IBM (2013) National level organisational responses to climate change adaptation: a case study of Malawi. Climate and Development 5 (1):93-98. doi:10.1080/17565529.2013.763762
Kropotkin P (1888) Mutual Aid: A Factor in Evolution. Porter Sargent, Boston, MA
Kuruppu N (2009) Adapting water resources to climate change in Kiribati: the importance of cultural values and meanings. Environmental Science & Policy 12 (7):799-809. doi:10.1016/j.envsci.2009.07.005
Lanckriet S, Derudder B, Naudts J, Bauer H, Deckers J, Haile M, Nyssen J (2015) A Political Ecology Perspective of Land Degradation in the North Ethiopian Highlands. Land Degradation and Development 26 (5):521-530. doi:10.1002/ldr.2278
Lange MK (2004) British Colonial Legacies and Political Development. World Development 32 (6):905-922. doi:http://dx.doi.org/10.1016/j.worlddev.2003.12.001
Larson AM (2003) Decentralisation and forest management in Latin America: towards a working model. Public Administration & Development 23 (3):211-211
Laube W, Schraven B, Awo M (2012) Smallholder adaptation to climate change: dynamics and limits in Northern Ghana. Climatic Change 111 (3-4):753-774. doi:10.1007/s10584-011-0199-1
Laux P, Kunstmann H, Bardossy A (2008) Predicting the regional onset of the rainy season in West Africa. International Journal of Climatology 28:329-342

Leary NA (1999) A framework for benefit-cost analysis of adaptation to climate change and climate variability. Mitigation and Adaptation Strategies for Global Change 4 (3-4):307-318
Lebel L (2006) Reflections on power. USER breifing BN-2006-10. Chiang Mai: Unit for Social and Environmental Research
Leichenko RM, O'Brien K (2008) Environmental Change and Globalization: Double Exposures. Oxford University Press, New York
Lemos MC (2015) Usable climate knowledge for adaptive and co-managed water governance. Current Opinion in Environmental Sustainability 12:48-52. doi:10.1016/j.cosust.2014.09.005
Lemos MC, Boyd E, Tompkins EL, Osbahr H, Liverman D (2007) Developing Adaptation and Adapting Development. Ecology and Society 12 (2)
Lentz C (2006) Decentralization, the state and conflicts over local boundaries in northern Ghana. Development and Change 37 (4):901-919
Leonard S, Parsons M, Olawsky K, Kofod F (2013) The role of culture and traditional knowledge in climate change adaptation: Insights from East Kimberley, Australia. Global Environmental Change 23 (3):623-632. doi:http://dx.doi.org/10.1016/j.gloenvcha.2013.02.012
Levi-Strauss C ([1950] 1987) Introduction to the Work of Marcel Mauss (trans: Baker F). Routledge and Kegan Paul, London
Leys AJ, Vanclay JK (2011) Social learning: A knowledge and capacity building approach for adaptive co-management of contested landscapes. Land Use Policy 28 (3):574-584. doi:10.1016/j.landusepol.2010.11.006
Likert R (1932) A Technique for the Measurement of Attitudes. Archives of Psychology 140:1-55
Lindberg SI (2009) Member of the Parliament of Ghana: a hybrid insitution with mixed effects. Overseas Development Institute, London
Lipper L, Thornton P, Campbell BM, Baedeker T, Braimoh A, Bwalya M, Caron P, Cattaneo A, Garrity D, Henry K, Hottle R, Jackson L, Jarvis A, Kossam F, Mann W, McCarthy N, Meybeck A, Neufeldt H, Remington T, Sen PT, Sessa R, Shula R, Tibu A, Torquebiau EF (2014) Climate-smart agriculture for food security. Nature Clim Change 4 (12):1068-1072. doi:10.1038/nclimate2437
Litfin KT (1994) Ozone Discourses. Science and Politics in Global Environmental Cooperation Columbia University Press, New York
Little D (2010) Lukes on Power. Understanding Society, vol 2014.
Liu X, Lindquist E, Vedlitz A, Vincent K (2010) Understanding Local Policymaking: Policy Elites' Perceptions of Local Agenda Setting and Alternative Policy Selection1. Policy Studies Journal 38 (1):69-91. doi:10.1177/1065912909346744.
Lobell DB, Burke MB, Tebaldi C, Mastrandrea MD, Falcon WP, Naylor RL (2008) Prioritizing Climate Change Adaptation Needs for Food Security in 2030. Science 319 (5863):607-610. doi:10.1126/science.1152339
Locke J (1980 [1690]) Second Treatise of Government. Hackett, Indianapolis, Indiana
Löf A (2013) Examining limits and barriers to climate change adaptation in an Indigenous reindeer herding community. Climate and Development 5 (4):328-339. doi:10.1080/17565529.2013.831338
Lukes S (1974) Power: A Radical View. 1 edn. Palgrave Macmillan, London
Lukes S (2005) Power: A Radical View. Palgrave Macmillan,
Lukes S (2006) Reply to Comments. Political Studies Review 4:164-173
Luthe T, Wyss R, Schuckert M (2012) Network governance and regional resilience to climate change: empirical evidence from mountain tourism communities in the Swiss Gotthard region. Regional Environmental Change 12 (4):839-854. doi:10.1007/s10113-012-0294-5
MacCarthy DS, Adiku SGK, Yangyuoru M (2013) Assessing the potential impact of climate change on maize production in two farming zones in Ghana using the CERES-

MaizeModel. Ghana Policy Journal 5 (Special Issue on Climate change in ghana: impacts on agricutlure and the policy implications):27-39
Mace MJ (2006) Adaptation Under the UN Framework Convention on Climate Change: the International Legal Framework. In: Adger WN, Paavola J, Huq S, Mace MJ (eds) Fairness in Adaptation to Climate Change. MIT Press, Cambridge, MA,
MacKinnon D (2011) Reconstructing scale: Towards a new scalar politics. Progress in Human Geography 35 (1):21-36
Maekawa M (2014) Effective Environmental Regimes in East Asia for Climate Change and Environmental Security. The Journal of Peace Studies 15 (6):7-30. doi:10.14363/kaps.2014.15.6.7
Mamdani M (1996) Citizen and subject: Contemporary Africa and the Legacy of Late Colonialism. Princeton University Press, Princeton, N.J.
Manuel-Navarrete D (2010) Power, realism, and the ideal of human emancipation in a climate of change. Wiley Interdisciplinary Reviews-Climate Change 1 (6):781-785. doi:10.1002/wcc.87
Manuel-Navarrete D, Pelling M, Redclift MR (2011) Governance as process: Powerspheres and climate change response. Environment, Politics, and Development Working Paper Series. King's Collge London, London
Mapedza E, Manzungu E, Rosen T, Ncube P, van Koppen B (2016) Decentralised water governance in Zimbabwe: Disorder within order. Water Resources and Rural Development 8:1-11. doi:10.1016/j.wrr.2016.05.001
Mapfumo P, Mtambanengwe F, Chikowo R (2016) Building on indigenous knowledge to strengthen the capacity of smallholder farming communities to adapt to climate change and variability in southern Africa. Climate and Development 8 (1):72-82. doi:10.1080/17565529.2014.998604
Marino E, Ribot J (2012) Special Issue Introduction: Adding Insult to Injury: Climate Change and the Inequities of Climate Intervention. Global Environmental Change 22:323-328
Marks D, Lebel L (2016) Disaster governance and the scalar politics of incomplete decentralization: Fragmented and contested responses to the 2011 floods in Central Thailand. Habitat International 52:57-66. doi:http://dx.doi.org/10.1016/j.habitatint.2015.08.024
Marx K (1990 [1867] ) Capital: A Critique of Political Economy vol 1. Penguin, New York
Massey E (2015) Adaptation. Essential Concepts of Global Environmental Governance. Routledge, New York
Matthews D (2008) Metadecision Making: Rehabilitating Interdisciplinarity in the Decision Sciences. Systems Research and Behavioral Science (25):157-179
Mattsson L-G (1984) An application of a network approach to marketing: defending and changing market positions. In: Dholakia N, Arndt J (eds) Changing the course of marketing: alternative paradigms for widening marketing theory. JAI Press, Greenwich, CT., pp 263-288
Mayers J, Vermeulen S (2005) Stakeholder Influence Mapping. Power Tools. International Institute for Environment and Development (IIED), London
Mayers J, Vermuelen S (2005) Stakeholder Influence Mapping. Power Tools. International Institute for Environment and Development (IIED),
McCarthy J (2005) First World political ecology: directions and challenges. Environment and Planning A 37 (6):953-958
McClure L, Baker D (2013) Doing Adaptation Differently? Does Neoliberalism Influence Adaptation Planning in Queensland? Paper presented at the State of Australian Cities Conference,, Sydney, Australia,
McCright AM, Dunlap RE (2010) Anti-reflexivity The American Conservative Movement's Success in Undermining Climate Science and Policy. Theory Culture & Society 27 (2-3):100-133. doi:10.1177/0263276409356001
McDowell G, Ford J, Jones J (2016) Community-level climate change vulnerability research: trends, progress, and future directions. Environmental Research Letters 11 (3):9. doi:10.1088/1748-9326/11/3/033001

McGee J, Taplin R (2009) The role of the Asia Pacific Partnership in discursive contestation of the international climate regime. International Environmental Agreements-Politics Law and Economics 9 (3):213-238. doi:10.1007/s10784-009-9101-2
McKibbin WJ, Wilcoxen PJ (2002) The Role of Economics in Climate Change Policy. The Journal of Economic Perspectives 16 (2):107-129. doi:10.2307/2696499
McLaughlin P (2011) Climate Change, Adaptation, and Vulnerability: Reconceptualizing Societal-Environment Interaction Within a Socially Constructed Adaptive Landscape. Organization & Environment 24 (3):269-291. doi:10.1177/1086026611419862
Mendelow A Stakeholder Mapping. In: Proceedings of the 2nd International Conference on Information Systems, Cambridge, MA., 1991.
Merelman RM (1968) On the Neo-Elitist Critique of Community Power. American Political Science Review 62 (02):451-460. doi:10.2307/1952940
Mermet L (2011) Strategic Environmental Management Analysis: Addressing Blind Spots of Collaborative Approaches. Pour le Debat, vol 5. Paris
Merton RK (1938) Social structure and anomie. American Sociological Review 5 (3):672-682
Midgley G (1992) The sacred and profane in critical systems thinking. Systems Practice 5:5-16
Midgley G (1996) What Is This Thing Called CST? In: Flood R, Romm NA (eds) Critical Systems Thinking. Springer US, pp 11-24. doi:10.1007/978-0-585-34651-9_1
Midgley G (2000) Systemic Intervention: Philosophy, Methodology, Practice. Kluwer Academic, New York
Midgley G, Munlo I, Brown M (1998) The Theory and Practice of Boundary Critique: Developing Housing Services for Older People. The Journal of the Operational Research Society 49 (5):467-478. doi:10.2307/3009885
Migdal J (1994) The state in society: an approach to struggles of domination In: Migdal J, Kohli A, Shue V (eds) State power and social forces: domination and transformation in the Third World Cambridge University Press., New York, pp 7-34
Mikkelsen JH, Langohr R (2004) Indigenous knowledge about soils and a sustainable crop production, a case study from the Guinea Woodland Savannah (Northern Region, Ghana). Geografisk Tidsskrift 104 (2):13-26
Mills CW (1956) The Power Elite. Oxford University Press, New York
Minson J (1980) Strategies for socialists? Foucault's conception of power. Economy and Society 9 (1):1-43
Mitchell T (2002) Rule of Experts: Egypt, Techno-Politics, Modernity. University of California Press, Berkeley
Mohan G (1996) Neoliberalism and decentralised development planning in Ghana. Third World Planning Review 18 (4):433
Morgan J, Waskow D (2013) A new look at climate equity in the UNFCCC. Climate Policy 14 (1):17-22. doi:10.1080/14693062.2014.848096
Morriss P (2002) Power: A Philosophical Analysis. Manchester University Press, Manchester
Morriss P (2006) Steven Lukes on the Concept of Power. Political Studies Review 4:124-135
Moseley W, Schnurr M, Bezner Kerr R (2015) Interrogating the technocratic (neoliberal) agenda for agricultural development and hunger alleviation in Africa. African Geographical Review 34 (1):1-7. doi:10.1080/19376812.2014.1003308
Moss R, Babiker M, Brinkman S, Calvo E, Carter T, Edmonds J, Elgizouli I, Emori S, Erda L, Hibbard K, Jones R, Kainuma M, Kelleher J, Lamarque JF, Manning M, Matthews B, Meehl J, Meyer L, Mitchell J, Nakicenovic N, O'Neill B, Pichs R, Riahi K, Rose S, Runci P, Stouffer R, van Vuuren D, Weyant J, Wilbanks T, Van Ypersele JP, Zurek M (2008) Towards new scenarios for analysis of emissions, climate change, impacts, and response strategies. Technical summary. Geneva
Mosse D (2004) Good Policy Is Unimplementable? Reflections on the Ethnography of Aid Policy and Practice. Development and Change 35 (4):639-671
Muller B (2001) Varieties of Distributive Justice in Climate Change: An Editorial Comment. Climatic Change 48:273-288

Murray Li T (2007) The Will to Improve: Govermentality, Development, and the Practice of Politics. Duke University Press,
Naess LO (2013) The role of local knowledge in adaptation to climate change. Wiley Interdisciplinary Reviews: Climate Change 4 (2):99-106. doi:10.1002/wcc.204
Næss LO (2014) Climate change and agricutlure: lessons from political economy perspectives. Agriculture for Development (22):19-21
Næss LO, Bang G, Eriksen S, Vevatne J (2005) Institutional adaptation to climate change: Flood responses at the municipal level in Norway. Global Environmental Change 15 (2):125-138. doi:http://dx.doi.org/10.1016/j.gloenvcha.2004.10.003
Nagel JH (1975) The descriptive analysis of power. Yale University Press, New Haven, CT.
Nagrah A, Chaudhry AM, Giordano M (2016) Collective Action in Decentralized Irrigation Systems: Evidence from Pakistan. World Development 84:282-298. doi:10.1016/j.worlddev.2016.02.003
Nagy GJ, Seijo L, Verocai JE, Bidegain M (2014) Stakeholders' climate perception and adaptation in coastal Uruguay. International Journal of Climate Change Strategies and Management 6 (1):63-84. doi:10.1108/ijccsm-03-2013-0035
Naim M (2013) The end of power: from boardrooms to battlefields and churches to states, why being in charge isn't what it used to be. Basic Books, New York
Ndamani F, Watanabe T (2015) Farmers' perceptions about adaptation practices to climate change and barriers to adaptation: A micro-level study in Ghana. Water (Switzerland) 7 (9):4593-4604. doi:10.3390/w7094593
Nelson V, Stathers T (2009) Resilience, power, culture, and climate: A case study from semi-arid Tanzania, and new research directions. Gender and Development 17 (1):81-94. doi:10.1080/13552070802696946
Nelson WA, Naambuyi D, Amoah O, Antwi J, Agbey S, Boegriba A, Yaro JA, Bempah J, Boadi O, Azasoo J, Benefoh DT, Kissiedu R (2010) Guidebook on Integrating Climate Change and Disaster Risk Reduction into National Development, Policies and Planning in Ghana. Accra
Neufeldt H, Jahn M, Cambell BM, Beddington J, DeClerck F, De Pinto A, Gulledge J, Hellin J, Herrero M, Jarvis A, LeZaks D, Meinke H, Rosenstock T, Scholes M, Scholes R, Vermeulen S, Wollenberg E, Zougmore R (2013) Beyond climate-smart agriculture: toward safe operating spaces for global food systems. Agriculture & Food Security 2 (12)
Nietzsche F (1967) The Will to Power (trans: Kaufmann W, Hollingdale RJ). Random House Inc, New York
Nijbroek RP (2014) Mangroves, mudbanks and seawalls: Whose environmental knowledge counts when adapting to sea level rise in suriname? Journal of Political Ecology 21 (1):533-550
Nussbaum M (1988) Nature, Function, and Capability: Aristotle on Political Distribution. Oxford Studies in Ancient Philosophy. Oxford University Press,
Nyantakyi-Frimpong H (2013a) Background No. 48 Indigenous knowledge and climate adaptation policy in northern Ghana.
Nyantakyi-Frimpong H (2013b) Backgrounder No. 62 Food Security in Northern Ghana: Policy Issues in Historical and Comtemporary Contexts.
Nyantakyi-Frimpong H, Bezner Kerr R (2014) A political ecology of high-input agriculture in northern Ghana. African Geographical Review 34 (1):13-35. doi:10.1080/19376812.2014.929971
Nye JS (2004) Soft Power: The Means to Success in World Politics. Public Affairs, New York
Nyong A, Adesina F, Elasha BO (2007) The value of indigenous knowledge in climate change mitigation and adaptation strategies in the African Sahel. Mitigation and Adaptation Strategies for Global Change 12 (5):787-797
O'Brien G, O'Keefe P, Meena H, Rose J, Wilson L (2008) Climate adaptation from a poverty perspective. Climate Policy 8 (2):194-201

O'Brien K (2012) Global environmental change II: From adaptation to deliberate transformation. Progress in Human Geography 36 (5):667-676
O'Brien KL, Leichenko RM (2000) Double exposure: assessing the impacts of climate change within the context of economic globalization. Global Environmental Change 10 (3):221-232. doi:http://dx.doi.org/10.1016/S0959-3780(00)00021-2
O'Brien K (2012) Global environmental change II: From adaptation to deliberate transformation. Progress in Human Geography 36 (5):667-676. doi:10.1177/0309132511425767
OECD (2015) Climate finance in 2013-14 and the USD 100 billion goal. Organisation for Economic Cooperation and Development, Climate Policy Initiative, Paris
Oels A (2005) Rendering climate change governable: From biopower to advanced liberal government? Journal of Environmental Policy & Planning 7 (3):185-207. doi:10.1080/15239080500339661
Okereke C (2008) Global justice and neoliberal environmental governance: ethics, sustainable development and international co-operation. Routledge, New York
Okereke C, Bulkeley H, Schroeder H (2009) Conceptualizing Climate Governance Beyond the International Regime. Global Environmental Politics 9 (1):58-78. doi:10.1162/glep.2009.9.1.58
Olesen JE, Chrinda N, Adiku SG (2013) Climate change impacts on crop productivity and possible adaptations in Ghana. Ghana Policy Journal 5 (Special Issue on Climate change in ghana: impacts on agricutlure and the policy implications):40-57
Oliga J (1996) Power, Ideology, and Control. Plenum, New York
Oliver C (1990) Determinants of Interorganizational Relationships: Integration and Future Directions. The Academy of Management Review 15 (2):241-265. doi:10.2307/258156
Olwig MF (2013) Beyond translation: Reconceptualizing the role of local practitioners and the development 'interface'. European Journal of Development Research 25 (3):428-444. doi:10.1057/ejdr.2013.9
Onyango L, Iddrisu Y, Mango J, Kurui Z, Wamubeyi B, Bawayelaaza Nyuor A, Naab B (2012) Village Baseline Study: site analysis report for Lawra-Jirapa, Ghana (GH0108). Copenhagen, Denmark
Osborne N (2015) Intersectionality and kyriarchy: A framework for approaching power and social justice in planning and climate change adaptation. Planning Theory 14 (2):130-151. doi:10.1177/1473095213516443
Osthorst W, Maenz C (2012) Types of cluster adaptation to climate change. Lessons from the port and logistics sector of Northwest Germany. Maritime Policy & Management 39 (2):227-248. doi:10.1080/03088839.2011.650724
Ostrom E (1990) Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press, Cambridge
Ostrom E (2010a) A Multi-Scale Approach to Coping with Climate Change and Other Collective Action Problems. Solutions 1 (2):27-36
Ostrom E (2010b) Polycentric systems for coping with collective action and global environmental change. Global Environmental Change-Human and Policy Dimensions 20 (4):550-557. doi:10.1016/j.gloenvcha.2010.07.004
Oxford Business Group (2012) The Report: Ghana 2012. Accra
Paavola J, Adger WN (2006) Fair adaptation to climate change. Ecological Economics (56):594-609
Paliwoda SJ, Thomson P (1986) Industrial product class and market behavior: a study in the French packaging market. In: Turnbull PW, Paliwoda SJ (eds) Research in international marketing. Croom Helm, London, pp 326-354
Parry M (2009) Climate Change is a Development Issue, and Only Sustainable Development Can Confront the Challenge Climate and Development 1 (1):5-9
Parry M, Rosenzweig C, Iglesias A, Fischer G, Livermore M (1999) Climate change and world food security: a new assessment. Global Environmental Change 9, Supplement 1 (0):S51-S67. doi:http://dx.doi.org/10.1016/S0959-3780(99)00018-7

Parsons RJ (2011) Strengthening Sovereignty: Security and Sustainability in an Era of Climate Change. Sustainability 3 (9):1416-1451. doi:10.3390/su3091416
Parsons T (1967) On the Concept of Political Power: Sociological Theory and Modern Society. Free Press, London
Patt A, Daze A, Suarez P (2009) Gender and climate change vulnerability: what's the problem, what's the solution? In: Ruth M, Ibarraran M (eds) Distributional Impacts of Climate Change and Disasters: Concepts and Cases. Edward Elgar, Cheltenham, pp 82-102
Patt AG, Schröter D (2008) Perceptions of climate risk in Mozambique: Implications for the success of adaptation strategies. Global Environmental Change 18 (3):458-467. doi:http://dx.doi.org/10.1016/j.gloenvcha.2008.04.002
Pattberg P, Widerberg O (2015) Theorising Global Environmental Governance: Key Findings and Future Questions. Millennium - Journal of International Studies 43 (2):684-705. doi:10.1177/0305829814561773
Pauw P, Pegels A (2013) Private sector engagement in climate change adaptation in least developed countries: an exploration. Climate and Development 5 (4):257-267. doi:10.1080/17565529.2013.826130
Pelling M, High C (2005) Understanding adaptation: What can social capital offer assessments of adaptive capacity? Global Environmental Change, Part A: Human and Policy Dimensions 15 (4):308-319
Pelling M, Manuel-Navarrete D (2011) From Resilience to Transformation: the Adaptive Cycle in Two Mexican Urban Centers. Ecology and Society 16 (2)
Perez C, Jones EM, Kristjanson P, Cramer L, Thornton PK, Förch W, Barahona C (2015) How resilient are farming households and communities to a changing climate in Africa? A gender-based perspective. Global Environmental Change 34:95-107. doi:http://dx.doi.org/10.1016/j.gloenvcha.2015.06.003
Persson A (2009) Environmental policy integration and bilateral development assistance: challenges and opportunities with an evolving governance framework. International Environmental Agreements-Politics Law and Economics 9 (4):409-429. doi:10.1007/s10784-009-9110-1
Persson A, Remling E (2014) Equity and efficiency in adaptation finance: initial experiences of the Adaptation Fund. Climate Policy 14 (4):488-506. doi:10.1080/14693062.2013.879514
Pielke RA, Jr., Gwyn P, Rayner S, Sarewitz D (2007) Lifting the Taboo on Adaptation. Nature (445):597-598
Pinkerton E (2015) The role of moral economy in two British Columbia fisheries: confronting neoliberal policies. Marine Policy In Press
Pinkerton E, Davis R (2015) Neoliberalism and the politics of enclosure in North American small-scale fisheries. Marine Policy In Press
Piya L, Joshi NP, Maharjan KL (2015) Vulnerability of Chepang households to climate change and extremes in the Mid-Hills of Nepal. Climatic Change:1-17. doi:10.1007/s10584-015-1572-2
Plange NK (1979) Underdevelopment in northern Ghana: Natural causes or colonial capitalism? Review of African Political Economy 6:4-14
Plaw A (2007) Lukes' Three-Dimensional Model of Power Redux: Is It Still Compelling? (Review Essay). Social Theory and Practice 33 (3)
Polack E (2008) A Right to Adaptation: Securing the Participation of Marginalised Groups. Ids Bulletin-Institute of Development Studies 39 (4):16-+
Polsby NW (1980) Community Power and Political Theory. 2 edn. Yale University Press, New Haven, CT
Popper KR (1962 [1945]) The open society and its enemies. Volume 2: the high tide of prophecy: Hegel, Marx and the
aftermath. Harper Torch Books, New York

Pramova E, Locatelli B, Brockhaus M, Fohlmeister S (2012) Ecosystem services in the National Adaptation Programmes of Action. Climate Policy 12 (4):393-409. doi:10.1080/14693062.2011.647848
Pratt AN, Yu B (2008) IFPRI Discussion Ppaper 00787: An Updated Look at the Recovery of Agricultural Productivity in Sub-Saharan Africa. Washington, D.C.
Prosser J (2011) Visual Methodology: Toward More Seeing in Research. In: Denzin NK, Lincoln YS (eds) Handbook of Qualitative Researth. 4 edn. Sage, Thousand Oaks, CA, pp 479-495
Prys M, Wojczewski T (2015) Rising Powers, NGOs and North-South Relations in Global Climate Governance: The Case of Climate Finance. Politikon 42 (1):93-111. doi:10.1080/02589346.2015.1005794
Putnam R (1995) Turning in, turning out: the strange disappearance of social capital in America. Political Science and Politics 28:667-683
Rademacher-Schulz C, Schraven B, Mahama ES (2013) Time matters: shifting seasonal migration in Northern Ghana in response to rainfall variability and food insecurity. Climate and Development 6 (1):46-52. doi:10.1080/17565529.2013.830955
Ramirez-Villegas J, Challinor AJ, Thornton PK, Jarvis A (2013) Implications of regional improvement in global climate models for agricultural impact research. Environmental Research Letters 8
Raven BH (1965) Social influence and power. In: Steiner I, Fishbein M (eds) Current studies in social psychology. Holt, Rinehart, Winston, New York, pp 371-382
Raven BH (2008) The Bases of Power and the Power/Interaction Model of Interpersonal Influence. Analyses of Social Issues and Public Policy 8 (1):1-22. doi:10.1111/j.1530-2415.2008.00159.x
Rawls J (1971) A Theory of Justice. Harvard University Press, Cambridge, MA
Redclift MR, Manuel-Navarrete D, Pelling M, Redclift MR, ManuelNavarrete D, Pelling M (2011) Governance as process: the evolution of 'power spheres' and climate change. Climate Change and Human Security: The Challenge to Local Governance under Rapid Coastal Urbanization:118-141
Reddy S, Heuty A (2008) Global Development Goals: The Folly of Technocratic Pretensions. Development Policy Review 26 (1):5-28. doi:10.1111/j.1467-7679.2008.00396.x
Reed MS (2008) Stakeholder participation for environmental management: A literature review. Biological Conservation 141:2417-2431
Reid H, Huq S (2014) Mainstreaming community-based adaptation into national and local planning. Climate and Development 6 (4):291-292. doi:10.1080/17565529.2014.973720
Reyes-García V, Aceituno-Mata L, Calvet-Mir L, Garnatje T, Gómez-Baggethun E, Lastra JJ, Ontillera R, Parada M, Rigat M, Vallès J, Vila S, Pardo-de-Santayana M (2014) Resilience of traditional knowledge systems: The case of agricultural knowledge in home gardens of the Iberian Peninsula. Global Environmental Change 24 (0):223-231. doi:http://dx.doi.org/10.1016/j.gloenvcha.2013.11.022
Reyes-García V, Fernández-Llamazares Á, Guèze M, Garcés A, Mallo M, Vila-Gómez M, Vilaseca M (2016) Local indicators of climate change: the potential contribution of local knowledge to climate research. Wiley Interdisciplinary Reviews: Climate Change 7 (1):109-124. doi:10.1002/wcc.374
Ribot JC (1996) Participation without representation: chiefs, councils and forestry law in the West African Sahel. Cultural Survival Quarterly (Fall):40-44
Ribot JC (2003) Democratic decentralisation of natural resources: institutional choice and discretionary power transfers in Sub-Saharan Africa. Public Administration & Development 23 (1):53-53
Ribot JC (2010) Vulnerability Does Not Fall from the Sky: Toward Multiscale, Pro-poor Climate Policy. New Frontiers of Social Policy. Washington, D.C.: World Bank,
Ribot JC (2011) Vulnerability before adaptation: toward transformative climate action. Global Environmental Change (21):1160-1162

Ribot JC (2014) Cause and response: vulnerability and climate in the Anthropocene. Journal of Peasant Studies 41 (5):667-705. doi:10.1080/03066150.2014.894911
Ricci L, Sanou B, Baguian H (2015) Climate risks in West Africa: Bobo-Dioulasso local actors' participatory risks management framework. Current Opinion in Environmental Sustainability 13:42-48. doi:10.1016/j.cosust.2015.01.004
Ringen S (2013) Nation of Devils: Democratic Leadership and the Problem of Obedience. Yale University Press, New Haven
Ringius L, Asbjorn T, Underdahl A (2002) Burden Sharing and Fairness Principles in International Climate Policy. International Environmental Agreements: Politics, Law and Economics 2:1-22
Rittel HWJ, Webber MM (1973) Dilemmas in a General Theory of Planning. Policy Sciences 4:155-169
Ritter T, Gemünden HG (2003) Interorganizational relationships and networks: An overview. Journal of Business Research 56 (9):691-697. doi:http://dx.doi.org/10.1016/S0148-2963(01)00254-5
Robbins P (2002) Obstacles to a First World political ecology? Looking near without looking up. Environment and Planning A (34):1509-1513
Robbins P (2011) Political Ecology: A Critical Introduction. Wiley,
Rodrik D (2010) Diagnostics before Prescription. Journal of Economic Perspectives 24 (3):33-44. doi:doi: 10.1257/jep.24.3.33
Rojas A, Magzul L, Marchildon GP, Reyes B (2009) The oldman river dam conflict: Adaptation and institutional learning. Prairie Forum 34 (1):235-260
Rose A, Kverndokk S (1998) Equity in Environmental Policy: An Application to Global Warming. Handbook on Environmental and Resource Economics. Cheltenham, Elgar
Rousseau J-J (1968 [1762]) The Social Contract (trans: Cranston M). Penguin Books, London
Rowlands J (1997) Questioning Empowerment: Working with Women in Honduras. Oxfam, Oxford
Rowley CK (1999) Rent seeking and rent extraction from the perspective of Africa. In: Mbaku JM, Kimeni MS (eds) Institutions and Collective Choice in Developing Countries: Applications of the Theory of Public Choice. Ashgate Publishing, Brookfield, pp 223-254
Rowley CK (2000) Political culture and economic performance in sub-Saharan Africa. European Journal of Political Economy 16 (1):133-158. doi:http://dx.doi.org/10.1016/S0176-2680(99)00051-8
Russell B (1938) Power: a new social analysis. Allen and Unwin, London
Rydin Y, Pennington M (2000) Public Participation and local environmental planning: the collective action problem and the potential of social capital. Local Environment 5 (2):153-169
Sabatier PA, Jenkins-Smit H (1993) Policy Change and Learning: An Advocacy Coalition Approach. Westview, Boulder, CO
Sager T (2011) Neo-liberal urban planning policies: a literature survey 1990–2010. Progress in Planning 76 (4):147-199
Samaddar S, Yokomatsu M, Dzivenu T, Oteng-Ababio M, Adams MR, Dayour F, Ishikawa H (2014) Assessing rural communities concerns for improved climate change adaptation strategies in Northern Ghana. Journal of Disaster Research 9 (4):529-541
Samoff J (1990) Decentralization: The Politics of Interventionism. Development and Change 21 (3):513-530. doi:10.1111/j.1467-7660.1990.tb00387.x
Sarkar S, Padaria RN, Vijayragavan K, Pathak H, Kumar P, Jha GK (2015) Assessing the potential of indigenous technological knowledge (ITK) for adaptation to climate change in the Himalayan and arid ecosystems. Indian Journal of Traditional Knowledge 14 (2):251-257
Sarpong DB, Anyidoho NA (2012) Working Paper: Climate Change and Agricultural Policy Processes in Ghana.

Sayer A (2012). Power, causality and normativity: a critical realist critique of Foucault 2 (5):179-194
Sayer J, Margules C, Boedhihartono AK, Dale A, Sunderland T, Supriatna J, Saryanthi R (2015) Landscape approaches; what are the pre-conditions for success? Sustainability Science 10 (2):345-355. doi:10.1007/s11625-014-0281-5
Schalatek L, Nakhooda S, Barnard S, Caravani A (2012) Climate Finance Thematic Briefing: Adaptation Finance. Cliamate Finance Fundamentals 3. London, Washington DC
Schipper ELF (2006) Conceptual History of Adaptation in the UNFCCC Process. Review of European Community & International Environmental Law 15 (1):82-92. doi:10.1111/j.1467-9388.2006.00501.x
Schipper ELF (2007) Working Paper 107: Climate Change Adaptation and Development: Exploring the Linkages. Tyndall Centre for Climate Change Research, Norwich, UK.
Schipper ELF, Ayers J, Reid H, Huq S, Rahman A (eds) (2014) Community-Based Adaptation to Climate Change: Scaling it up. Routledge, New York
Schipper ELF, Fencl A, Hoffmaister JP, Osbeck M (2012) Adaptation to Climate Change and Agriculture: What Role for Rural Institutions? CGIAR research Program on Climate Change, Agriculture and Food Security. Stockholm Environment Institute, Cophenhagen
Schlenker W, Lobell DB (2010) Robust negative impacts of climate change on African agriculture. Environmental Research Letters 5 (1):014010
Schliep R, Bertzky M, Hirschnitz M, Stoll-Kleemann S (2008) Changing climate in protected areas? Risk perception of climate change by biosphere reserve managers. Gaia-Ecological Perspectives for Science and Society 17:116-124
Schroeder H, Lovell H (2012) The role of non-nation-state actors and side events in the international climate negotiations. Climate Policy 12 (1):23-37
Schulz K, Siriwardane R (2015) Earth System Governance Working Paper No. 33: Depoliticised and technocratic? Normativity and the politics of transformative adaptation. Lund, Amsterdam
Scoones I, Thompson J (2011) The Politics of Seed in Africa's Green Revolution: Alternative Narratives and Competing Pathways. IDS Bulletin 42 (4):1-23. doi:10.1111/j.1759-5436.2011.00232.x
Scott J (2007) Power, Domination and Stratification: Towards a Conceptual Synthesis. Sociology Problems and Practice (55):25-39
Scott JC (1992) Domination and the Arts of Resistance: Hiddent Transcripts. Yale University Press,
Scott JC (1998) Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed. Yale University, New Haven
Searle JR (2005) What is an institution? Journal of Institutional Economics 1 (1):1-22
Seini AW (2002) Technical Publication (No. 61): Agricultural growth and competitiveness under policy reforms in Ghana. Legon-Accra
Sen A (1985) Commodities and Capabilities. Oxford University Press, New Dehli
Sen A (1989) Development as Capability Expansion. Journal of Development Planning 19:41-58
Sen A (1999) Development as Freedom. Oxford University Press, New York
Sen A (2006) Identity and Violence: The Illusion of Destiny. Norton and Company, New York
Shapiro I (2006) On the Second Edition of Lukes' Third Face. Political Studies Review 4:146-155
Sharma V, Orindi V, Hesse C, Pattison J, Anderson S (2014) Supporting local climate adaptation planning and implementation through local governance and decentralised finance provision. Development in Practice 24 (4):579-590. doi:10.1080/09614524.2014.907240
Sherman MH, Ford J (2014) Stakeholder engagement in adaptation interventions: an evaluation of projects in developing nations. Climate Policy 14 (3):417-441. doi:http://dx.doi.org/10.1080/14693062.2014.859501

Sietz D, Boschütz M, Klein RJT (2011) Mainstreaming climate adaptation into development assistance: rationale, institutional barriers and opportunities in Mozambique. Environmental Science & Policy 14 (4):493-502. doi:http://dx.doi.org/10.1016/j.envsci.2011.01.001
Sikor T (2006) Analyzing Community-based Forestry: Local, Political and Agrarian Perspectives Forest Policy and Economics 8:339-349
Silverman D (2001) Interpreting Qualitative Data: Second Edition. Sage, London
Simon D, Schiemer F (2015) Crossing boundaries: complex systems, transdisciplinarity and applied impact agendas. Current Opinion in Environmental Sustainability 12:6-11. doi:10.1016/j.cosust.2014.08.007
Sinclair K, Curtis A, Mendham E, Mitchell M (2014) Can resilience thinking provide useful insights for those examining efforts to transform contemporary agriculture? Agriculture and Human Values 31 (3):371-384. doi:10.1007/s10460-014-9488-4
Sinevaara-Niskanen H (2015) Vocabularies for human development: Arctic politics and the power of knowledge. Polar Record 51 (2):191-200. doi:10.1017/s0032247413000946
Skelton DR, Limiac CM, Lumkes JH Mechanized agriculture in rural developing countries. In: American Society of Agricultural and Biological Engineers Annual International Meeting 2014, ASABE 2014, 2014. pp 938-945
Skoufias E (2003) Economic crises and natural disasters: coping strategies and policy implications. World Development (31):1087-1102
Smit B, McNabb D, Smithers J (1996) Agricultural adaptation to climatic variation. Climatic Change 33 (1):7-29. doi:10.1007/bf00140511
Smit B, Pilifosova O (2001) Adaptation to climate change in the context of sustainable development and equity. Climate Change 2001: Impacts, Adaptation, and Vulnerability - Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press
Smit B, Wandel J (2006) Adaptaton, Adaptive Capacity and Vulnerability. Global Environmental Change 16 (3):282-282
Sova CA, Chaudhury AS (2013) State of agricultural climate change adaptation policy in Nepal. CGIAR research program on Climate Change, Agriculture and Food Security (CCAFS), vol Working Paper No. 44. Copenhagen, Denmark
Sova CA, Chaudhury AS, Helfgott A, Corner-Dolloff C (2012) Community-based adaptation costing: an integrated framework for the participatory costing of community-based adaptations to climate change in agriculture. Working Paper No. 16. Copenhagen, Denmark
Sova CA, Chaudhury AS, Nelson WA, Nutsukpo DK (2014) Climate Change Adaptation Policy in Ghana: Priorities for the Agriculture Sector. Working Paper No. 68. Copenhagen, Denmark
Sova CA, Helfgott A, Chaudhury AS, Matthews D, Thornton TF, Vermeulen S (2015a) Multi-level Stakeholder Influence Mapping: Visualizing Power Relations Across Actor Levels in Nepal's Agricultural Climate Change Adaptation Regime. Systemic Practice and Action Research 28 (4):383-409. doi:10.1007/s11213-014-9335-y
Sova CA, Thornton TF, Zougmore R, Helfgott A, Chaudhury AS (2016) Power and influence mapping in Ghana's agricultural adaptation policy regime. Climate and Development (Online First)
Sova CA, Vervoort J, Thornton T, Helfgott A, Matthews D, Chaudhury A (2015b) Exploring farmer preference shaping in international agricultural climate change adaptation regimes. Environmental Science & Policy 54:463-474. doi:http://dx.doi.org/10.1016/j.envsci.2015.08.008
Sovacool BK (2011) Hard and soft paths for climate change adaptation. Climate Policy 11 (4):1177-1183. doi:10.1080/14693062.2011.579315
Spires M, Shackleton S, Cundill G (2014) Barriers to implementing planned community-based adaptation in developing countries: a systematic literature review. Climate and Development 6 (3):277-287. doi:10.1080/17565529.2014.886995

Sprinz DF (2001) Domestic Politics and Global Climate Policy. In: Luterbacher U, Sprinz DF (eds) International Relations and Global Climate Change. MIT Press, Cambridge, MA,
Stephan B, Rothe D, Methmann C (2014) Third Side of the Coin: Hegemony and Governmentality in Global Climate Politics. In: Stripple J, Bulkeley H (eds) Governing the Climate. New Approches to Rationality, Power and Politics. Cambridge University Press, New York,
Steward JH (1972) Theory of Culture Change: The Methodology of Multilinear Evolution. University of Illinois Press, Urbana
Stiglitz J (2000) Knowledge infrastructure and the localisation of knowledge. Banking on knowledge: the genesis of the Global Development Network London: Routledge:24-43
Stocker L, Burke G, Kennedy D, Wood D (2012) Sustainability and climate adaptation: Using Google Earth to engage stakeholders. Ecological Economics 80:15-24. doi:10.1016/j.ecolecon.2012.04.024
Stott C, Huq S (2014) Knowledge flows in climate change adaptation: exploring friction between scales. Climate and Development 6 (4):382-387. doi:10.1080/17565529.2014.951014
Strauch AM, Rurai MT, Almedom AM (2016) Influence of forest management systems on natural resource use and provision of ecosystem services in Tanzania. Journal of Environmental Management 180:35-44. doi:10.1016/j.jenvman.2016.05.004
Streck C (2001) The Global Environment Facility: A Role Model for Global Governance? Global Environmental Politics 1:17-18
Sudhipongpracha T, Wongpredee A (2016) Decentralizing decentralized governance: Community empowerment and coproduction of municipal public works in Northeast Thailand. Community Development Journal 51 (2):302-319. doi:10.1093/cdj/bsv026
Sultana F (2014) Gendering Climate Change: Geographical Insights. Professional Geographer 66 (3):372-381. doi:10.1080/00330124.2013.821730
Swyngedouw E (2011) Depoliticized Environments: The End of Nature, Climate Change and the Post-Political Condition. Royal Institute of Philosophy Supplement 69:253-274
Tachie-Obeng E, Akponikpè PBI, Adiku S (2013) Considering effective adaptation options to impacts of climate change for maize production in Ghana. Environmental Development 5 (1):131-145. doi:10.1016/j.envdev.2012.11.008
Takakura H (2015) Limits of pastoral adaptation to permafrost regions caused by climate change among the Sakha people in the middle basin of Lena River. Polar Science. doi:http://dx.doi.org/10.1016/j.polar.2016.04.003
Tan Y, Liu X, Hugo G (2015) Exploring relationship between social inequality and adaptations to climate change: evidence from urban household surveys in the Yangtze River delta, China. Population and Environment 36 (4):400-428. doi:10.1007/s11111-014-0223-2
Tan Z, Tieszen LL, Liu S, Tachie-Obeng E (2010) Modeling to evaluate the response of savanna-derived cropland to warming-drying stress and nitrogen fertilizers. Climatic Change 100 (3):703-715. doi:10.1007/s10584-009-9688-x
Tanner T, Allouche J (2011) Towards a New Political Economy of Climate Change and Development. Ids Bulletin-Institute of Development Studies 42 (3):1-14. doi:10.1111/j.1759-5436.2011.00217.x
Tanner T, Lewis D, Wrathall DJ, Bronen R, Cradock-Henry N, Huq S, Lawless C, Nawrotzki R, Prasad V, Rahman A, Alaniz R, King K, Mcnamara K, Nadiruzzaman MD, Henly-Shepard S, Thomalla F (2015) Livelihood resilience in the face of climate change. Nature Climate Change 5:23-26
Taylor M (2013) Climate change, relational vulnerability and human security: rethinking sustainable adaptation in agrarian environments. Climate and Development 5 (4):318-327. doi:10.1080/17565529.2013.830954

Terhalle M, Depledge J (2013) Great-power politics, order transition, and climate governance: insights from international relations theory. Climate Policy 13 (5):572-588. doi:10.1080/14693062.2013.818849
Thomas DSG, Twyman C (2005) Equity and justice in climate change adaptation amongst natural-resource-dependent societies. Global Environmental Change 15 (2):115-124. doi:http://dx.doi.org/10.1016/j.gloenvcha.2004.10.001
Thorn J, Thornton TF, Helfgott A (2015) Autonomous adaptation to global environmental change in peri-urban settlements: Evidence of a growing culture of innovation and revitalisation in Mathare Valley Slums, Nairobi. Global Environmental Change 31 (0):121-131. doi:http://dx.doi.org/10.1016/j.gloenvcha.2014.12.009
Thornton TF, Comberti C (2013) Synergies and trade-offs between adaptation, mitigation and development. Climatic Change
Thornton TF, Manasfi N (2010) Adaptation - Genuine and Spurious: Demystifying Adaptation Processes in Relation to Climate Change. Environment and Society: Advances in Research 1 (1):132-155. doi:10.3167/ares.2010.010107
Tompkins EL, Adger WN (2004) Does adaptive managment of natural resources enhance reslience to climate change? Ecology and Society 9 (2)
Tompkins EL, Adger WN, Boyd E, Nicholson-Cole S, Weatherhead K, Arnell N (2010) Observed adaptation to climate change: UK evidence of transition to a well-adapting society. Global Environmental Change 20 (4):627–635
Tracy SJ (2013) Qualitative Research Methods: Collecting Evidence, Crafting Analysis, Communicating Impact. Wiley-Blackwell,
Treby EJ, Clark M (2004) Refining a practical approach to participatory decision making: an example from coastal zone management. Coastal Management (32):353-372
Tremblay MA (1957) The key informant technique: a nonethnographic application. American Anthropologist 59:688-701
Tschakert P, Dietrich KA (2010) Anticipatory Learning for Climate Change Adaptation and Resilience. Ecology and Society 15 (2)
Tschakert P, Sagoe R, Ofori-Darko G, Codjoe SN (2010) Floods in the Sahel: An analysis of anomalies, memory, and anticipatory learning. Climatic Change 103 (3):471-502. doi:10.1007/s10584-009-9776-y
Turner M, Hulme D (1997) Governance, Administration and Development: Making the State Work. Macmillan, London
Ulrich W (1983) Critical Heuristics of Social Planning: A New Approach to Practical Philosophy Paul Haupt, Bern, Switzerland and Stuttgart, Germany
Ulrich W (1987) Critical heuristics of social systems design. European Journal of Operational Research (31):276-283
Ulrich W (2003) Beyond Methodology Choice: Critical Systems Thinking as Critically Systemic Discourse. The Journal of the Operational Research Society 54 (4):325-342. doi:10.2307/4101702
UNFCCC (1992) United Nations Framework Convention on Climate Change. United Nations
UNFCCC (2012) National Adaptation Plans: Technical Guidelines for the National Adaptation Plan Process.
UNFCCC (2013) The State of Adaptation under the United Nations Framework Convention on Climate Change.
Urwin K, Jordan A (2008) Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance. Global Environmental Change 18 (1):180-191. doi:http://dx.doi.org/10.1016/j.gloenvcha.2007.08.002
van der Geest K (2011) North-South Migration in Ghana: What Role for the Environment? International Migration 49:e69-e94. doi:10.1111/j.1468-2435.2010.00645.x
Van Donge JK (2007) Flexible SWAps for Strategic Policy-making: Reflections on the Zambian Experience. Development Policy Review 25 (4):473-494. doi:10.1111/j.1467-7679.2007.00381.x
van Gigch JP (2003) Metadecisions: Rehabilitating Epistemology. Kluwer, New York

Vayda AP, Walters BB (1999) Against political ecology. Human Ecology 27:167-179
Vergara LG (2013) Elites, political elites and social change in modern societies. Revista de Sociologia (28):31-49
Vermeulen S, Aggarwal PK, Ainslie A, Angelone C, Cambell BM, Challinor AJ, Hansen JW, Ingram JSI, Jarvis A, Kristjanson P, Lau C, Nelson GC, Thornton PK, Wollenberg E (2012a) Options for Support to Agriculture and Food Security Under Climate Change. Environmental Science and Policy (15):136-144
Vermeulen SJ, Campbell BM, Ingram JSI (2012b) Climate Change and Food Systems. Annual Review of Environment and Resources 37 (1):195-222. doi:10.1146/annurev-environ-020411-130608
Vermeulen SJ, Challinor AJ, Thornton PK, Campbell BM, Eriyagama N, Vervoort JM, Kinyangi J, Jarvis A, Läderach P, Ramirez-Villegas J, Nicklin KJ, Hawkins E, Smith DR (2013) Addressing uncertainty in adaptation planning for agriculture. Proceedings of the National Academy of Sciences 110 (21):8357-8362. doi:10.1073/pnas.1219441110
Vervoort J, Bourgeois R, Ericksen P, Kok K, Thornton P, Foerch W, Chaudhury M, Kristjanson P (2013) Linking multi-actor futures for food systems and environmental governance. Paper presented at the Earth Systems Governance Tokyo Conference: Complex Architecture, Multiple Agents, Tokyo,
Vincent K (2007) Uncertainty in adaptive capacity and the importance of scale. Global Environmental Change 17 (1):12-24. doi:http://dx.doi.org/10.1016/j.gloenvcha.2006.11.009
Vincent K, Cull T, Chanika D, Hamazakaza P, Joubert A, Macome E, Mutonhodza-Davies C (2013) Farmers' responses to climate variability and change in southern Africa – is it coping or adaptation? Climate and Development 5 (3):194-205. doi:10.1080/17565529.2013.821052
Vink MJ, Dewulf A, Termeer C (2013) The role of knowledge and power in climate change adaptation governance: A systematic literature review. Ecology and Society 18 (4). doi:10.5751/ES-05897-180446
Wainwright J (2010) Climate Change, Capitalism, and the Challenge of Transdisciplinarity. Annals of the Association of American Geographers 100 (4):983-991. doi:10.2307/40863617
Wainwright J, Mann G (2015) Climate Change and the Adaptation of the Political. Annals of the Association of American Geographers 105 (2):313-321. doi:10.1080/00045608.2014.973807
Walker P (2006) Political ecology: where is the policy? Progress in Human Geography 30:382-395
Wallace A (1956) Revitalization Movements. American Anthropologist (58):264-281
Warren C, Visser L (2016) The Local Turn: an Introductory Essay Revisiting Leadership, Elite Capture and Good Governance in Indonesian Conservation and Development Programs. Human Ecology:1-10. doi:10.1007/s10745-016-9831-z
WaterAid (2015) Climate finance and water security: What are the opportunities for increased WASH financing? London
Webb J, Schirato T, Danaher G (2002) Understanding Bourdieu. SAGE Publications, London
Weber M (1978 [1922]) Economy and Society. California University Press, Berkeley
Weiler F (2012) Determinants of bargaining success in the climate change negotiations. Climate Policy 12 (5):552-574
Weis T (2007) The global food economy: the battle for the future of farming. Fernwood, Halifax
Wheeler S, Zuo A, Bjornlund H (2013) Farmers' climate change beliefs and adaptation strategies for a water scarce future in Australia. Global Environmental Change 23 (2):537-547. doi:http://dx.doi.org/10.1016/j.gloenvcha.2012.11.008
Whitehead M (2013) Neoliberal Urban Environmentalism and the Adaptive City: Towards a Critical Urban Theory and Climate Change. Urban Studies 50 (7):1348-1367. doi:10.1177/0042098013480965

Wilbanks TJ (2015) Putting "Place" in a multiscale context: Perspectives from the sustainability sciences. Environmental Science and Policy 53:70-79. doi:10.1016/j.envsci.2015.04.009
Wild L, Booth D, Cummings C, Foresti M, Wales J (2015) Adapting Development: Improving services to the poor. London
Wilson G (2006) Beyond the technocrat? The professional expert in development practice. Development and Change 37 (3):501-523
Wittgenstein L (2006 [1953]) Filosofische onderzoekingen. Serie grote klassieken. Boom Uitgeverij, Amsterdam
Wolf ER (1999) Envisioning Power: Ideologies of Dominance and Crisis. University of California Press, London
Wolf ER (2001) Pathways of Power: Building an Anthropology of the Modern World. University of California Press, London
Wolfinger RE (1974) The Politics of Progress. Prentice-Hall, Englewood Cliffs, NJ
Wong S (2010) Working Paper 82: Elite capture or capture elites? Lessons from the 'counter-elite' and 'co-opt elite' approaches in Bangladesh and Ghana. . World Institute for Development Economics Research,,
Wossen T, Berger T (2015) Climate variability, food security and poverty: Agent-based assessment of policy options for farm households in Northern Ghana. Environmental Science & Policy 47 (0):95-107. doi:http://dx.doi.org/10.1016/j.envsci.2014.11.009
Wossen T, Berger T, Swamikannu N, Ramilan T (2014) Climate variability, consumption risk and poverty in semi-arid Northern Ghana: Adaptation options for poor farm households. Environmental Development 12:2-15. doi:10.1016/j.envdev.2014.07.003
Wrathall DJ, Bury J, Carey M, Mark B, McKenzie J, Young K, Baraer M, French A, Rampini C (2014) Migration Amidst Climate Rigidity Traps: Resource Politics and Social-Ecological Possibilism in Honduras and Peru. Annals of the Association of American Geographers 104 (2):292-304. doi:10.1080/00045608.2013.873326
Wright H, Vermeulen S, Laganda G, Olupot M, Ampaire E, Jat ML (2014) Farmers, food and climate change: ensuring community-based adaptation is mainstreamed into agricultural programmes. Climate and Development 6 (4):318-328. doi:10.1080/17565529.2014.965654
Yaro JA, Teye J, Bawakyillenuo S (2014) Local institutions and adaptive capacity to climate change/variability in the northern savannah of Ghana. Climate and Development:1-11. doi:10.1080/17565529.2014.951018
Yates JS (2012) Uneven interventions and the scalar politics of governing livelihood adaptation in rural Nepal. Global Environmental Change 22 (2):537-546. doi:http://dx.doi.org/10.1016/j.gloenvcha.2012.01.007
Young C (1994) The African Colonial State in Comparative Perspective. Yale University Press, New Haven, CT
Young OR (2002) The Institutional Dimensions of Environmental Change: Fit, Interplay, and Scale. MIT Press, Cambridge, Massachusetts
Young OR (2012) On Environmental Governance: Sustainability, Efficiency, and Equity. On Politics. Paradigm Publishers,
Yukl G (1998) Leadership in Organizations. Prentice-Hall, Syndey
Zahariadis N (2014) Ambiguity and Multiple Streams. In: Sabatier PA, Weible CM (eds) Theories of the Policy Process: Third Edition. Westview Press, Boulder, CO,
Ziervogel G, Ericksen PJ (2010) Adapting to Climate Change to Sustain Food Security. Wiley Interdisciplinary Reviews: Climate Change (1):1757–7799
Zougmore R (2014) Climate smart agriculture integrated into decision-making in Ghana. CCAFS News Blog, vol 2014. CGIAR Research Progam on Climate Change, Agriculture and Food Security

# Annexes

**Annex 1: Systematic review of 'power' in climate change adaptation (Literature Review)**

| Author | Year | Title | Journal | Explicit or Implicit Power | Sector | Theme | Country status |
|---|---|---|---|---|---|---|---|
| L. O. Naess, G. Bang, S. Eriksen and J. Vevatne | 2005 | Institutional adaptation to climate change: Flood responses at the municipal level in Norway | Global Environmental Change | Implicit | Water | Social capital, institutions | Developed (Norway) |
| R. Few, K. Brown and E. L. Tompkins | 2007 | Public participation and climate change adaptation: Avoiding the illusion of inclusion | Climate Policy | Implicit | Coastal Management | Stakeholder participation | Developed (United Kingdom) |
| E. Polack | 2008 | A Right to Adaptation: Securing the Participation of Marginalised Groups | Ids Bulletin-Institute of Development Studies | Implicit | Undefined | Stakeholder participation, international negotiations | Global |
| R. Schliep, M. Bertzky, M. Hirschnitz and S. Stoll-Kleemann | 2008 | Changing climate in protected areas? Risk perception of climate change by biosphere reserve managers | Gaia-Ecological Perspectives for Science and Society | Implicit | Biodiversity conservation/Protected areas | International Negotiations | Global |
| E. Boyd and S. Juhola | 2009 | Stepping up to the climate change: opportunities in re-conceptualizing development futures | Journal of International Development | Implicit | Undefined | International Negotiations | Global |
| S. Eriksen and J. Lind | 2009 | Adaptation as a Political Process: Adjusting to Drought and Conflict in Kenya's Drylands | Environmental Management | Explicit | Drought and Conflict | Social capital | Developing (Kenya) |
| N. Kuruppu | 2009 | Adapting water resources to climate change in Kiribati: the importance of cultural values and meanings | Environmental Science & Policy | Implicit | Water | Stakeholder participation, social capital | Developing (Kiribati) |
| J. McGee and R. Taplin | 2009 | The role of the Asia Pacific Partnership in discursive contestation of the international climate regime | International Environmental Agreements-Politics Law and Economics | Implicit | Undefined | International Negotiations | Developed (multiple) |
| V. Nelson and T. Stathers | 2009 | Resilience, power, culture, and climate: A case study from semi-arid Tanzania, and new research directions | Gender and Development | Implicit | Agriculture | Gender | Developing (Tanzania) |
| A. Persson | 2009 | Environmental policy integration and bilateral development assistance: challenges and opportunities with an evolving governance framework | International Environmental Agreements-Politics Law and Economics | Implicit | Undefined | International Negotiations | Global |
| A. Rojas, L. Magzul, | 2009 | The oldman river dam conflict: Adaptation and institutional | Prairie Forum | Implicit | Water | Stakeholder | Developed |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| G. P. Marchildon and B. Reyes | | learning | | | | participation | (Canada) |
| F. Fortier | 2010 | Taking a climate chance: A procedural critique of Vietnam's climate change strategy | Asia Pacific Viewpoint | Implicit | Undefined | Stakeholder participation | Developing (Vietnam) |
| D. Manuel-Navarrete | 2010 | Power, realism, and the ideal of human emancipation in a climate of change | Wiley Interdisciplinary Reviews-Climate Change | Implicit | Undefined | International negotiations, knowledge and ideology | Global |
| A. M. McCright and R. E. Dunlap | 2010 | Anti-reflexivity The American Conservative Movement's Success in Undermining Climate Science and Policy | Theory Culture & Society | Explicit | Undefined | Other (Non-decision making) | Developed (United States) |
| P. Tschakert and K. A. Dietrich | 2010 | Anticipatory Learning for Climate Change Adaptation and Resilience | Ecology and Society | Implicit | Undefined | Social capital | Developing ("Africa") |
| J. Ayers, N. Kaur and S. Anderson | 2011 | Negotiating Climate Resilience in Nepal | Ids Bulletin-Institute of Development Studies | Implicit | Undefined | Knowledge and ideologies | Developing (Nepal) |
| G. Berardi, R. Green and B. Hammond | 2011 | Stability, sustainability, and catastrophe: Applying resilience thinking to U. S. agriculture | Human Ecology Review | Implicit | Agriculture | Knowledge and ideology | Developed (United States) |
| H. Djoudi and M. Brockhaus | 2011 | Is adaptation to climate change gender neutral? Lessons from communities dependent on livestock and forests in northern Mali | International Forestry Review | Implicit | Agriculture/Forestry | Gender | Developing (Mali) |
| M. Grasso | 2011 | The role of justice in the North-South conflict in climate change: the case of negotiations on the Adaptation Fund | International Environmental Agreements-Politics Law and Economics | Implicit | Undefined | International Negotiations | Global |
| I. P. Holman and P. Trawick | 2011 | Developing adaptive capacity within groundwater abstraction management systems | Journal of Environmental Management | Implicit | Water | Social capital | Developed (United Kingdom) |
| A. J. Leys and J. K. Vanclay | 2011 | Social learning: A knowledge and capacity building approach for adaptive co-management of contested landscapes | Land Use Policy | Implicit | Forestry | Knowledge and ideologies, social capital | Developed (Australia) |
| P. McLaughlin | 2011 | Climate Change, Adaptation, and Vulnerability: Reconceptualizing Societal-Environment Interaction Within a Socially Constructed Adaptive Landscape | Organization & Environment | Implicit | Undefined | Knowledge and ideologies, social capital | Global |
| R. J. Parsons | 2011 | Strengthening Sovereignty: Security and Sustainability in an Era of Climate Change | Sustainability | Implicit | Flooding/ice cap melt | International Negotiations | Developing (Pakistan) |
| M. Pelling and D. Manuel-Navarrete | 2011 | From Resilience to Transformation: the Adaptive Cycle in Two Mexican Urban Centers | Ecology and Society | Explicit | Coastal Management | Knowledge and ideologies | Developing (Mexico) |
| M. R. Redclift, D. Manuel-Navarrete, M. | 2011 | Governance as process: the evolution of 'power spheres' and climate change | Climate Change and Human | Explicit | Tourism | Other 'powersphere' | Developing (Mexico) |

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|---|---|---|---|---|---|---|---|
| Pelling | | | Security | | | | |
| T. Tanner and J. Allouche | 2011 | Towards a New Political Economy of Climate Change and Development | Ids Bulletin-Institute of Development Studies | Explicit | Undefined | Knowledge and ideologies | Global |
| B. Haalboom and D. C. Natcher | 2012 | The Power and Peril of "Vulnerability": Approaching Community Labels with Caution in Climate Change Research | Arctic | Implicit | Undefined | Stakeholder participation | Global (Northern Indigenous peoples) |
| B. Harvey, D. Burns and K. Oswald | 2012 | Linking Community, Radio, and Action Research on Climate Change: Reflections on a Systemic Approach | Ids Bulletin-Institute of Development Studies | Implicit | Undefined | Knowledge and ideologies, stakeholder participation | Developing (Ghana) |
| T. Luthe, R. Wyss and M. Schuckert | 2012 | Network governance and regional resilience to climate change: empirical evidence from mountain tourism communities in the Swiss Gotthard region | Regional Environmental Change | Implicit | Tourism | Social capital | Developed (Switzerland) |
| W. Osthorst and C. Maenz | 2012 | Types of cluster adaptation to climate change. Lessons from the port and logistics sector of Northwest Germany | Maritime Policy & Management | Implicit | Ports | Social capital | Developed (Northern Europe) |
| L. Stocker, G. Burke, D. Kennedy and D. Wood | 2012 | Sustainability and climate adaptation: Using Google Earth to engage stakeholders | Ecological Economics | Implicit | Coastal Management | Knowledge and ideologies | Developed (Australia) |
| J. S. Yates | 2012 | Uneven interventions and the scalar politics of governing livelihood adaptation in rural Nepal | Global Environmental Change-Human and Policy Dimensions | Implicit | Undefined | Social capital, knowledge and ideology, institutions | Developing (Nepal) |
| B. Bee | 2013 | Who reaps what is sown? A feminist inquiry into climate change adaptation in two Mexican ejidos | ACME | Explicit | Undefined | Gender | Developing (Mexico) |
| P. Bond | 2013 | Water rights, commons and advocacy narratives | South African Journal on Human Rights | Implicit | Water | Knowledge and ideology | Developed (South Africa) |
| P. Cochran, O. H. Huntington, C. Pungowiyi, S. Tom, F. S. Chapin Iii, H. P. Huntington, N. G. Maynard and S. F. Trainor | 2013 | Indigenous frameworks for observing and responding to climate change in Alaska | Climatic Change | Implicit | Undefined | Stakeholder participation, knowledge and ideology | Global (Northern Indigenous peoples) |
| S. Cousins | 2013 | UN Security Council: Playing a role in the international climate change regime? | Global Change, Peace and Security | Implicit | Undefined | International Negotiations | Global |
| H. Djoudi, M. Brockhaus and B. Locatelli | 2013 | Once there was a lake: vulnerability to environmental changes in northern Mali | Regional Environmental Change | Implicit | Foresty, Livestock | Social capital | Developing (Mali) |

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|---|---|---|---|---|---|---|---|
| K. Edvardsson Bj√∂rnberg and S. O. Hansson | 2013 | Gendering local climate adaptation | Local Environment | Implicit | Undefined | Gender | Global |
| R. Friend and M. Moench | 2013 | What is the purpose of urban climate resilience? Implications for addressing poverty and vulnerability | Urban Climate | Implicit | Undefined | Other (resilience) | Developing (Asia) |
| S. Gabrielsson and V. Ramasar | 2013 | Widows: agents of change in a climate of water uncertainty | Journal of Cleaner Production | Implicit | Water | Social capital | Developing (Kenya) |
| J. C. Gaillard, C. Monteil, A. Perrillat-Collomb, S. Chaudhary, M. Chaudhary, O. Chaudhary, F. Giazzi and J. R. D. Cadag | 2013 | Participatory 3-dimension mapping: A tool for encouraging multi-caste collaboration to climate change adaptation and disaster risk reduction | Applied Geography | Explicit | Flooding | Social capital, Institutions | Developing (Nepal) |
| M. D. Gerst, P. Wang, A. Roventini, G. Fagiolo, G. Dosi, R. B. Howarth and M. E. Borsuk | 2013 | Agent-based modeling of climate policy: An introduction to the ENGAGE multi-level model framework | Environmental Modelling & Software | Implicit | Undefined | International Negotiations | Global |
| A. Lof | 2013 | Examining limits and barriers to climate change adaptation in an Indigenous reindeer herding community | Climate and Development | Implicit | Herding | Social capital | Developed (Sweden) |
| L. O. Naess | 2013 | The role of local knowledge in adaptation to climate change | Wiley Interdisciplinary Reviews: Climate Change | Implicit | Undefined | Knowledge and ideologies, institutions | Developing (Tanzania) |
| M. Taylor | 2013 | Climate change, relational vulnerability and human security: rethinking sustainable adaptation in agrarian environments | Climate and Development | Implicit | Agriculture | Social capital | Developing (India) |
| M. J. Vink, A. Dewulf and C. Termeer | 2013 | The role of knowledge and power in climate change adaptation governance: A systematic literature review | Ecology and Society | Explicit | Undefined | Knowledge and ideologies | Gobal |
| M. Whitehead | 2013 | Neoliberal Urban Environmentalism and the Adaptive City: Towards a Critical Urban Theory and Climate Change | Urban Studies | Implicit | Urban Adaptation | Knowledge and ideology | Global |
| A. Arnall | 2014 | A climate of control: Flooding, displacement and planned resettlement in the Lower Zambezi River valley, Mozambique | Geographical Journal | Explicit | Flooding/resettlement | Knowledge and ideologies | Developing (Mozambique) |
| A. Bahadur and T. Tanner | 2014 | Transformational resilience thinking: Putting people, power and politics at the heart of urban climate resilience | Environment and Urbanization | Implicit | Undefined | Other (resilience) | Developing (India) |
| S. Blackburn | 2014 | The politics of scale and disaster risk governance: Barriers to decentralisation in Portland, Jamaica | Geoforum | Implicit | Disaster Risk Reduction | Institutions | Developing (Jamaica) |

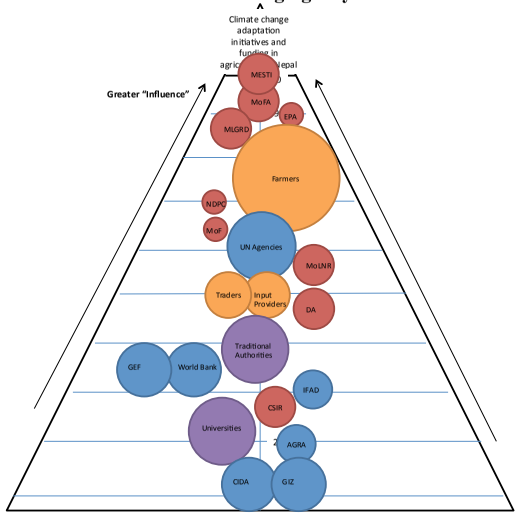
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|---|---|---|---|---|---|---|---|
| E. Boyd, J. Ensor, V. C. Broto and S. Juhola | 2014 | Environmentalities of urban climate governance in Maputo, Mozambique | Global Environmental Change-Human and Policy Dimensions | Explicit | Cities | Knowledge and ideologies, social capital, Institutional | Developing (Mozambique) |
| L. Brottem | 2014 | Hosts, strangers and the tenure politics of livestock corridors in Mali | Africa | Implicit | Agriculture | Social capital | Developing (Mali) |
| M. A. Caretta | 2014 | Credit plus microcredit schemes: a key to women's adaptive capacity | Climate and Development | Implicit | Agriculture | Gender | Developing (Kenya) |
| B. C. Chaffin, H. Gosnell and B. A. Cosens | 2014 | A decade of adaptive governance scholarship: synthesis and future directions | Ecology and Society | Implicit | Undefined | Instituitons | Global |
| C. Coirolo and A. Rahman | 2014 | Power and differential climate change vulnerability among extremely poor people in Northwest Bangladesh: lessons for mainstreaming | Climate and Development | Explicit | Undefined | Social capital | Developing (Bangladesh) |
| I. d. A. Corneloup and A. P. J. Mol | 2014 | Small island developing states and international climate change negotiations: the power of moral "leadership" | International Environmental Agreements-Politics Law and Economics | Implicit | Undefined | International Negotiations | Developing (SIDS) |
| M. E. Filippi, M. Hordijk, J. Alegra and J. D. Rojas | 2014 | Knowledge integration: A step forward? Continuities and changes in Arequipa‚Äôs water governance system | Environment and Urbanization | Implicit | Water | Stakeholder Participation, Knowledge and ideologies | Developing (Peru) |
| K. J. Grove | 2014 | Adaptation Machines and the Parasitic Politics of Life in Jamaican Disaster Resilience | Antipode | Implicit | Disaster Risk Reduction | Knowledge and ideologies | Developing (Jamaica) |
| M. Maekawa | 2014 | Effective Environmental Regimes in East Asia for Climate Change and Environmental Security | The Journal of Peace Studies | Implicit | Undefined | International Negotiations | Developing (Asia) |
| G. J. Nagy, L. Seijo, J. E. Verocai and M. Bidegain | 2014 | Stakeholders' climate perception and adaptation in coastal Uruguay | International Journal of Climate Change Strategies and Management | Implicit | Coastal Management | Stakeholder Participation, Knowledge and ideology, social capital | Developing (Uruguay) |
| R. P. Nijbroek | 2014 | Mangroves, mudbanks and seawalls: Whose environmental knowledge counts when adapting to sea level rise in suriname? | Journal of Political Ecology | Implicit | Coastal Management | Knowledge and ideologies | Developing (Suriname) |
| J. Ribot | 2014 | Cause and response: vulnerability and climate in the Anthropocene | Journal of Peasant Studies | Implicit | Undefined | Social capital | Global |
| P. Romero-Lankao, S. Hughes, H. Qin, J. Hardoy, A. Rosas-Huerta, R. Borquez and A. Lampis | 2014 | Scale, urban risk and adaptation capacity in neighborhoods of Latin American cities | Habitat International | Implicit | Urban Adaptation | Other (state power) | Developing (Latin America) |

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|---|---|---|---|---|---|---|---|
| K. Sinclair, A. Curtis, E. Mendham and M. Mitchell | 2014 | Can resilience thinking provide useful insights for those examining efforts to transform contemporary agriculture? | Agriculture and Human Values | Implicit | Agriculture | Institutions | Developed (Australia) |
| C. Stott and S. Huq | 2014 | Knowledge flows in climate change adaptation: exploring friction between scales | Climate and Development | Implicit | Undefined | Knowledge and ideologies | Developing (Bangladesh) |
| F. Sultana | 2014 | Gendering Climate Change: Geographical Insights | Professional Geographer | Implicit | Undefined | Gender | Developing (Asia) |
| D. J. Wrathall, J. Bury, M. Carey, B. Mark, J. McKenzie, K. Young, M. Baraer, A. French and C. Rampini | 2014 | Migration Amidst Climate Rigidity Traps: Resource Politics and Social-Ecological Possibilism in Honduras and Peru | Annals of the Association of American Geographers | Implicit | Migration | Social capital | Developing (Peru, Honduras) |
| D. Armitage, R. C. de Loe, M. Morris, T. W. D. Edwards, A. K. Gerlak, R. I. Hall, D. Huitema, R. Ison, D. Livingstone, G. MacDonald, N. Mirumachi, R. Plummer and B. B. Wolfe | 2015 | Science-policy processes for transboundary water governance | Ambio | Implicit | Water (transboundary basins) | International Negotiations | Global |
| A. J. Barnett and H. C. Eakin | 2015 | We and us, not I and me: Justice, social capital, and household vulnerability in a Nova Scotia fishery | Applied Geography | Implicit | Fisheries | Instituitons, Social Capital | Developed (Canada) |
| K. J. Bowen, F. P. Miller, V. Dany and S. Graham | 2015 | The relevance of a coproductive capacity framework to climate change adaptation: Investigating the health and water sectors in Cambodia | Ecology and Society | Implicit | Water and Health | Knowledge and ideologies, International negotiations | Developing (Cambodia) |
| F. S. Chapin, III, M. Sommerkorn, M. D. Robards and K. Hillmer-Pegram | 2015 | Ecosystem stewardship: A resilience framework for arctic conservation | Global Environmental Change | Implicit | Biodiversity | Knowledge and ideologies, social capital | Global ("Arctic") |
| K. Intemann | 2015 | Distinguishing between legitimate and illegitimate values in climate modeling | European Journal for Philosophy of Science | Implicit | Undefined | Knowledge and ideologies | Global |
| M. S. Islam and S. H. Lim | 2015 | When "Nature" strikes: A sociology of climate change and disaster vulnerabilities in Asia | Nature and Culture | Implicit | Disaster Risk Reduction | Knowledge and ideologies | Developing (Asia) |
| M. C. Lemos | 2015 | Usable climate knowledge for adaptive and co-managed water governance | Current Opinion in Environmental Sustainability | Implicit | Water | Knowledge and ideologies, institutions | Global |
| N. Osborne | 2015 | Intersectionality and kyriarchy: A framework for approaching power and social justice in planning and climate change adaptation | Planning Theory | Explicit | Undefined | Social capital (identity) | Global |

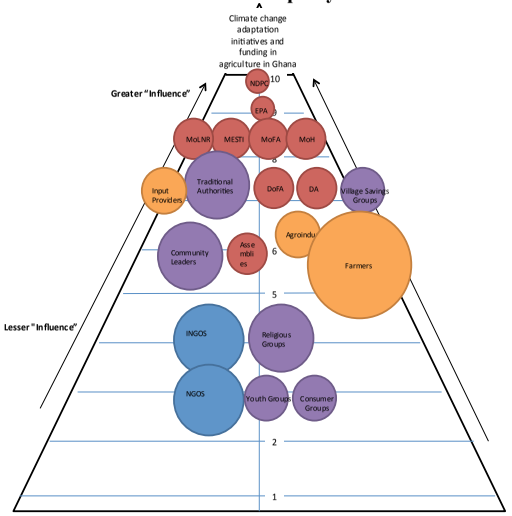
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|---|---|---|---|---|---|---|---|
| M. Prys and T. Wojczewski | 2015 | Rising Powers, NGOs and North-South Relations in Global Climate Governance: The Case of Climate Finance | Politikon | Implicit | Climate Finance | International Negotiations | Global |
| L. Ricci, B. Sanou and H. Baguian | 2015 | Climate risks in West Africa: Bobo-Dioulasso local actors' participatory risks management framework | Current Opinion in Environmental Sustainability | Implicit | Undefined | Social capital | Developing (Burkina Faso) |
| J. Sayer, C. Margules, A. K. Boedhihartono, A. Dale, T. Sunderland, J. Supriatna and R. Saryanthi | 2015 | Landscape approaches; what are the pre-conditions for success? | Sustainability Science | Implicit | Landscapes | Social capital | Global (Congo, Indonesia, Australia) |
| D. Simon and F. Schiemer | 2015 | Crossing boundaries: complex systems, transdisciplinarity and applied impact agendas | Current Opinion in Environmental Sustainability | Implicit | Undefined | Social capital | Global |
| H. Sinevaara-Niskanen | 2015 | Vocabularies for human development: Arctic politics and the power of knowledge | Polar Record | Implicit | Undefined | Knowledge and ideologies, Gender | Global ("Arctic") |
| Y. Tan, X. Liu and G. Hugo | 2015 | Exploring relationship between social inequality and adaptations to climate change: evidence from urban household surveys in the Yangtze River delta, China | Population and Environment | Implicit | Urban Adaptation | Social capital | Developing (China) |
| J. Wainwright and G. Mann | 2015 | Climate Change and the Adaptation of the Political | Annals of the Association of American Geographers | Implicit | Undefined | Social capital, International negotiations | Global |
| T. J. Wilbanks | 2015 | Putting "Place" in a multiscale context: Perspectives from the sustainability sciences | Environmental Science and Policy | Implicit | Undefined | Social Capital | Global |

## Annex 2. Completed MSIM maps (Paper 2)

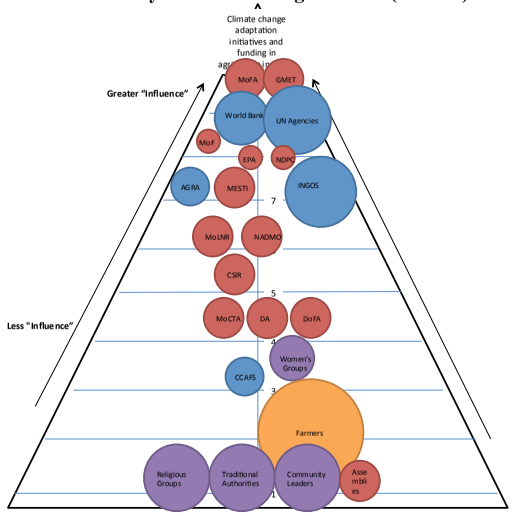
**Funding agency**



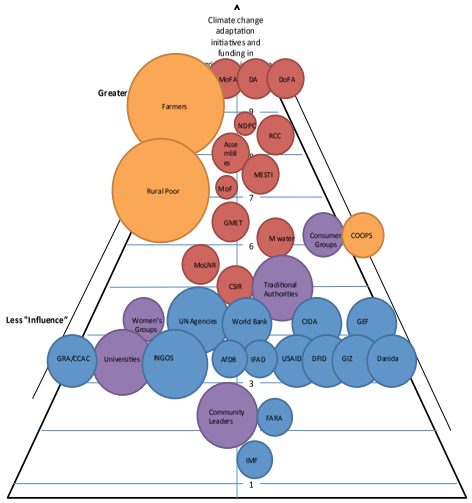

**Political party**



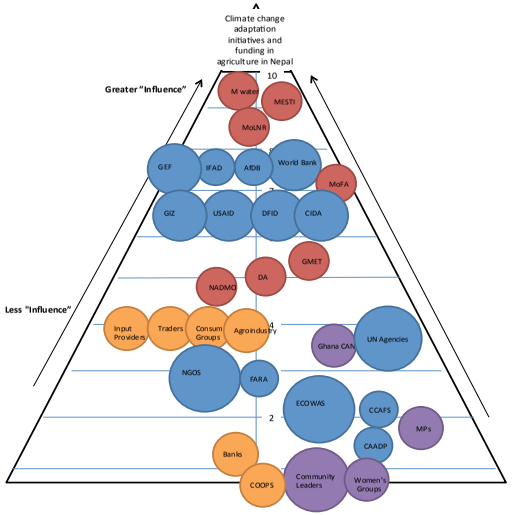

**Ministry of Food and Agriculture (MOFA)**



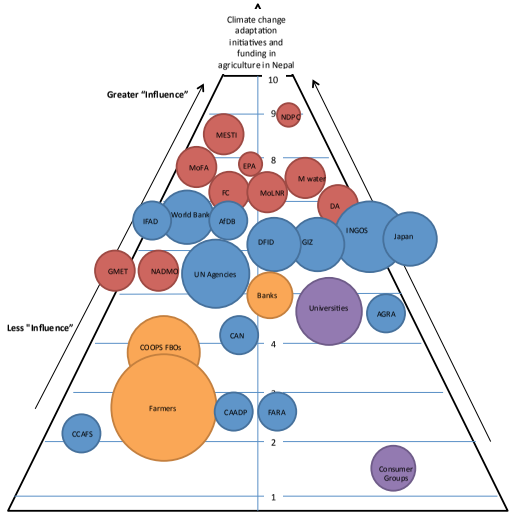

**Ministry of Environment, Science, Technology and Innovation (MESTI)**



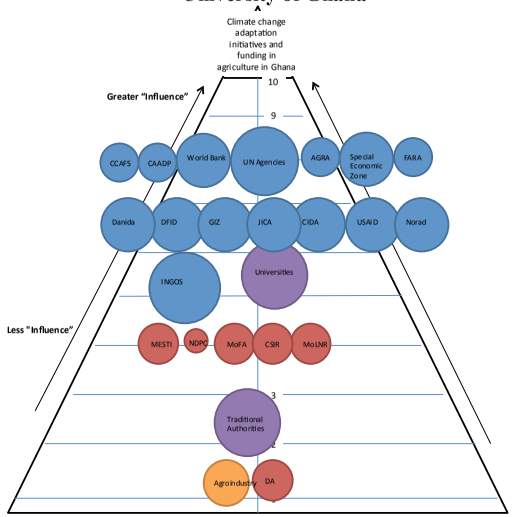

**Regional Agricultural research agency**



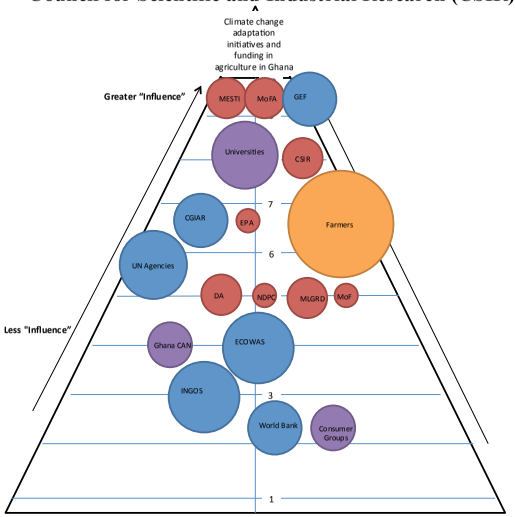

**National Development Planning Commission (NDPC)**



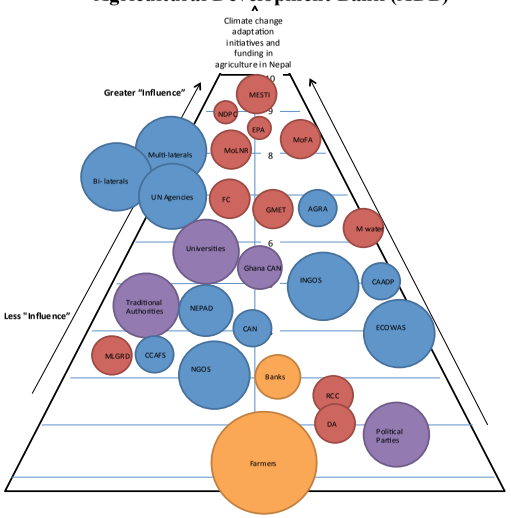
## University of Ghana



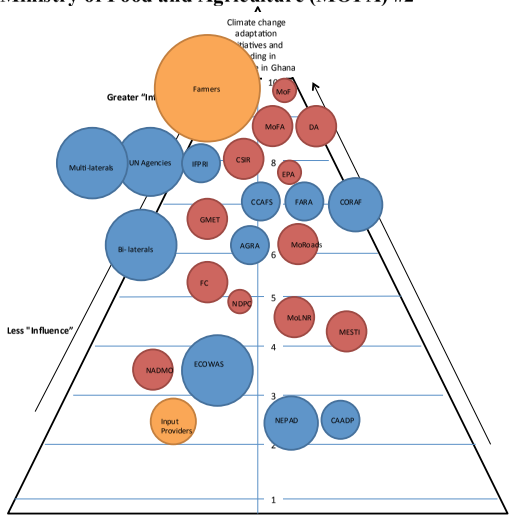

## Council for Scientific and Industrial Research (CSIR)




## Agricultural Development Bank (ADB)



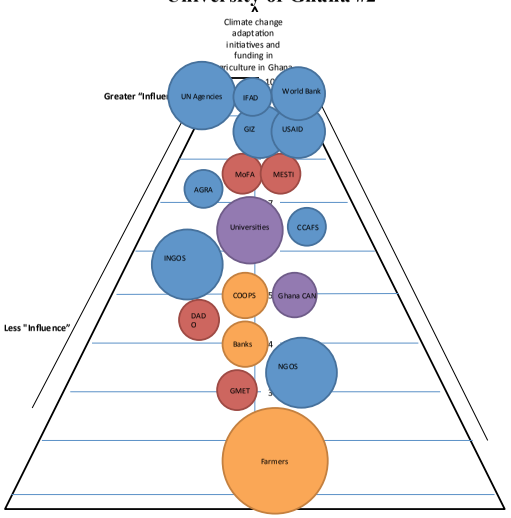

## Ministry of Food and Agriculture (MOFA) #2



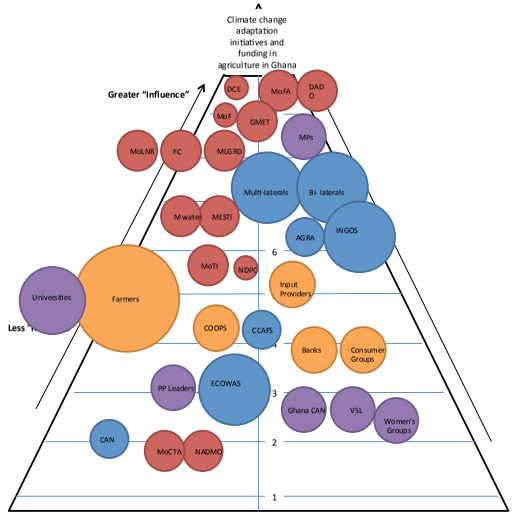

## Farmer (Lawra)



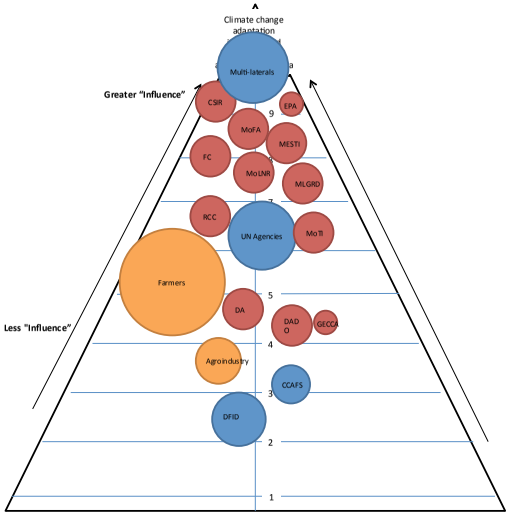

## University of Ghana #2



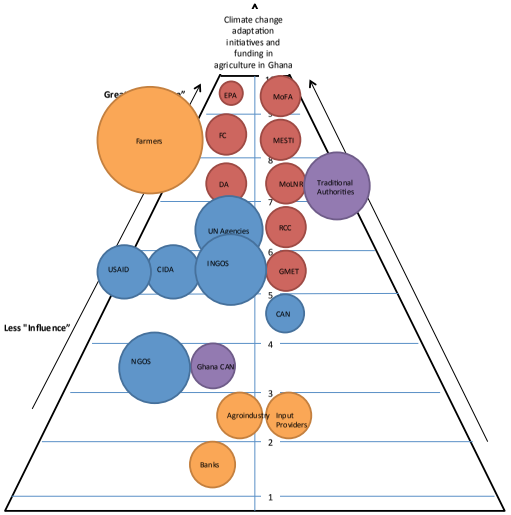
## Local NGO



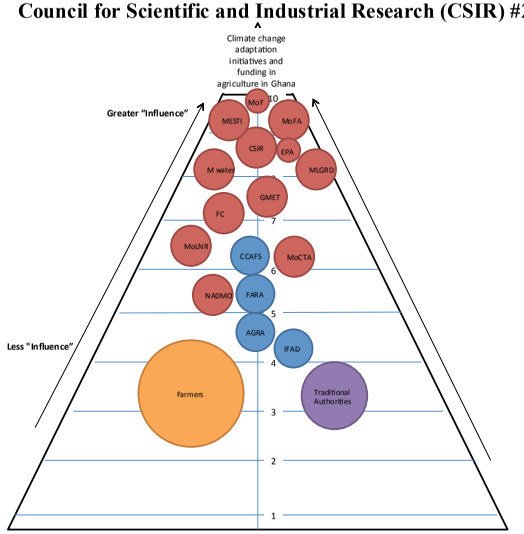

## SADA



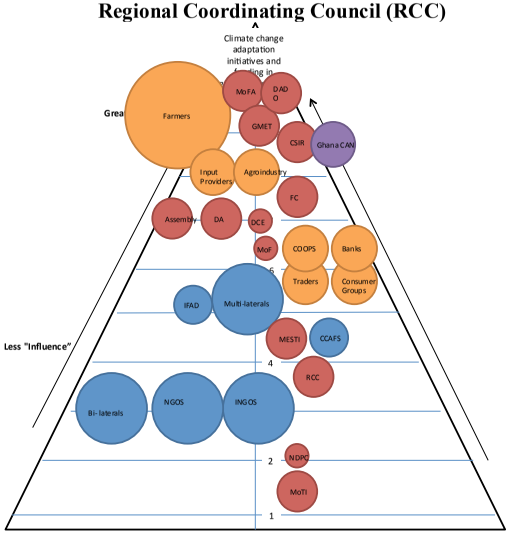

## International NGO



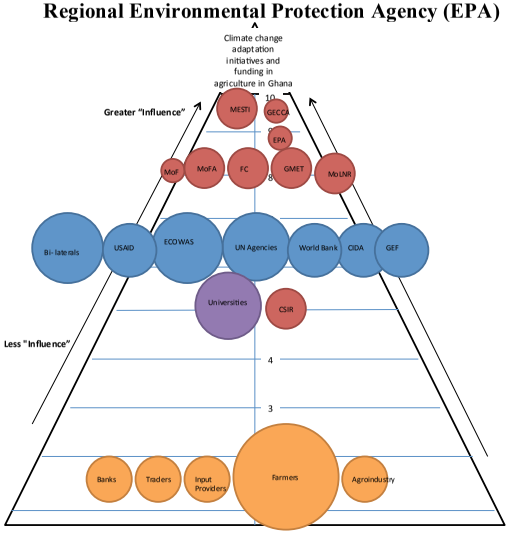

## Council for Scientific and Industrial Research (CSIR) #2



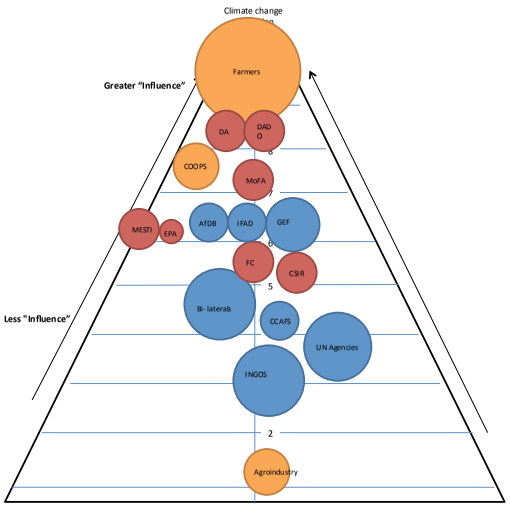

## Regional Coordinating Council (RCC)



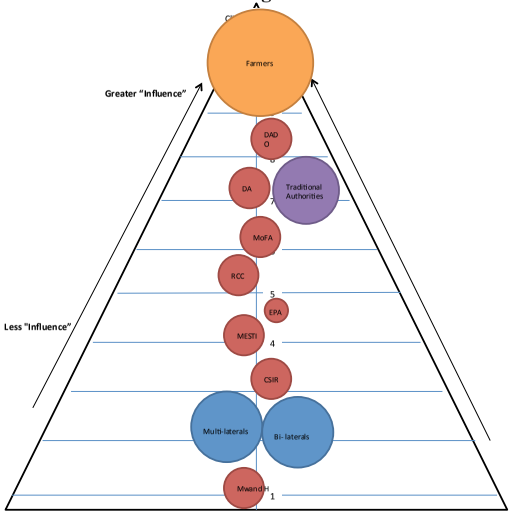

## Regional Environmental Protection Agency (EPA)



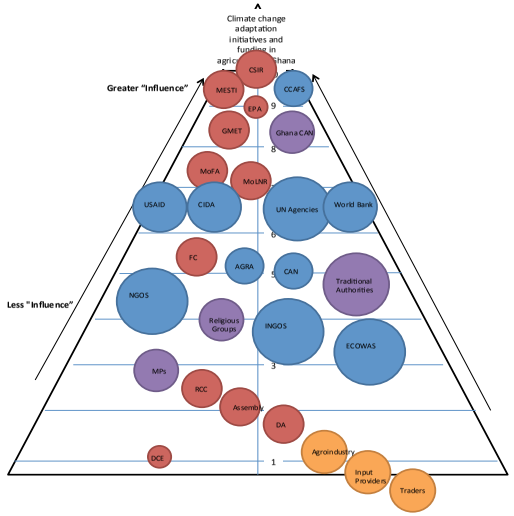
## Ghana Social Opportunities Project ( GSOP)



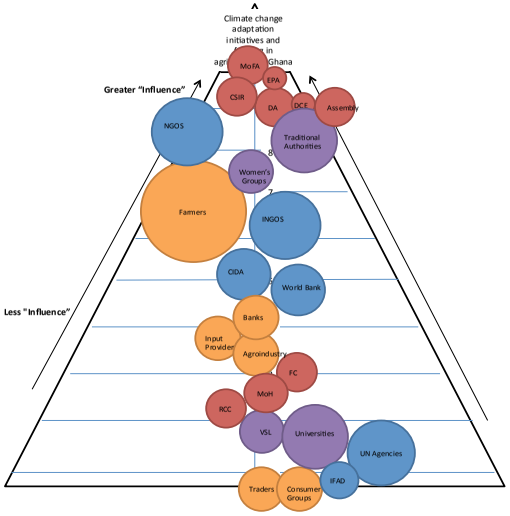

## MOFA Regional Office



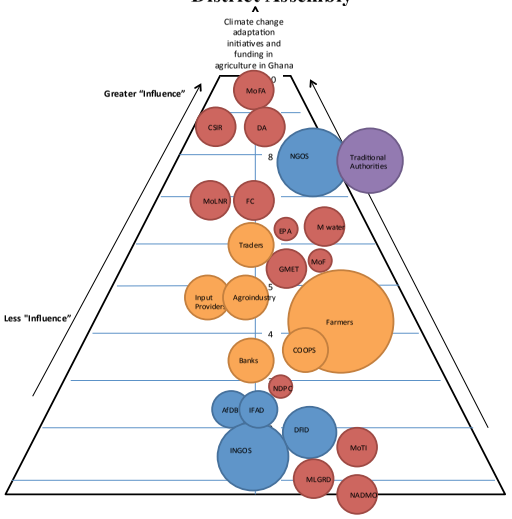

## MOFA District Office



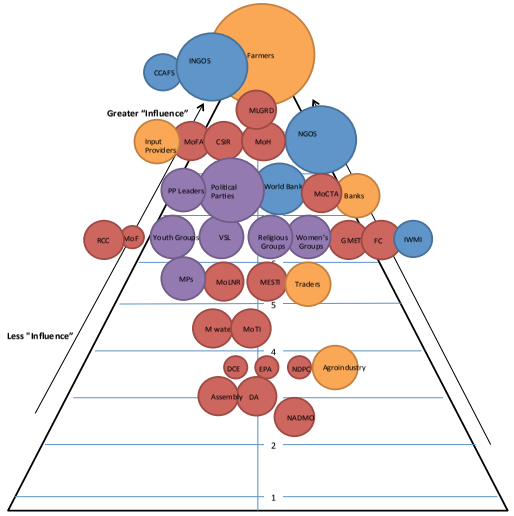

## Local NGO



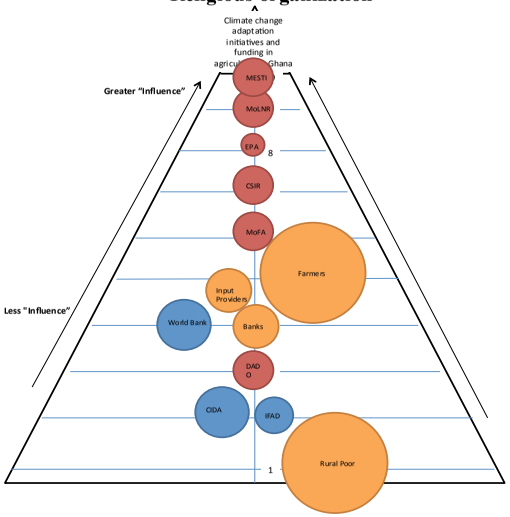

## District Assembly



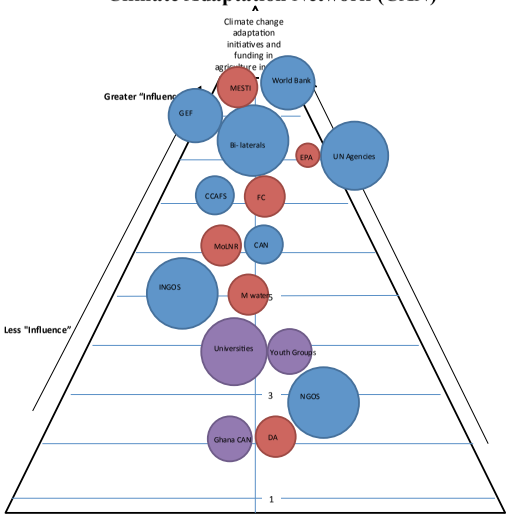

## Traditional leader



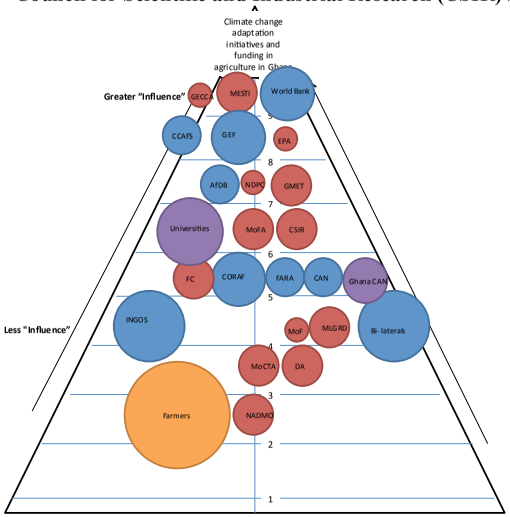
## Religious organization



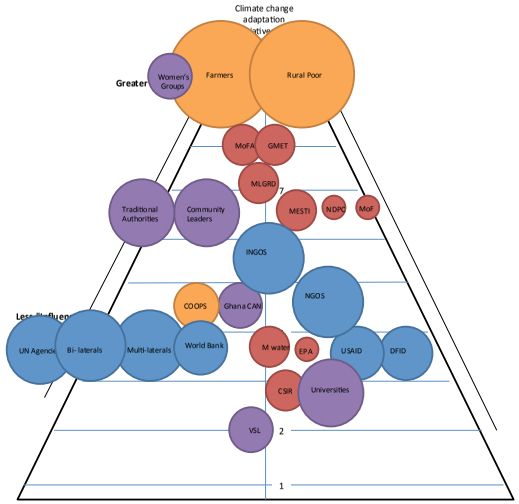

## Climate Adaptation Network (CAN)



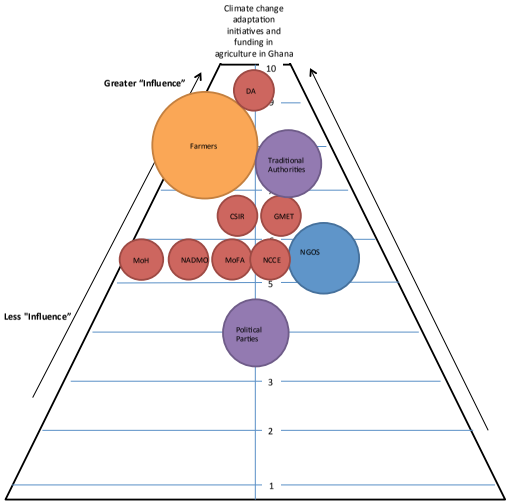

## Council for Scientific and Industrial Research (CSIR) #3



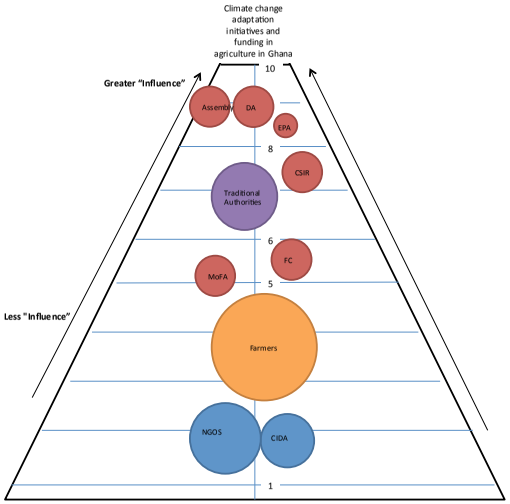

## Multistakeholder platform




## Farmer




## District Assembly #2



**Annex 3. Ghana MSIM raw data (Paper 2)**

*National Respondents (1-5)*

| **Actor Group** | GEF-(20/05) | ADJUSTED | NPP (20/05) | ADJUSTED | MOFA (21/05) | ADJUSTED | GECCA (21/05) | ADJUSTED | FARA (21/05 | ADJUSTED |
|---|---|---|---|---|---|---|---|---|---|---|
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 18.0 | 13.0 | 6.0 | 8.7 | 8.0 | 8.7 | 10.0 | 8.7 | 15.0 | 12.2 |
| Ministry of Food and Agriculture (MoFA) | 17.0 | 12.3 | 7.0 | 10.1 | 12.0 | 13.0 | | 0.0 | 12.0 | 9.8 |
| World Bank | 6.0 | 4.3 | | 0.0 | 11.0 | 11.9 | 4.0 | 3.5 | 13.0 | 10.6 |
| National Development Planning Commission (NDPC) | 13.0 | 9.4 | 9.0 | 13.0 | 9.0 | 9.8 | 13.0 | 11.3 | | 0.0 |
| UN FAO | 11.0 | 7.9 | | 0.0 | 11.0 | 11.9 | 4.0 | 3.5 | 6.0 | 4.9 |
| Environmental Protection Agency (EPA) | 16.0 | 11.6 | 8.0 | 11.6 | 9.0 | 9.8 | | 0.0 | | 0.0 |
| Global Environment Facility (GEF) | 6.0 | 4.3 | | 0.0 | | 0.0 | 4.0 | 3.5 | 13.0 | 10.6 |
| GiZ | 1.0 | 0.7 | | 0.0 | | 0.0 | 3.0 | 2.6 | 11.0 | 8.9 |
| Ministry of Land and Natural Resources (MoLNR) | 10.0 | 7.2 | 7.0 | 10.1 | 7.0 | 7.6 | 6.0 | 5.2 | 14.0 | 11.4 |
| Ghana Meteorological Agency (GMET) | | 0.0 | | 0.0 | 12.0 | 13.0 | 8.0 | 6.9 | 10.0 | 8.1 |
| USAID | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.6 | 11.0 | 8.9 |
| Farmers | 14.0 | 10.1 | 3.0 | 4.3 | 2.0 | 2.2 | 14.0 | 12.1 | 2.0 | 1.6 |
| District Assembly (DA) | 8.0 | 5.8 | 6.0 | 8.7 | 5.0 | 5.4 | 15.0 | 13.0 | 9.0 | 7.3 |
| DfID | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.6 | 11.0 | 8.9 |
| International Fund for Agricultural Development (IFAD) | 5.0 | 3.6 | | 0.0 | | 0.0 | 3.0 | 2.6 | 13.0 | 10.6 |
| Ministry of Finance (MoF) | 12.0 | 8.7 | | 0.0 | 10.0 | 10.8 | 9.0 | 7.8 | | 0.0 |
| INGO's (CARE, Plan, IDE etc) | | 0.0 | 2.0 | 2.9 | 8.0 | 8.7 | 3.0 | 2.6 | | 0.0 |
| CIDA | 1.0 | 0.7 | | 0.0 | | 0.0 | 4.0 | 3.5 | 11.0 | 8.9 |
| Climate Change, Agriculture and Food Security (CCAFS) | | 0.0 | | 0.0 | 3.0 | 3.3 | | 0.0 | 4.0 | 3.3 |
| AfDB | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.6 | 13.0 | 10.6 |
| Universities [UG, UDS] | 3.0 | 2.2 | | 0.0 | | 0.0 | 3.0 | 2.6 | | 0.0 |
| Jica | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| AGRA | 2.0 | 1.4 | | 0.0 | 8.0 | 8.7 | | 0.0 | | 0.0 |
| Danida | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.6 | | 0.0 |
| Norad | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Water Resources Works and Housing | | 0.0 | | 0.0 | | 0.0 | 7.0 | 6.1 | 16.0 | 13.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Forestry Commission (FC) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Local Government and Rural Development (MoLGRD) | 15.0 | 10.8 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| MoFA District Office (DoFA) | | 0.0 | 5.0 | 7.2 | 5.0 | 5.4 | 15.0 | 13.0 | | 0.0 |
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | 4.0 | 2.9 | | 0.0 | 6.0 | 6.5 | 5.0 | 4.3 | | 0.0 |
| Ghana Climate Action Network (G-CAN) | | 0.0 | | 0.0 | 1.0 | 1.1 | | 0.0 | 6.0 | 4.9 |
| FARA | | 0.0 | | 0.0 | | 0.0 | 2.0 | 1.7 | 5.0 | 4.1 |
| International Monetary Fund (IMF) | | 0.0 | | 0.0 | | 0.0 | 1.0 | 0.9 | | 0.0 |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | 7.0 | 5.1 | 5.0 | 7.2 | | 0.0 | 5.0 | 4.3 | | 0.0 |
| ECOWAS | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 4.0 | 3.3 |
| CORAF | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| COOP | | 0.0 | | 0.0 | | 0.0 | 7.0 | 6.1 | 1.0 | 0.8 |
| Input Providers | 9.0 | 6.5 | 5.0 | 7.2 | | 0.0 | | 0.0 | 7.0 | 5.7 |
| National Disaster Management Organisation (NADMO) | | 0.0 | | 0.0 | 7.0 | 7.6 | | 0.0 | 8.0 | 6.5 |
| CAADP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 2.0 | 1.6 |
| Climate Action Network (CAN) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Women's groups | | 0.0 | | 0.0 | 4.0 | 4.3 | 4.0 | 3.5 | 1.0 | 0.8 |
| Rural Poor | | 0.0 | | 0.0 | | 0.0 | 9.0 | 7.8 | | 0.0 |
| CGIAR [IWMI, IFPRI] | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| NGO's | | 0.0 | 1.0 | 1.4 | | 0.0 | | 0.0 | 5.0 | 4.1 |
| NEPAD | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Banks (ADB, ECOBANK etc) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 2.0 | 1.6 |
| Community Leaders | | 0.0 | 4.0 | 5.8 | 1.0 | 1.1 | 2.0 | 1.7 | 1.0 | 0.8 |
| Assemblypersons | | 0.0 | 4.0 | 5.8 | 1.0 | 1.1 | 11.0 | 9.5 | | 0.0 |
| Agroindustries | | 0.0 | 5.0 | 7.2 | | 0.0 | | 0.0 | 7.0 | 5.7 |
| Consumer Groups | | 0.0 | 1.0 | 1.4 | | 0.0 | 7.0 | 6.1 | | 0.0 |
| Member of Parliament (MP) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.4 |
| District Chief Executive (DCE) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ghana Environmental Conventions Coordinating Authority (GECCA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | 15.0 | 13.0 | | 0.0 |
| Regional Coordinating Council (RCC) | | 0.0 | | 0.0 | | 0.0 | 12.0 | 10.4 | | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Traders | 9.0 | 6.5 | | 0.0 | | 0.0 | | 0.0 | 7.0 | 5.7 |
| Savings and Loans groups | | 0.0 | 5.0 | 7.2 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Health | | 0.0 | 7.0 | 10.1 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | | 0.0 | | 0.0 | 5.0 | 5.4 | | 0.0 | | 0.0 |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Trade and Industry (MOTI) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Consumers | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 7.0 | 5.7 |
| Youth groups | | 0.0 | 1.0 | 1.4 | | 0.0 | | 0.0 | | 0.0 |
| Multilateral | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Religious Groups | | 0.0 | 2.0 | 2.9 | 1.0 | 1.1 | | 0.0 | | 0.0 |
| Political Party Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.6 | | 0.0 |
| Political Parties (NDC, NPP) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| NCCE | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNEP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNDP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |

*National respondents (6-10)*

| **Actor Group** | NDPC (22/05) | ADJUSTED | UG/WACCI (22/05 | ADJUSTED | CSIR STEPRI (22/05 | ADJUSTED | ADB (23/05) | ADJUSTED | MoFA (23/05) | ADJUSTED |
|---|---|---|---|---|---|---|---|---|---|---|
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 15.0 | 12.2 | 3.0 | 5.6 | 8.0 | 13.0 | 21.0 | 13.0 | 3.0 | 3.0 |
| Ministry of Food and Agriculture (MoFA) | 14.0 | 11.4 | 3.0 | 5.6 | 8.0 | 13.0 | 18.0 | 11.1 | 12.0 | 12.0 |
| World Bank | 10.0 | 8.1 | 7.0 | 13.0 | 1.0 | 1.6 | 17.0 | 10.5 | 11.0 | 11.0 |
| National Development Planning Commission (NDPC) | 16.0 | 13.0 | 3.0 | 5.6 | 4.0 | 6.5 | 20.0 | 12.4 | 5.0 | 5.0 |
| UN FAO | 8.0 | 6.5 | 7.0 | 13.0 | 5.0 | 8.1 | 14.0 | 8.7 | 11.0 | 11.0 |
| Environmental Protection Agency (EPA) | 14.0 | 11.4 | | 0.0 | 6.0 | 9.8 | 19.0 | 11.8 | 10.0 | 10.0 |
| Global Environment Facility (GEF) | | 0.0 | | 0.0 | 8.0 | 13.0 | 17.0 | 10.5 | 11.0 | 11.0 |
| GiZ | 9.0 | 7.3 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| Ministry of Land and Natural Resources (MoLNR) | 12.0 | 9.8 | 3.0 | 5.6 | | 0.0 | 17.0 | 10.5 | 4.0 | 4.0 |
| Ghana Meteorological Agency (GMET) | 8.0 | 6.5 | | 0.0 | | 0.0 | 13.0 | 8.0 | 8.0 | 8.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| USAID | | 0.0 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| Farmers | 3.0 | 2.4 | | 0.0 | 6.0 | 9.8 | 1.0 | 0.6 | 13.0 | 13.0 |
| District Assembly (DA) | 11.0 | 8.9 | 1.0 | 1.9 | 4.0 | 6.5 | 3.0 | 1.9 | 12.0 | 12.0 |
| DfID | 9.0 | 7.3 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| International Fund for Agricultural Development (IFAD) | 10.0 | 8.1 | | 0.0 | | 0.0 | 17.0 | 10.5 | 11.0 | 11.0 |
| Ministry of Finance and Economomic Planning (MoF) | | 0.0 | | 0.0 | 4.0 | 6.5 | | 0.0 | 13.0 | 13.0 |
| INGO's (CARE, Plan, IDE etc) | 9.0 | 7.3 | 4.0 | 7.4 | 2.0 | 3.3 | 9.0 | 5.6 | | 0.0 |
| CIDA | | 0.0 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| Climate Change, Agriculture and Food Security (CCAFS) | 2.0 | 1.6 | 7.0 | 13.0 | | 0.0 | 6.0 | 3.7 | 9.0 | 9.0 |
| AfDB | 10.0 | 8.1 | | 0.0 | | 0.0 | 17.0 | 10.5 | 11.0 | 11.0 |
| Universities [UG, UDS] | 6.0 | 4.9 | 5.0 | 9.3 | 7.0 | 11.4 | 11.0 | 6.8 | | 0.0 |
| Jica | 9.0 | 7.3 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| AGRA | 6.0 | 4.9 | 7.0 | 13.0 | | 0.0 | 13.0 | 8.0 | 7.0 | 7.0 |
| Danida | | 0.0 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| Norad | | 0.0 | 6.0 | 11.1 | | 0.0 | 16.0 | 9.9 | 7.0 | 7.0 |
| Ministry of Water Resources Works and Housing | 13.0 | 10.6 | | 0.0 | | 0.0 | 12.0 | 7.4 | | 0.0 |
| Forestry Commission (FC) | 12.0 | 9.8 | | 0.0 | | 0.0 | 14.0 | 8.7 | 6.0 | 6.0 |
| Ministry of Local Government and Rural Development (MoLGRD) | | 0.0 | | 0.0 | 4.0 | 6.5 | 6.0 | 3.7 | | 0.0 |
| MoFA District Office (DoFA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | | 0.0 | 3.0 | 5.6 | 7.0 | 11.4 | | 0.0 | | 0.0 |
| Ghana Climate Action Network (G-CAN) | | 0.0 | | 0.0 | 3.0 | 4.9 | 10.0 | 6.2 | | 0.0 |
| FARA | 3.0 | 2.4 | 7.0 | 13.0 | | 0.0 | | 0.0 | 9.0 | 9.0 |
| International Monetary Fund (IMF) | | 0.0 | | 0.0 | | 0.0 | 17.0 | 10.5 | 11.0 | 11.0 |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | | 0.0 | 2.0 | 3.7 | | 0.0 | 8.0 | 5.0 | | 0.0 |
| ECOWAS | | 0.0 | 7.0 | 13.0 | 3.0 | 4.9 | 7.0 | 4.3 | 2.0 | 2.0 |
| CORAF | | 0.0 | 7.0 | 13.0 | | 0.0 | | 0.0 | 9.0 | 9.0 |
| COOP | 4.0 | 3.3 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Input Providers | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 1.0 | 1.0 |
| National Disaster Management Organisation (NADMO) | 8.0 | 6.5 | | 0.0 | | 0.0 | | 0.0 | 2.0 | 2.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CAADP | 3.0 | 2.4 | 7.0 | 13.0 | | 0.0 | 9.0 | 5.6 | 1.0 | 1.0 |
| Climate Action Network (CAN) | 5.0 | 4.1 | | 0.0 | | 0.0 | 7.0 | 4.3 | | 0.0 |
| Women's groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Rural Poor | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| CGIAR [IWMI, IFPRI] | | 0.0 | | 0.0 | 6.0 | 9.8 | | 0.0 | 11.0 | 11.0 |
| NGO's | | 0.0 | | 0.0 | | 0.0 | 5.0 | 3.1 | | 0.0 |
| NEPAD | | 0.0 | 7.0 | 13.0 | | 0.0 | 8.0 | 5.0 | 1.0 | 1.0 |
| Banks (ADB, ECOBANK etc) | 7.0 | 5.7 | | 0.0 | | 0.0 | 5.0 | 3.1 | | 0.0 |
| Community Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Assemblypersons | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Agroindustries | | 0.0 | 1.0 | 1.9 | | 0.0 | | 0.0 | | 0.0 |
| Consumer Groups | 1.0 | 0.8 | | 0.0 | 1.0 | 1.6 | | 0.0 | | 0.0 |
| Member of Parliament (MP) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| District Chief Executive (DCE) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ghana Environmental Conventions Coordinating Authority (GECCA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Regional Coordinating Council (RCC) | | 0.0 | | 0.0 | | 0.0 | 4.0 | 2.5 | | 0.0 |
| Traders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Savings and Loans groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Health | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | 15.0 | 9.3 | | 0.0 |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 7.0 | 7.0 |
| Ministry of Trade and Industry (MOTI) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Consumers | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Youth groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Multilateral | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Religious Groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Political Party Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Political Parties (NDC, NPP) | | 0.0 | | 0.0 | | 0.0 | 2.0 | 1.2 | | 0.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| NCCE | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNEP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNDP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 |

*National respondents (11-15)*

| **Actor Group** | UG (30/05) | ADJUSTED | DI (30/05) | ADJUSTED | CAN (24/05) | ADJUSTED | CSIR (24/05) | ADJUSTED | G-CAN (24/05) | ADJUSTED | **FREQUENCY RANKED** | **COMPOSITE SCORE** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 10.0 | 10.8 | 14.0 | 9.1 | 13.0 | 12.1 | 8.0 | 13.0 | 6.0 | 8.7 | **15.0** | **10.1** |
| Ministry of Food and Agriculture (MoFA) | 10.0 | 10.8 | 20.0 | 13.0 | | 0.0 | 5.0 | 8.1 | 8.0 | 11.6 | **13.0** | **9.4** |
| World Bank | 12.0 | 13.0 | 15.0 | 9.8 | 14.0 | 13.0 | 8.0 | 13.0 | 3.0 | 4.3 | **14.0** | **8.5** |
| National Development Planning Commission (NDPC) | | 0.0 | 10.0 | 6.5 | | 0.0 | 6.0 | 9.8 | 6.0 | 8.7 | **12.0** | **7.4** |
| UN FAO | 12.0 | 13.0 | | 0.0 | 10.0 | 9.3 | | 0.0 | 3.0 | 4.3 | **12.0** | **6.8** |
| Environmental Protection Agency (EPA) | | 0.0 | | 0.0 | 10.0 | 9.3 | 7.0 | 11.4 | 3.0 | 4.3 | **10.0** | **6.7** |
| Global Environment Facility (GEF) | | 0.0 | 15.0 | 9.8 | 12.0 | 11.1 | 7.0 | 11.4 | 3.0 | 4.3 | **10.0** | **6.0** |
| GiZ | 11.0 | 11.9 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **12.0** | **5.9** |
| Ministry of Land and Natural Resources (MoLNR) | | 0.0 | 16.0 | 10.4 | 7.0 | 6.5 | | 0.0 | | 0.0 | **11.0** | **5.9** |
| Ghana Meteorological Agency (GMET) | 2.0 | 2.2 | 18.0 | 11.7 | | 0.0 | 6.0 | 9.8 | 8.0 | 11.6 | **10.0** | **5.7** |
| USAID | 11.0 | 11.9 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **10.0** | **5.4** |
| Farmers | 1.0 | 1.1 | 8.0 | 5.2 | | 0.0 | 1.0 | 1.6 | 9.0 | 13.0 | **13.0** | **5.1** |
| District Assembly (DA) | | 0.0 | | 0.0 | 2.0 | 1.9 | 2.0 | 3.3 | | 0.0 | **12.0** | **5.1** |
| DfID | | 0.0 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **10.0** | **5.1** |
| International Fund for Agricultural Development (IFAD) | 12.0 | 13.0 | 15.0 | 9.8 | | 0.0 | | 0.0 | 3.0 | 4.3 | **9.0** | **4.9** |
| Ministry of Finance and Economomic Planning (MoF) | | 0.0 | 19.0 | 12.4 | | 0.0 | 3.0 | 4.9 | 6.0 | 8.7 | **8.0** | **4.8** |
| INGO's (CARE, Plan, IDE etc) | 7.0 | 7.6 | 13.0 | 8.5 | 6.0 | 5.6 | 3.0 | 4.9 | 5.0 | 7.2 | **12.0** | **4.8** |
| CIDA | | 0.0 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **10.0** | **4.7** |
| Climate Change, Agriculture and Food Security (CCAFS) | 8.0 | 8.7 | 7.0 | 4.6 | 9.0 | 8.4 | 7.0 | 11.4 | | 0.0 | **10.0** | **4.5** |
| AfDB | | 0.0 | 15.0 | 9.8 | | 0.0 | 6.0 | 9.8 | 3.0 | 4.3 | **8.0** | **4.4** |
| Universities [UG, UDS] | 8.0 | 8.7 | 8.0 | 5.2 | 4.0 | 3.7 | 5.0 | 8.1 | 2.0 | 2.9 | **11.0** | **4.4** |
| Jica | | 0.0 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **8.0** | **4.3** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AGRA | 9.0 | 9.8 | 13.0 | 8.5 | | 0.0 | | 0.0 | | 0.0 | **8.0** | **4.1** |
| Danida | | 0.0 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **8.0** | **4.0** |
| Norad | | 0.0 | 15.0 | 9.8 | 11.0 | 10.2 | 3.0 | 4.9 | 3.0 | 4.3 | **7.0** | **3.8** |
| Ministry of Water Resources Works and Housing | | 0.0 | 14.0 | 9.1 | 5.0 | 4.6 | | 0.0 | 3.0 | 4.3 | **7.0** | **3.7** |
| Forestry Commission (FC) | | 0.0 | 16.0 | 10.4 | 9.0 | 8.4 | 4.0 | 6.5 | | 0.0 | **6.0** | **3.3** |
| Ministry of Local Government and Rural Development (MoLGRD) | | 0.0 | 16.0 | 10.4 | | 0.0 | 3.0 | 4.9 | 7.0 | 10.1 | **6.0** | **3.1** |
| MoFA District Office (DoFA) | 5.0 | 5.4 | 20.0 | 13.0 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **2.9** |
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | | 0.0 | | 0.0 | | 0.0 | 5.0 | 8.1 | 2.0 | 2.9 | **7.0** | **2.8** |
| Ghana Climate Action Network (G-CAN) | 6.0 | 6.5 | 4.0 | 2.6 | 1.0 | 0.9 | 4.0 | 6.5 | 4.0 | 5.8 | **9.0** | **2.6** |
| FARA | | 0.0 | | 0.0 | | 0.0 | 4.0 | 6.5 | | 0.0 | **6.0** | **2.4** |
| International Monetary Fund (IMF) | | 0.0 | 15.0 | 9.8 | | 0.0 | | 0.0 | 3.0 | 4.3 | **5.0** | **2.4** |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 6.0 | 8.7 | **6.0** | **2.3** |
| ECOWAS | | 0.0 | 5.0 | 3.3 | | 0.0 | | 0.0 | | 0.0 | **6.0** | **2.0** |
| CORAF | | 0.0 | | 0.0 | | 0.0 | 4.0 | 6.5 | | 0.0 | **3.0** | **1.9** |
| COOP | 6.0 | 6.5 | 7.0 | 4.6 | | 0.0 | | 0.0 | 4.0 | 5.8 | **6.0** | **1.8** |
| Input Providers | | 0.0 | 9.0 | 5.9 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **1.8** |
| National Disaster Management Organisation (NADMO) | | 0.0 | 1.0 | 0.7 | | 0.0 | 1.0 | 1.6 | | 0.0 | **6.0** | **1.7** |
| CAADP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **1.6** |
| Climate Action Network (CAN) | | 0.0 | 2.0 | 1.3 | 8.0 | 7.4 | 4.0 | 6.5 | | 0.0 | **5.0** | **1.6** |
| Women's groups | | 0.0 | 3.0 | 2.0 | | 0.0 | | 0.0 | 9.0 | 13.0 | **5.0** | **1.6** |
| Rural Poor | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 9.0 | 13.0 | **2.0** | **1.4** |
| CGIAR [IWMI, IFPRI] | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.4** |
| NGO's | 3.0 | 3.3 | | 0.0 | 3.0 | 2.8 | | 0.0 | 4.0 | 5.8 | **6.0** | **1.4** |
| NEPAD | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **1.3** |
| Banks (ADB, ECOBANK etc) | 4.0 | 4.3 | 6.0 | 3.9 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **1.2** |
| Community Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 6.0 | 8.7 | **5.0** | **1.2** |
| Assemblypersons | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **1.1** |
| Agroindustries | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **1.0** |
| Consumer Groups | | 0.0 | 6.0 | 3.9 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **0.9** |
| Member of Parliament (MP) | | 0.0 | 17.0 | 11.1 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **0.9** |
| District Chief Executive (DCE) | | 0.0 | 20.0 | 13.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.9** |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ghana Environmental Conventions Coordinating Authority (GECCA) | | 0.0 | | 0.0 | | 0.0 | 8.0 | 13.0 | | 0.0 | **1.0** | **0.9** |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.9** |
| Regional Coordinating Council (RCC) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **0.9** |
| Traders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **0.8** |
| Savings and Loans groups | | 0.0 | 4.0 | 2.6 | | 0.0 | | 0.0 | 1.0 | 1.4 | **3.0** | **0.8** |
| Ministry of Health | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.7** |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | | 0.0 | 1.0 | 0.7 | | 0.0 | 2.0 | 3.3 | | 0.0 | **3.0** | **0.6** |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.6** |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.5** |
| Ministry of Trade and Industry (MOTI) | | 0.0 | 10.0 | 6.5 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.4** |
| Consumers | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.4** |
| Youth groups | | 0.0 | | 0.0 | 4.0 | 3.7 | | 0.0 | | 0.0 | **2.0** | **0.3** |
| Multilateral | | 0.0 | | 0.0 | | 0.0 | | 0.0 | 3.0 | 4.3 | **1.0** | **0.3** |
| Religious Groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **0.3** |
| Political Party Leaders | | 0.0 | 5.0 | 3.3 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.2** |
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.2** |
| Political Parties (NDC, NPP) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.1** |
| NCCE | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| UNEP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| UNDP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |

*Regional Respondents (1-4)*

| **Actor Group** | AICC/SADA (29/05) | ADJUSTED | PLAN Ghana (29/05) | ADJUSTED | SARI (28/05) | ADJUSTED | RCC (23/05) | ADJUSTED |
|---|---|---|---|---|---|---|---|---|
| Ministry of Food and Agriculture (MoFA) | 13.0 | 11.3 | 9.0 | 13.0 | 11.0 | 11.9 | 14.0 | 13.0 |
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 12.0 | 10.4 | 8.0 | 11.6 | 11.0 | 11.9 | 5.0 | 4.6 |
| Environmental Protection Agency (EPA) | 14.0 | 12.1 | 9.0 | 13.0 | 10.0 | 10.8 | | 0.0 |
| Farmers | 6.0 | 5.2 | 8.0 | 11.6 | 1.0 | 1.1 | 13.0 | 12.1 |
| Forestry Commission (FC) | 11.0 | 9.5 | 8.0 | 11.6 | 7.0 | 7.6 | 10.0 | 9.3 |
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | 14.0 | 12.1 | | 0.0 | 10.0 | 10.8 | 12.0 | 11.1 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| District Assembly (DA) | 5.0 | 4.3 | 7.0 | 10.1 | | 0.0 | 9.0 | 8.4 |
| MoFA District Office (DoFA) | 4.0 | 3.5 | | 0.0 | | 0.0 | 14.0 | 13.0 |
| Ghana Meteorological Agency (GMET) | | 0.0 | 5.0 | 7.2 | 8.0 | 8.7 | 13.0 | 12.1 |
| Global Environment Facility (GEF) | 15.0 | 13.0 | | 0.0 | | 0.0 | 6.0 | 5.6 |
| International Fund for Agricultural Development (IFAD) | 15.0 | 13.0 | | 0.0 | 2.0 | 2.2 | 6.0 | 5.6 |
| Ministry of Land and Natural Resources (MoLNR) | 10.0 | 8.7 | 7.0 | 10.1 | 6.0 | 6.5 | | 0.0 |
| AfDB | 15.0 | 13.0 | | 0.0 | | 0.0 | 6.0 | 5.6 |
| Ministry of Finance and Economomic Planning (MoF) | | 0.0 | | 0.0 | 12.0 | 13.0 | 8.0 | 7.4 |
| World Bank | 15.0 | 13.0 | | 0.0 | | 0.0 | 6.0 | 5.6 |
| Regional Coordinating Council (RCC) | 8.0 | 6.9 | 6.0 | 8.7 | | 0.0 | 4.0 | 3.7 |
| UN FAO | 7.0 | 6.1 | 6.0 | 8.7 | | 0.0 | | 0.0 |
| CIDA | | 0.0 | 5.0 | 7.2 | | 0.0 | 3.0 | 2.8 |
| USAID | | 0.0 | 5.0 | 7.2 | | 0.0 | 3.0 | 2.8 |
| International Monetary Fund (IMF) | 15.0 | 13.0 | | 0.0 | | 0.0 | 6.0 | 5.6 |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | | 0.0 | 7.0 | 10.1 | 1.0 | 1.1 | | 0.0 |
| Agroindustries | 3.0 | 2.6 | 2.0 | 2.9 | | 0.0 | 11.0 | 10.2 |
| COOP | | 0.0 | | 0.0 | | 0.0 | 8.0 | 7.4 |
| Ministry of Local Government and Rural Development (MoLGRD) | 9.0 | 7.8 | | 0.0 | 9.0 | 9.8 | | 0.0 |
| DfID | 1.0 | 0.9 | | 0.0 | | 0.0 | 3.0 | 2.8 |
| Ghana Environmental Conventions Coordinating Authority (GECCA) | 4.0 | 3.5 | | 0.0 | | 0.0 | | 0.0 |
| Climate Change, Agriculture and Food Security (CCAFS) | 2.0 | 1.7 | | 0.0 | 5.0 | 5.4 | 5.0 | 4.6 |
| GiZ | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.8 |
| Jica | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.8 |
| Danida | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.8 |
| Norad | | 0.0 | | 0.0 | | 0.0 | 3.0 | 2.8 |
| Ghana Climate Action Network (G-CAN) | | 0.0 | 3.0 | 4.3 | | 0.0 | 12.0 | 11.1 |
| Input Providers | | 0.0 | 2.0 | 2.9 | | 0.0 | 11.0 | 10.2 |
| INGO's (CARE, Plan, IDE etc) | | 0.0 | 5.0 | 7.2 | | 0.0 | 3.0 | 2.8 |
| Ministry of Water Resources Works and Housing | | 0.0 | | 0.0 | 9.0 | 9.8 | | 0.0 |
| Banks (ADB, ECOBANK etc) | | 0.0 | 1.0 | 1.4 | | 0.0 | 8.0 | 7.4 |
| Assemblypersons | | 0.0 | | 0.0 | | 0.0 | 9.0 | 8.4 |
| Traders | | 0.0 | | 0.0 | | 0.0 | 7.0 | 6.5 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| District Chief Executive (DCE) | | 0.0 | | 0.0 | | 0.0 | 9.0 | 8.4 |
| NGO's | | 0.0 | 3.0 | 4.3 | | 0.0 | 3.0 | 2.8 |
| Ministry of Trade and Industry (MOTI) | 7.0 | 6.1 | | 0.0 | | 0.0 | 1.0 | 0.9 |
| Consumer Groups | | 0.0 | | 0.0 | | 0.0 | 7.0 | 6.5 |
| Climate Action Network (CAN) | | 0.0 | 4.0 | 5.8 | | 0.0 | | 0.0 |
| ECOWAS | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | | 0.0 | | 0.0 | 5.0 | 5.4 | | 0.0 |
| National Disaster Management Organisation (NADMO) | | 0.0 | | 0.0 | 4.0 | 4.3 | | 0.0 |
| FARA | | 0.0 | | 0.0 | 4.0 | 4.3 | | 0.0 |
| Universities [UG, UDS] | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| AGRA | | 0.0 | | 0.0 | 3.0 | 3.3 | | 0.0 |
| Multilaterals (undiferentiated) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| National Development Planning Commission (NDPC) | | 0.0 | | 0.0 | | 0.0 | 2.0 | 1.9 |
| Women's groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Savings and Loans groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Health | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Member of Parliament (MP) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Religious Groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| CAADP | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Community Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| CGIAR [IWMI, IFPRI] | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Youth groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Political Parties (NDC, NPP) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| CORAF | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Rural Poor | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| NEPAD | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Political Party Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Consumers | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| NCCE | | 0.0 | | 0.0 | | 0.0 | | 0.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNEP | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNDP | | 0.0 | | 0.0 | | 0.0 | | 0.0 |

*Regional respondents (5-7)*

| **Actor Group** | EPA (28/05) | ADJUSTED | GSOP (28/05) | ADJUSTED | MOFA (28/05) | ADJUSTED | **FREQUENCY RANKED** | **COMPOSITE SCORE** |
|---|---|---|---|---|---|---|---|---|
| Ministry of Food and Agriculture (MoFA) | 5.0 | 9.3 | 10.0 | 10.0 | 8.0 | 9.5 | **7.0** | **11.1** |
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 7.0 | 13.0 | 8.0 | 8.0 | 5.0 | 5.9 | **7.0** | **9.3** |
| Environmental Protection Agency (EPA) | 6.0 | 11.1 | 8.0 | 8.0 | 6.0 | 7.1 | **6.0** | **8.9** |
| Farmers | 1.0 | 1.9 | 13.0 | 13.0 | 11.0 | 13.0 | **7.0** | **8.3** |
| Forestry Commission (FC) | 5.0 | 9.3 | 7.0 | 7.0 | | 0.0 | **6.0** | **7.7** |
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | 2.0 | 3.7 | 6.0 | 6.0 | 4.0 | 4.7 | **6.0** | **6.9** |
| District Assembly (DA) | | 0.0 | 12.0 | 12.0 | 9.0 | 10.6 | **5.0** | **6.5** |
| MoFA District Office (DoFA) | | 0.0 | 12.0 | 12.0 | 10.0 | 11.8 | **4.0** | **5.8** |
| Ghana Meteorological Agency (GMET) | 5.0 | 9.3 | | 0.0 | | 0.0 | **4.0** | **5.3** |
| Global Environment Facility (GEF) | 3.0 | 5.6 | 9.0 | 9.0 | 3.0 | 3.5 | **5.0** | **5.2** |
| International Fund for Agricultural Development (IFAD) | | 0.0 | 9.0 | 9.0 | 3.0 | 3.5 | **5.0** | **4.8** |
| Ministry of Land and Natural Resources (MoLNR) | 4.0 | 7.4 | | 0.0 | | 0.0 | **4.0** | **4.7** |
| AfDB | | 0.0 | 9.0 | 9.0 | 3.0 | 3.5 | **4.0** | **4.4** |
| Ministry of Finance and Economomic Planning (MoF) | 5.0 | 9.3 | | 0.0 | | 0.0 | **3.0** | **4.2** |
| World Bank | 3.0 | 5.6 | | 0.0 | 3.0 | 3.5 | **4.0** | **4.0** |
| Regional Coordinating Council (RCC) | | 0.0 | | 0.0 | 7.0 | 8.3 | **4.0** | **3.9** |
| UN FAO | 3.0 | 5.6 | 3.0 | 3.0 | | 0.0 | **4.0** | **3.3** |
| CIDA | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **5.0** | **3.3** |
| USAID | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **5.0** | **3.3** |
| International Monetary Fund (IMF) | | 0.0 | | 0.0 | 3.0 | 3.5 | **3.0** | **3.2** |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | | 0.0 | | 0.0 | 9.0 | 10.6 | **3.0** | **3.1** |
| Agroindustries | 1.0 | 1.9 | 1.0 | 1.0 | | 0.0 | **5.0** | **2.7** |
| COOP | | 0.0 | 11.0 | 11.0 | | 0.0 | **2.0** | **2.6** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ministry of Local Government and Rural Development (MoLGRD) | | 0.0 | | 0.0 | | 0.0 | **2.0** | **2.5** |
| DfID | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **5.0** | **2.4** |
| Ghana Environmental Conventions Coordinating Authority (GECCA) | 7.0 | 13.0 | | 0.0 | | 0.0 | **2.0** | **2.4** |
| Climate Change, Agriculture and Food Security (CCAFS) | | 0.0 | 4.0 | 4.0 | | 0.0 | **4.0** | **2.3** |
| GiZ | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **4.0** | **2.2** |
| Jica | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **4.0** | **2.2** |
| Danida | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **4.0** | **2.2** |
| Norad | 3.0 | 5.6 | 5.0 | 5.0 | 2.0 | 2.4 | **4.0** | **2.2** |
| Ghana Climate Action Network (G-CAN) | | 0.0 | | 0.0 | | 0.0 | **2.0** | **2.2** |
| Input Providers | 1.0 | 1.9 | | 0.0 | | 0.0 | **3.0** | **2.1** |
| INGO's (CARE, Plan, IDE etc) | | 0.0 | 2.0 | 2.0 | | 0.0 | **3.0** | **1.7** |
| Ministry of Water Resources Works and Housing | | 0.0 | | 0.0 | 1.0 | 1.2 | **2.0** | **1.6** |
| Banks (ADB, ECOBANK etc) | 1.0 | 1.9 | | 0.0 | | 0.0 | **3.0** | **1.5** |
| Assemblypersons | | 0.0 | | 0.0 | | 0.0 | **1.0** | **1.2** |
| Traders | 1.0 | 1.9 | | 0.0 | | 0.0 | **2.0** | **1.2** |
| District Chief Executive (DCE) | | 0.0 | | 0.0 | | 0.0 | **1.0** | **1.2** |
| NGO's | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.0** |
| Ministry of Trade and Industry (MOTI) | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.0** |
| Consumer Groups | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.9** |
| Climate Action Network (CAN) | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.8** |
| ECOWAS | 3.0 | 5.6 | | 0.0 | | 0.0 | **1.0** | **0.8** |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.8** |
| National Disaster Management Organisation (NADMO) | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.6** |
| FARA | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.6** |
| Universities [UG, UDS] | 2.0 | 3.7 | | 0.0 | | 0.0 | **1.0** | **0.5** |
| AGRA | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.5** |
| Multilaterals (undiferentiated) | | 0.0 | | 0.0 | 2.0 | 2.4 | **1.0** | **0.3** |
| National Development Planning Commission (NDPC) | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.3** |
| Women's groups | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Savings and Loans groups | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Health | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Member of Parliament (MP) | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Religious Groups | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| CAADP | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Community Leaders | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| CGIAR [IWMI, IFPRI] | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Youth groups | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Political Parties (NDC, NPP) | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| CORAF | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Rural Poor | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| NEPAD | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Political Party Leaders | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Consumers | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| NCCE | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| UNEP | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| UNDP | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |

*Local respondents (1-4)*

| **Actor Group** | Farmer (25/05) | ADJUSTED | MOFA (26/05) | ADJUSTED | NGO (23/05) | ADJUSTED | DA (27/05) | ADJUSTED |
|---|---|---|---|---|---|---|---|---|
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | 8.0 | 10.4 | 23.0 | 13.0 | 20.0 | 11.8 | 19.0 | 12.4 |
| Ministry of Food and Agriculture (MoFA) | 10.0 | 13.0 | 19.0 | 10.7 | 22.0 | 13.0 | 20.0 | 13.0 |
| Environmental Protection Agency (EPA) | 4.0 | 5.2 | 21.0 | 11.9 | 21.0 | 12.4 | 15.0 | 9.8 |
| Farmers | 9.0 | 11.7 | | 0.0 | 15.0 | 8.9 | 10.0 | 6.5 |
| District Assembly (DA) | 4.0 | 5.2 | 5.0 | 2.8 | 19.0 | 11.2 | 19.0 | 12.4 |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | 6.0 | 7.8 | 13.0 | 7.3 | 17.0 | 10.0 | 18.0 | 11.7 |
| NGO's | | 0.0 | 12.0 | 6.8 | 18.0 | 10.6 | 18.0 | 11.7 |
| Forestry Commission (FC) | 3.0 | 3.9 | 16.0 | 9.0 | 8.0 | 4.7 | 17.0 | 11.1 |
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 8.0 | 10.4 | 22.0 | 12.4 | | 0.0 | | 0.0 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Ministry of Land and Natural Resources (MoLNR) | | 0.0 | 18.0 | 10.2 | | 0.0 | 17.0 | 11.1 |
| Ghana Meteorological Agency (GMET) | 4.0 | 5.2 | 20.0 | 11.3 | | 0.0 | 12.0 | 7.8 |
| Input Providers | 6.0 | 7.8 | 2.0 | 1.1 | 10.0 | 5.9 | 11.0 | 7.2 |
| INGO's (CARE, Plan, IDE etc) | 6.0 | 7.8 | 10.0 | 5.7 | 14.0 | 8.3 | 3.0 | 2.0 |
| Banks (ADB, ECOBANK etc) | 7.0 | 9.1 | | 0.0 | 11.0 | 6.5 | 8.0 | 5.2 |
| Climate Change, Agriculture and Food Security (CCAFS) | 7.0 | 9.1 | 22.0 | 12.4 | | 0.0 | | 0.0 |
| Assemblypersons | 2.0 | 2.6 | 6.0 | 3.4 | 19.0 | 11.2 | | 0.0 |
| World Bank | | 0.0 | 17.0 | 9.6 | 12.0 | 7.1 | | 0.0 |
| Women's groups | 7.0 | 9.1 | | 0.0 | 16.0 | 9.5 | | 0.0 |
| Ministry of Health | 5.0 | 6.5 | | 0.0 | 7.0 | 4.1 | | 0.0 |
| District Chief Executive (DCE) | 6.0 | 7.8 | 3.0 | 1.7 | 19.0 | 11.2 | | 0.0 |
| Traders | 5.0 | 6.5 | 1.0 | 0.6 | 1.0 | 0.6 | 14.0 | 9.1 |
| Religious Groups | 7.0 | 9.1 | 11.0 | 6.2 | | 0.0 | | 0.0 |
| CIDA | | 0.0 | 17.0 | 9.6 | 13.0 | 7.7 | | 0.0 |
| Ministry of Water Resources Works and Housing | 4.0 | 5.2 | | 0.0 | | 0.0 | 16.0 | 10.4 |
| Member of Parliament (MP) | 7.0 | 9.1 | 8.0 | 4.5 | | 0.0 | | 0.0 |
| Savings and Loans groups | 7.0 | 9.1 | | 0.0 | 5.0 | 3.0 | | 0.0 |
| Agroindustries | | 0.0 | 4.0 | 2.3 | 9.0 | 5.3 | 11.0 | 7.2 |
| Ministry of Finance and Economomic Planning (MoF) | 2.0 | 2.6 | | 0.0 | | 0.0 | 13.0 | 8.5 |
| CGIAR [IWMI, IFPRI] | 7.0 | 9.1 | | 0.0 | | 0.0 | | 0.0 |
| Youth groups | 7.0 | 9.1 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Local Government and Rural Development (MoLGRD) | 3.0 | 3.9 | | 0.0 | | 0.0 | 2.0 | 1.3 |
| Regional Coordinating Council (RCC) | | 0.0 | 7.0 | 4.0 | 6.0 | 3.5 | | 0.0 |
| Political Parties (NDC, NPP) | 2.0 | 2.6 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | 3.0 | 3.9 | | 0.0 | | 0.0 | | 0.0 |
| Political Party Leaders | 3.0 | 3.9 | | 0.0 | | 0.0 | | 0.0 |
| UN FAO | | 0.0 | 17.0 | 9.6 | 3.0 | 1.8 | | 0.0 |
| Ghana Climate Action Network (G-CAN) | | 0.0 | 20.0 | 11.3 | | 0.0 | | 0.0 |
| Ministry of Trade and Industry (MOTI) | 2.0 | 2.6 | | 0.0 | | 0.0 | 4.0 | 2.6 |
| USAID | | 0.0 | 17.0 | 9.6 | | 0.0 | | 0.0 |
| AGRA | | 0.0 | 15.0 | 8.5 | | 0.0 | | 0.0 |
| National Development Planning Commission (NDPC) | | 0.0 | | 0.0 | | 0.0 | 7.0 | 4.6 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Climate Action Network (CAN) | | 0.0 | 14.0 | 7.9 | | 0.0 | | 0.0 |
| National Disaster Management Organisation (NADMO) | 1.0 | 1.3 | | 0.0 | | 0.0 | 1.0 | 0.7 |
| International Fund for Agricultural Development (IFAD) | | 0.0 | | 0.0 | 2.0 | 1.2 | 6.0 | 3.9 |
| COOP | | 0.0 | | 0.0 | | 0.0 | 9.0 | 5.9 |
| ECOWAS | | 0.0 | 9.0 | 5.1 | | 0.0 | | 0.0 |
| NCCE | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| AfDB | | 0.0 | | 0.0 | | 0.0 | 6.0 | 3.9 |
| MoFA District Office (DoFA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| DfID | | 0.0 | | 0.0 | | 0.0 | 5.0 | 3.3 |
| Universities [UG, UDS] | | 0.0 | | 0.0 | 4.0 | 2.4 | | 0.0 |
| Rural Poor | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Consumer Groups | | 0.0 | | 0.0 | 1.0 | 0.6 | | 0.0 |
| GiZ | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Global Environment Facility (GEF) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Jica | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Danida | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Norad | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| International Monetary Fund (IMF) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| FARA | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| CAADP | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Community Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ghana Environmental Conventions Coordinating Authority (GECCA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| CORAF | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| NEPAD | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Multilateral | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Consumers | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | | 0.0 |
| UNEP | | 0.0 | | 0.0 | | 0.0 | | 0.0 |

*Local respondents (5-8)*

| **Actor Group** | Chief (27/05) | ADJUSTED | RELIG (27/05) | ADJUSTED | Farmer (27/03) | ADJUSTED | DA (27/03) | ADJUSTED | **FREQUENCY RANKED** | **COMPOSITE SCORE** |
|---|---|---|---|---|---|---|---|---|---|---|
| Council for Scientific and Industrial Research (CSIR) [ARI, SARI, STEPRI etc] | 8.0 | 9.5 | 8.0 | 9.5 | 3.0 | 6.5 | 6.0 | 9.8 | **8.0** | **10.3** |
| Ministry of Food and Agriculture (MoFA) | 8.0 | 9.5 | 7.0 | 8.3 | 2.0 | 4.3 | 3.0 | 4.9 | **8.0** | **9.6** |
| Environmental Protection Agency (EPA) | 3.0 | 3.5 | 9.0 | 10.6 | | 0.0 | 7.0 | 11.4 | **7.0** | **8.1** |
| Farmers | 11.0 | 13.0 | 6.0 | 7.1 | 5.0 | 10.8 | 2.0 | 3.3 | **7.0** | **7.7** |
| District Assembly (DA) | 2.0 | 2.4 | | 0.0 | 6.0 | 13.0 | 8.0 | 13.0 | **7.0** | **7.5** |
| Traditional Authorities (Paramount Chief, Sub Chief and Chiefs) | | 0.0 | | 0.0 | 4.0 | 8.7 | 5.0 | 8.1 | **6.0** | **6.7** |
| NGO's | 8.0 | 9.5 | | 0.0 | 2.0 | 4.3 | 1.0 | 1.6 | **6.0** | **5.6** |
| Forestry Commission (FC) | 6.0 | 7.1 | | 0.0 | | 0.0 | 4.0 | 6.5 | **6.0** | **5.3** |
| Ministry of Environment, Science, Technology and Innovation (MESTI) | 5.0 | 5.9 | 11.0 | 13.0 | | 0.0 | | 0.0 | **4.0** | **5.2** |
| Ministry of Land and Natural Resources (MoLNR) | 5.0 | 5.9 | 10.0 | 11.8 | | 0.0 | | 0.0 | **4.0** | **4.9** |
| Ghana Meteorological Agency (GMET) | 6.0 | 7.1 | | 0.0 | 3.0 | 6.5 | | 0.0 | **5.0** | **4.7** |
| Input Providers | 8.0 | 9.5 | 5.0 | 5.9 | | 0.0 | | 0.0 | **6.0** | **4.7** |
| INGO's (CARE, Plan, IDE etc) | 10.0 | 11.8 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **4.4** |
| Banks (ADB, ECOBANK etc) | 7.0 | 8.3 | 4.0 | 4.7 | | 0.0 | | 0.0 | **5.0** | **4.2** |
| Climate Change, Agriculture and Food Security (CCAFS) | 10.0 | 11.8 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **4.2** |
| Assemblypersons | 2.0 | 2.4 | | 0.0 | | 0.0 | 8.0 | 13.0 | **5.0** | **4.1** |
| World Bank | 7.0 | 8.3 | 4.0 | 4.7 | | 0.0 | | 0.0 | **4.0** | **3.7** |
| Women's groups | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **3.2** |
| Ministry of Health | 8.0 | 9.5 | | 0.0 | 2.0 | 4.3 | | 0.0 | **4.0** | **3.1** |
| District Chief Executive (DCE) | 3.0 | 3.5 | | 0.0 | | 0.0 | | 0.0 | **4.0** | **3.0** |
| Traders | 5.0 | 5.9 | | 0.0 | | 0.0 | | 0.0 | **5.0** | **2.8** |
| Religious Groups | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **2.8** |
| CIDA | | 0.0 | 2.0 | 2.4 | | 0.0 | 1.0 | 1.6 | **4.0** | **2.7** |
| Ministry of Water Resources Works and Housing | 4.0 | 4.7 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **2.5** |
| Member of Parliament (MP) | 5.0 | 5.9 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **2.4** |
| Savings and Loans groups | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **2.4** |
| Agroindustries | 3.0 | 3.5 | | 0.0 | | 0.0 | | 0.0 | **4.0** | **2.3** |
| Ministry of Finance and Economomic Planning (MoF) | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **2.3** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CGIAR [IWMI, IFPRI] | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **2.0** |
| Youth groups | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **2.0** |
| Ministry of Local Government and Rural Development (MoLGRD) | 9.0 | 10.6 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **2.0** |
| Regional Coordinating Council (RCC) | 6.0 | 7.1 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **1.8** |
| Political Parties (NDC, NPP) | 7.0 | 8.3 | | 0.0 | 1.0 | 2.2 | | 0.0 | **3.0** | **1.6** |
| Ministry of Chieftancy and Traditional Affairs (MoCTA) | 7.0 | 8.3 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.5** |
| Political Party Leaders | 7.0 | 8.3 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.5** |
| UN FAO | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.4** |
| Ghana Climate Action Network (G-CAN) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **1.4** |
| Ministry of Trade and Industry (MOTI) | 4.0 | 4.7 | | 0.0 | | 0.0 | | 0.0 | **3.0** | **1.2** |
| USAID | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **1.2** |
| AGRA | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **1.1** |
| National Development Planning Commission (NDPC) | 3.0 | 3.5 | | 0.0 | | 0.0 | | 0.0 | **2.0** | **1.0** |
| Climate Action Network (CAN) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **1.0** |
| National Disaster Management Organisation (NADMO) | 1.0 | 1.2 | | 0.0 | 2.0 | 4.3 | | 0.0 | **4.0** | **0.9** |
| International Fund for Agricultural Development (IFAD) | | 0.0 | 2.0 | 2.4 | | 0.0 | | 0.0 | **3.0** | **0.9** |
| COOP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.7** |
| ECOWAS | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.6** |
| NCCE | | 0.0 | | 0.0 | 2.0 | 4.3 | | 0.0 | **1.0** | **0.5** |
| AfDB | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.5** |
| MoFA District Office (DoFA) | | 0.0 | 3.0 | 3.5 | | 0.0 | | 0.0 | **1.0** | **0.4** |
| DfID | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.4** |
| Universities [UG, UDS] | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.3** |
| Rural Poor | | 0.0 | 1.0 | 1.2 | | 0.0 | | 0.0 | **1.0** | **0.1** |
| Consumer Groups | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **1.0** | **0.1** |
| GiZ | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Global Environment Facility (GEF) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Jica | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Danida | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Norad | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| International Monetary Fund (IMF) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| FARA | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CAADP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Community Leaders | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ghana Environmental Conventions Coordinating Authority (GECCA) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| CORAF | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| NEPAD | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Multilateral | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Trade and Industry | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Bilateral (Country-Nepal) | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Roads | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Consumers | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| GRA/CCAC | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| Ministry of Communication | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |
| UNEP | | 0.0 | | 0.0 | | 0.0 | | 0.0 | **0.0** | **0.0** |

**Annex 4. Respondent list (Paper 5)**

| Resp. # | Organization | Org Type | Gender | Level | Sector |
|---|---|---|---|---|---|
| 1 | Council for Scientific and Industrial Research, Animal Research Institute (ARI) | Academia | Male | National | Agriculture |
| 2 | Forum for Agricultural Research in Agriculture (FARA) | Academia | Male | National | Agriculture |
| 3 | West African Center for Crop Improvement (WACCI), University of Ghana Legon | Academia | Male | National | Agriculture |
| 4 | University of Ghana Legon | Academia | Female | National | Agriculture |
| 5 | Council for Scientific and Industrial Research, Science and Technology Policy Research Institute (STEPRI) | Academia | Male | National | Development |
| 6 | University of Ghana Legon | Academia | Male | National | Agriculture |
| 7 | Peasant Farmers Association of Ghana | Civil Society | Female | National | Agriculture |
| 8 | Institute for Development Enterprise (IDE) | Civil Society | Male | National | Agriculture |
| 9 | Solidaridad | Civil Society | Male | National | Development |
| 10 | New Patriotic Party (NPP) | Civil Society | Male | National | Political |
| 11 | The Development Institute | Civil Society | Male | National | Development |
| 12 | International Development Enterprise (IDE) | Civil Society | Male | National | Agriculture |
| 13 | Religious Bodies Network on Climate Change (RELBONET) | Civil Society | Male | National | Climate Change |
| 14 | Climate Action Network Ghana (CAN) | Civil Society | Male | National | Climate Change |
| 15 | CARE Ghana | Civil Society | Male | National | Climate Change |
| 16 | Ghana Climate Adaptation Network (Ghana CAN) | Civil Society | Male | National | Climate Change |
| 17 | National Democratic Congress (NDC) | Civil Society | Male | National | Political |
| 18 | Alliance for a Green Revolution in Africa (AGRA) | Donor (bi/multilateral) | Male | National | Agriculture |
| 19 | Global Environment Facility (GEF) | Donor (bi/multilateral) | Male | National | Climate Change |
| 20 | Netherlands Development Organization (SNV) | Donor (bi/multilateral) | Male | National | Agriculture |
| 21 | International Fund for Agricultural Development (IFAD) | Donor (bi/multilateral) | Male | National | Agriculture |
| 22 | Canadian International Development Agency (CIDA) | Donor (bi/multilateral) | Female | National | Development |
| 23 | United Nations Development Program (UNDP) | Donor (bi/multilateral) | Female | National | Development |
| 24 | Japan International Cooperation Agency (JICA) | Donor (bi/multilateral) | Male | National | Development |
| 25 | World Bank | Donor (bi/multilateral) | Male | National | Climate Change |
| 26 | German International Development Agency (GIZ) | Donor (bi/multilateral) | Male | National | Climate Change |
| 27 | Ghana Meteorological Agency (GMET) | Government | Male | National | Climate Change |
| 28 | Ghana Cocoa Board (COCOBOD) | Government | Male | National | Agriculture |
| 29 | Ministry of Finance (MoF) | Government | Male | National | Planning |
| 30 | Ministry of Environment Science, Technology and Innovation (MESTI) | Government | Male | National | Climate Change |
| 31 | Ministry of Environment Science, Technology and Innovation (MESTI) | Government | Male | National | Climate Change |
| 32 | Ministry of Food and Agriculture (MoFA) | Government | Male | National | Agriculture |
| 33 | Ministry of Environment Science, Technology and Innovation (MESTI) | Government | Male | National | Climate Change |
| 34 | Ministry of Food and Agriculture (MoFA) | Government | Male | National | Agriculture |
| 35 | Environmental Protection Agency (EPA) | Government | Male | National | Climate Change |
| 36 | Ministry of Local Governance and Rural | Government | Male | National | Planning |

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|---|---|---|---|---|---|
| | Development (MLGRD) | | | | |
| 37 | National Development Planning Commission (NDPC) | Government | Male | National | Planning |
| 38 | National Development Planning Commission (NDPC) | Government | Male | National | Planning |
| 39 | National Disaster Management Organization (NADMO) | Government | Male | National | Climate Change |
| 40 | Agricultural Developmet Bank (ADB) | Private Sector | Male | National | Agriculture |
| 41 | Association of Ghana Industries (AGI) | Private Sector | Male | National | Development |
| 42 | Wienco Ghana Limited (Input Provider) | Private Sector | Male | National | Agriculture |
| 43 | Ghana Social Opportunities Program (GSOP) | Civil Society | Male | Regional | Development |
| 44 | CARE Ghana | Civil Society | Male | Regional | Climate Change |
| 45 | Regional Coordinating Council (RCC) | Government | Male | Regional | Planning |
| 46 | Ministry of Food and Agriculture (MoFA) | Government | Male | Regional | Agriculture |
| 47 | Environmental Protection Agency (EPA) | Government | Male | Regional | Climate Change |
| 48 | Regional Coordinating Council (RCC) | Government | Female | Regional | Planning |
| 49 | Regional Coordinating Council (RCC) | Government | Male | Regional | Development |
| 50 | National Disaster Management Organization (NADMO) | Government | Male | Regional | Planning |
| 51 | Regional Coordinating Council (RCC) | Government | Male | Regional | Planning |
| 52 | Ministry of Food and Agriculture (MoFA) | Government | Male | Regional | Agriculture |
| 53 | Ghana Meteorological Agency (GMET) | Government | Male | Regional | Climate Change |
| 54 | Regional Coordinating Council (RCC) | Government | Male | Regional | Planning |
| 55 | Ministry of Food and Agriculture (MoFA) | Government | Male | Regional | Agriculture |
| 56 | Savannah Accelerated Development Authority (SADA) | Private Sector | Male | Regional | Forestry |
| 57 | Agricultural Input Provider | Private Sector | Male | Regional | Agriculture |
| 58 | Agricultural Input Provider | Private Sector | Male | Regional | Agriculture |
| 59 | National Democratic Congress (NDC) | Civil Society | Male | Local | Political |
| 60 | Religious Body | Civil Society | Male | Local | Development |
| 61 | International Development Enterprise (IDE) | Civil Society | Male | Local | Agriculture |
| 62 | Local NGO (Lawra) | Civil Society | Male | Local | Agriculture |
| 63 | Traditional Authority | Civil Society | Male | Local | Development |
| 64 | International Development Enterprise (IDE) | Civil Society | Male | Local | Agriculture |
| 65 | National Democratic Congress (NDC) | Civil Society | Male | Local | Political |
| 66 | United States Peace Corps | Civil Society | Female | Local | Agriculture |
| 67 | Ministry of Food and Agriculture (MoFA) | Government | Male | Local | Agriculture |
| 68 | District Department of Agriculture (MoFA) | Government | Male | Local | Agriculture |
| 69 | National Commission for Civic Education (NCCE) | Government | Female | Local | Political |
| 70 | Lawra District Assembly (DA) | Government | Male | Local | Planning |
| 71 | Lawra District Assembly (DA) | Government | Male | Local | Planning |
| 72 | Ministry of Food and Agriculture (MOFA) | Government | Female | Local | Agriculture |
| 73 | Lawra District Assembly (DA) | Government | Male | Local | Planning |
| 74 | Forestry Commission (FC) | Government | Male | Local | Forestry |
| 75 | Ministry of Food and Agriculture (MoFA) | Government | Male | Local | Agriculture |
| 76 | Lawra District Assembly (DA) - Business Development | Government | Male | Local | Development |
| 77 | Lawra District Assembly (DA) - Cooperatives | Government | Male | Local | Development |
| 78 | Ministry of Food and Agriculture (MoFA) | Government | Male | Local | Agriculture |
| 79 | Orbili Farmer | Private Sector | Male | Local | Agriculture |
| 80 | Orbili Farmer | Private Sector | Male | Local | Agriculture |

**Annex 5. Interview schedule (Paper 5)**

INSTITUTIONAL

- Please briefly describe your role and the main objectives/interest of your organization?
- What is the geographic reach of your organization (i.e. districts, constituency, regions etc)
- Who is your client? (e.g. farming community, civil society, wholesalers, NGOs, Govt etc.)
- How does your organization ensure that the interests of those you serve are captured and included in your planning (e.g. through dialogue, forming committees, vulnerability analysis)?
- What resources does the organization have […access to]? (e.g. expertise, funds, human resource, legislation authority, global network)
- Does your organization work in the agricultural/climate change sector or with actors from the agricultural/climate change sector?
- Who are the key decision makers in your organization in terms of climate change or climate change adaptation.
- What types of decisions do they make, what resources do they control, where do they go for knowledge, and how are they held accountable?
- Which organizations/groups does your organization regularly interact with (climate adaptation)?

CLIMATE CHANGE ADAPTATION

- What do you think of when you hear the word: (a) "climate change", (b) "climate change adaptation"
- How do you identify climate change challenges and adaptation strategies?
- Do you think that communities have the capacity to make informed decisions in climate change adaptation/development interventions?
- What are the most important policies in environmental change, climate change, agriculture, sectors and how do they impact you?
- What constitutes measure of success for these projects/plans? (e.g reaching X number of people, or releasing X amount of funds). How do you measure it?
- Can you give examples of successful projects? What worked and what did not? What are the key operational challenges you face (climate change adaptation in agriculture/ objectives)

POLITICAL ECONOMY

- Is there an impact of decentralization on your organization?
- What do you think of the multiple adaptation funding channels (Govt, line ministries, NGOs/Bilateral). Is there a need to centralize these? Who should manage this process?
- Is the planned funding mechanism designed appropriately to reach the climate vulnerable communities? Explain?
- What are the practical challenges and limitations in the implementation, what can be improved?
- Name the three most influential actors in climate change adaptation in your opinion.
- Who should be the main funder for climate change adaptation?
- Who should be the main recipient of climate change adaptation funding?
- What role do the following actors play in climate change adaptation? (a) Chieftaincy; (b) Political Parties; (c) Agencies; (d) Private sectors (NGOs, industry), (e) Funders

MISCELLANEOUS

- Why so much language on climate smart agriculture in the NCCP? How were priority areas and interventions chosen?
- What do you consider adaptation interventions in the agricultural sector?
- Has there been a parliamentary vote on climate change in Ghana? What about the parliamentary environment committee?
- To what extend do you rely on your own intuition in prioritizing adaptation options?

**Annex 6. Three dimensions of power in Ghana's adaptation policy regime (Paper 5)**

| Dimension of Power | Manifestation | Description | Anticipated impact on adaptive capacity | Cross-dimension links |
|---|---|---|---|---|
| D1 Decision making | **Policy Outcomes:** Emphasis on mitigation within climate policy facilitated by the dominance of development partners, and limited domestic ownership | The content of formal climate change policies (NCCP) represent the type of express policy preferences reached through political participation that Lukes' describes in his first dimension | NCCP promotes interventions preferred by international agents, especially emissions reductions (mitigation) within the agricultural sector | Link to 'D3.a.b discourse of climate change as deforestation'; to 'D3.b neoliberal development rationality' |
| D1 Decision making | **Participation and Inclusiveness:** General perception among respondents that adaptation policy and planning institutions are inclusive of local needs and preferences, but lack implementation | Formal planning institutions in Ghana serve as the basis for political participation, bringing stakeholder preferences out and, at times, in conflict with other actor groups. This manifestation of power through the formal development planning mechanism constitutes first dimension, decision making power | Strong bottom-up planning, and climate policy integration in to sectoral and district plans promotes active participation of 'local' units (e.g. farmers and district agents) in adaption planning. Inclusive, bottom-up planning promotes diverse and locally appropriate adaptation strategies | Link to third dimension 'D3.a.c narratives around the capacity of farmers'; to 'D2 Selective Funding (non-funding) and implementation'; to 'D2 decentralization without devolution'; to 'D3.c Punctualization of government and politics' |
| D1/2 Decision making and agenda setting | **Executive Power:** The strength of Executive relative to the Legislature branch in Ghana's development and adaptation planning regime | The executive and legislative branches interact in formal, first dimension political settings, and their ability to fulfill or defer their decision making (or non-decision making) and oversight responsibilities suggests second dimension agenda setting power | The inability (unwillingness) of legislators to hold the executive branch in check regarding policy and funding decisions results in the elevated influence of the President leading to unilateral decision making and the undermining of participatory planning in Ghana. Resources for locally appropriate adaptation can be diverted at 'source' towards presidential and party priorities | Link to 'D2 Selective Funding (non-funding) and implementation'; to 'D3.c. Cultural derivation of authority'; to 'D1. Policy outcomes' (i.e. manifestos); to 'D2 decentralization without devolution'; to 'D1 policy outcomes'; to 'D3.c Punctualization of government and politics' |
| D2 Agenda Setting | **Decentralization without devolution:** Political decentralization that does not devolve power to the district, but vests power in a DCE appointed by president | Ongoing decentralization efforts in Ghana that fail to effectively devolve power to local authorities constitutes a type of second dimension agenda setting power described by Lukes | Decentralization in name only does not increase the autonomy of local agencies and the decision making power of smallholders. It does, however, increase the discretion of the DCE who is the DA spending officer and is appointed by the President. Adaptation pathways supported by the executive are likely to prevail and can be concentrated within communities loyal to the party in power | Links to 'D1/2 Executive power'; to 'D2 Selective Funding (non-funding) and implementation'; to 'D3.c Punctualization of government and politics' |

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| D2 Agenda Setting | **Selective Funding (non-funding) and implementation:** Perennial delays and cuts to district funding limits DA autonomy from central government facilitated by executive source deductions, and paralleled by selective funding of the NCCP by development agents | Resistance to fiscal decentralization, source deductions by the executive branch, and policy design of the NCCP each facilitate the selective funding of adaptation interventions constituting second dimension 'non decision making' | Selective funding by the executive branch leads to delays (and source deductions) in time-sensitive payments to DA's for agricultural inputs and service provision. Similarly, donors can choose segments of the climate change policy to fund, leading to a bias towards the implementation of donor-supported adaptation pathways | Links to 'D2. Actor autonomy and accountability'; to 'D1/2 Executive power'; to 'D2 decentralization without devolution'; to 'D3.b Neoliberal rationality'; 'D3.a.c narratives around the capacity of farmers' |
| D2 Agenda Setting | **Actor autonomy and accountability:** Extreme autonomy of non-governmental organizations driven by mistrust, and poor coordination between government and non-governmental agencies | The extreme autonomy of non-governmental organizations in Ghana's adaptation regime implies that the decisions that these groups take fall outside of formal political forums. Conflict between government and INGOs constitutes second dimension agenda setting power | In a context of complete autonomy from government planning structures, the adaptation preferences of INGOs prevail over local alternatives captured in DA medium term and annual action plans. This can lead to duplication of efforts or an undermining of the inclusive adaptation planning process | Links to 'D2 Selective Funding (non-funding) and implementation; to 'D3.b Neoliberal rationality' |
| D3.a.c Preference Shaping – Narratives and discourse, systemic bias | **Narratives around the capacity of farmers:** Narratives around the capacity of farmers (particularly in the North) and the value of indigenous knowledge (i.e. "Farmers know nothing/everything"; "Farmers as victims"; "illiterates" versus the "educated") | Narratives and discourse that establish so-called 'truths' (perceptions) regarding the capacity of certain actor groups and thus rendering them 'subjects' or 'victims', belongs to the third dimension of power, mainly dominant narratives and discourse, but also systemic bias | Narratives around the low capacity of farmers (especially in the Upper West Region) devalue indigenous knowledge and traditional adaptation pathways. Farmers portrayed as 'victims' are policy takers, not active stakeholders in policy development and implementation. Consequently, locally acceptable or preferable adaptation options fail to emerge | Links to 'D2 Selective Funding (non-funding); to 'D1 Participation and inclusiveness'; to 'D3.a Narrative of uncertainty' |
| D3.a.b Preference Shaping – narratives and discourse, and ration | **Narrative of uncertainty:** Narrative of uncertainty, and adaptation as technical and expert-driven | Narratives and discourse of 'uncertainty' assigns trusteeship over decision making to qualified experts, predetermining systems boundaries and biasing problem identification and solutions to those held to be viable by trustees. This phenomenon belongs to third dimension of power, dominant narratives and discourse | Elevates the status of international experts and domestic technical agents or those capable of overcoming the inherent 'uncertainty' simultaneously devaluing local agents, eroding the need for active participation by 'non-experts' and stifling the emergence of locally determined adaptation measures | Links to 'D3.a.c narratives around the capacity of farmers'; to 'D2 Actor autonomy and accountability'; to 'D2 Selective Funding (non-funding) and implementation |

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| D3.a.b Preference Shaping – narratives and discourse, prevailing ratioanlities | **Narrative of "environment as deforestation":** Discourse of climate change as 'environment' and environment as 'deforestation' | The belief that climate change is an inherently environmental issue among local actors (i.e. not a development issue) biases problem and solution identification. This dynamic belongs to both dominant narratives and discourse and prevailing rationalities of the third dimension of power | The framing of climate change as an environmental issue as opposed to a development issue limits the scope of intervention to those measures deemed to belong to the realm of the 'environmental stewardship', including tree planting | Links to 'D1 Policy outcomes'; to 'D3. a.c narratives around the capacity of farmers' |
| D3.b Preference Shaping – prevailing rationality | **Neoliberal rationality:** Prevailing 'neoliberal' market-based, techno-fix rationality reinforced by negative perceptions of the state and existing development deficits | The prevalence of certain 'inevitable logics', or taken for granted notions in adaptation governance that privileges certain lines of policy intervention over others is a third dimension preference shaping manifestation of power, prevailing rationalities of government | A neoliberal rationality active in business-as-usual development promotes adaptation interventions that are infrastructure or market based. Key actors within the DA who value infrastructure interventions for vote-getting purposes, and a general negative perception of government perpetuate this rationality. The result is a potential restricting of adaptation pathways available/presented to smallholders | Links to 'D1 policy outcomes'; to 'D2 Selective funding (non-funding) and implementation; to 'D2 actor autonomy and accountability'; to 'D3. Narrative of uncertainty' |
| D3.c Preference Shaping – Systemic bias | **Cultural derivation of Authority:** Colonial history, "indirect rule" and the role of traditional authorities, strong man politics | The historical and cultural deference of decision making and opinion leading to traditional authorities, seniors, and 'big men', constitutes a systemic bias that shapes the preferences of local actors | Traditional authority elevates the status of chiefs as opinion leaders within the community, centralizing decision making processes within these individuals who hold power over land tenure. This can result in a reduction in long-term investment in land by community members (especially women) and related adaptation strategies | Links to 'D1/2 Executive power'; to 'D3.c Puncutalization of government and politics'; to 'D2 Decentralization without devolution' |
| D3.c. Preference shaping – systemic bias | **Punctualization of government and politics:** Adoption of traditional ruling structures for political ends, conflation of government and political parties, and 'political service delivery' | The dominant belief, particularly among the rural poor, that government (civil servants) and 'political parties' are one and the same—a belief perpetuated by the parties themselves — that leads structural clientalism and patronism in adaptation service delivery. This is a third dimension preference shaping manifestation, derived from systemic bias | Conflation of civil servants with political parties elevates the status of political parties, creating a dominant short-termism in adaptation initiatives that is biased towards politically aligned communities, and that can undermine the established DA planning process and locally determined adaptation measures | Links to 'D1/2 Executive power'; to 'D2 Decentralization without devolution'; to 'D3.c cultural derivation of authority' |