

THE MARGINALISATION OF AN ORPHAN SPECIES: EXAMINING
BAMBOO'S FIT WITHIN INTERNATIONAL FORESTRY INSTITUTIONS

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ABSTRACT

This thesis presents an examination of the interplay between bamboo and institutions of resource management in China, India and internationally, highlighting the need for greater diversity and scope of Western dominated forestry institutions and associated mechanisms. Firstly, the thesis aims to explore the conceptual understanding of forests and the exclusion of bamboo from this construction. The key reason this question is important is that it changes the ‘technological zones’ of forestry. Growing resource scarcity has meant that bamboo is now an increasingly important input in the global forest products marketplace. Secondly, the thesis aims to examine how governance mechanisms and actors respond to the inclusion of this new input.

The thesis adopts the ‘paper route’; the first paper traces the socio-historical reasons why bamboo’s potential is yet to be realised, particularly within international policy. It considers the challenges of forestry being predominantly conceptualised as treed lands and the implications for the limited efficacy of sustainable forestry, carbon and trade instruments when applied to bamboo. The second paper acts as an introduction to Western produced forest certification devices, focusing on their transformation within forestry institutions and perceived legitimacy within China. The third paper focuses on a case study of bamboo certification in India. The final paper analyses the controversy regarding the efficacy of forest certification for bamboo globally.

The thesis aims to explore these topics through three lines of theory. First, it contributes to institutional framing theory by examining where the idea of a ‘forest’ originated from and the consequences this has had for the rise of bamboo as a ‘timber’ product. Second, the thesis aims to further legitimacy theory in two key ways, by examining how the Chinese government accommodates and facilitates the differing needs of both international and domestic markets, whilst ultimately assuming a legitimate form of (institutionalised) domestic governance, and how the perceived input (procedure) and output (efficacy) legitimacy influence the potential success of current and future forest certification for bamboo. Third, the thesis seeks to provide a dynamic analysis of the role of certification through the lens of performativity, which uncovers how certification can create different realities for different actors.

This thesis is timely and important for a number of reasons. Firstly, China is gaining more prominence on the world stage, both as an economic and political power. With increased pressure on forestry resources, the forestry administration is determined to upscale sustainable forest management. This requires adhering to global notions of sustainability through market mechanisms and ensuring a degree of autonomy of forest management through localising processes. Secondly, China recently received Forest Stewardship Council (FSC) bamboo certification for some of the most intensively managed areas in the country. This has increased controversy amongst experts regarding the efficacy of the mechanism to truly bring about sustainable bamboo management. Thirdly, on a more global scale, one of the crucial issues with up-scaling bamboo management is the fact that there are over 1,200 species of bamboo, with three different rooting structures: monopodial (diffuse) sympodial (clumping), and amphodial (mixed) – which have distinct policy and management needs. Focusing purely on the large-scale, intensively managed, monopodial or ‘treelike’ stands in China would ignore the vast areas of small-scale, sympodial bamboo homesteads with issues regarding flowering and propagation of sterile species. Bamboo plantations in Africa, Latin America, and India are being developed, which require enabling policy and management mechanisms. With a global industry estimated at US\$10bn, the implications of an inclusive and enabling frame for bamboo management could have wide ranging impacts for both natural resource management and livelihood development.

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PREFACE

I moved to China in 2002 as a volunteer for Voluntary Services Overseas (VSO). After teaching English in a rural city in Guizhou province for two years, I moved to the programme office in Beijing to work on an HIV and AIDS education programme. This was followed by a year and a half advanced Chinese language programme at Beijing Language and Culture University (BLCU). In 2005, during my time at BLCU, I volunteered on a sustainable consumption project for the China Environment and Development Reference and Research Centre. My role was to research air pollution and sustainable alternatives to timber. This was when I discovered bamboo. I interviewed experts at the International Network for Bamboo and Rattan (INBAR) and subsequently edited INBAR's publications as a volunteer; the position provided extended insights into the world of bamboo.

I left China in 2006 to do an MSc in Environmental Sustainability at the University of Edinburgh. Whilst studying for my course, I also participated in the 4th year Chinese undergraduate degree. My thesis focused on the feasibility of bamboo certification for China, for which I conducted fieldwork in China assisted by INBAR.

After graduating in 2007, I returned to China to work as a consultant for INBAR, conducting research on bamboo resources and certification in rural areas. The task of making certification work for local communities was incredibly challenging. The fact that bamboo was placed and operated within forestry institutions—institutions which were conceptualised primarily as treed lands—appeared to be a major stumbling block for bamboo farmers in China and for farmers globally. Observing this interesting complication inspired me to apply for a DPhil at the University of Oxford. In 2008, I enrolled on my DPhil programme funded by the British Inter-University China Centre (BICC).

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LIST OF ACRONYMS

CAF	Chinese Academy of Forestry
CBRC	China National Bamboo Research Centre
CCAA	China Certification and Accreditation Association
CNAS	China National Accreditation Service for Conformity and Assessment
CNCA	China National Certification Administration
CDM	Clean Development Mechanism
CFCC	Chinese Forest Certification Council
COC	Chain of Custody
CSR	Corporate Social Responsibility
FLEGT	Forest Law and Enforcement, Governance and Trade
FSC	Forest Stewardship Council
GPN	Global Production Network
HS	Harmonised Commodity Description and Coding Systems
INBAR	International Network for Bamboo and Rattan
ISO	International Standards Organisation
NGO	Non Governmental Organisation
NTFP	Non Timber Forest Product
NSMD	Non State Market Driven (governance)
P&C	Principles and Criteria
PEFC	Programme for the Endorsement of Certification schemes
REDD	Reducing Emissions from Deforestation and Degradation
SFA	State Forestry Administration
VPA	Voluntary Partnership Agreements
WBO	World Bamboo Organisation
WTO	World Trade Organisation

WWF

World Wide Fund for Nature

CHAPTER 1: INTRODUCTION

1.1. Aims of the Study

This thesis presents a case study of bamboo. The overarching aim is to examine bamboo's fit within international forestry institutions, with particular reference to certification. The thesis approaches research from a social constructivist perspective and through a human-plant geographies approach. It aims to examine how the social construction of bamboo as a 'natural' resource impacts and shapes natural resource governance mechanisms, such as certification. It intends to explore these issues through four major papers, which cover two main topics—bamboo and certification—in China and India.

Firstly, the thesis aims to explore the conceptual understanding of forests and the exclusion of bamboo from this understanding. This is important because the insertion of bamboo within forestry institutions changes the 'technological zones' of forestry. Bamboo's inclusion within forestry institutions is significant; growing resource scarcity has meant that bamboo is now an input, and an increasingly important input, in the global forest products marketplace.

Secondly, the thesis aims to examine how governance mechanisms and actors respond to the inclusion of this new input. It does this by examining: 1) how the management of bamboo fits with a selection of forest governance mechanisms designed to promote responsible management practices; 2) how China, the country with the greatest commercial bamboo resources in the world, is adapting its governance structure to facilitate forest certification within its borders; 3) how forest certification plays a performative role in shaping sustainable bamboo governance; and 4) how the communities of practice for the cultivation of bamboo

have reacted to the inclusion of bamboo within the ‘technological zones’ of forestry regarding the application of associated governance mechanisms.

The thesis aims to explore these topics through three lines of theory. First, the thesis contributes to institutional literature by exploring institutional framing. It examines the cultural construction of the ‘forest’ and the consequences this has had for the rise of bamboo as a ‘timber’ product. Second, the thesis aims to further legitimacy theory by examining how the Chinese government accommodates and facilitates the differing needs of both international and domestic markets, whilst ultimately assuming a legitimate form of (institutionalised) domestic governance, and how the perceived input (procedure) and output (efficacy) legitimacy influence the potential success of current and future forest certification for bamboo. Third, the thesis seeks to provide a dynamic analysis of the role of certification through the lens of performativity, which uncovers how certification can create different realities for different actors. These themes are examined in further detail in this chapter and are explored through four key research questions identified below:

- 1) How does bamboo fit within international institutions of forest governance and what are the implications for its management and development?
- 2) How is China responding to forest certification (Non State Market Driven - NSMD governance), and how is legitimacy being negotiated?
- 3) What is the performative role of forest certification for sustainable bamboo management?
- 4) How are bamboo ‘communities of practice’ responding to the inclusion of bamboo within the ‘technological zones’ of forestry, and what are the implications for the legitimacy of forest certification?

1.2. Position within Geography

The thesis draws upon multiple lines of enquiry within geography, in particular: i) the social construction of nature, ii) human-plant geographies, and, iii) resource geographies. These themes are based broadly on social constructivism within human geography. They collectively highlight how plants—through their social construction, value, and position within institutions—are embedded within socio-historical contexts, determined by place and space.

The social construction of nature and agency of non-human actors are common themes in human geography. Braun (2008) suggests that scholars of neoliberal natures should adopt a non-anthropogenic view of the agency of nature and investigate the ways in which non-human subjects become represented as political subjects. This provides a more sensitive characterisation of non-humans, highlighting the political and economic forces which construct them. A focus on the co-constitution of resources and social relations enables the identification of counter hegemonic forms, with alternative concepts of nature-society relations (Bakker 2010). Therefore, landscapes are symbolic environments created by humans conferring meaning to nature and the environment. Shared, taken-for-granted symbols and meanings emerge through a process of social and natural phenomena, creating a known reality for a group of people. Reality is therefore socially defined, yet the definitions are embodied within a cultural context (Greider and Garkovich 1994).

Going beyond non-human actors, one must consider plant geographies. The topic of human-plant geographies has garnered less academic attention than human-animal geographies. This may in part be because plants are not subjected to the same ethical considerations as animals and are readily transformed, making them mobile and malleable. Furthermore, plants can be placed under food or commodity geographies, rather than gaining from human geography

approaches to constructivism. Plants are rarely considered as individuals; they are normally framed as collectives or assemblages (Head and Atchison 2008). Due to their changing form, plants change their affective capacity. For example, bamboo is simultaneously a vegetable and a substitute for timber, cotton fibres, fibreglass, as well as other production materials. Plant charisma changes depending on its associations. In China, bamboo is revered, whereas in India it is associated with low castes and death. When considering plants such as bamboo, human geography has highlighted the cultural contingency of categorisation such as invasive species, aliens, and weeds (Head and Atchison 2008).

Perceived as a ‘natural’ resource, bamboo’s potential as a substitute crop is yet to be fully realised. This resonates with debates within resource geographies regarding views of natural resource scarcity. Scarcity is often viewed as something inherent in nature, when it is inextricably linked to cultural and social factors (Harvey 1974). More emphasis needs to be placed upon enhancing the value of natural resources than emphasising issues of scarcity (Scott and Pearce 1992). Furthermore, considering resources as a predominantly social category, rather than ‘natural’, helps us to understand that resource dynamics can change their value over time and space due to technology advances and culture. If a historical or geographical category is changed, then the material transforms its value. Whether something is classed as a resource, Bridge (2009) argues, tells us more about a society than about the resource itself. Resource geographies therefore consider why something is regarded as a resource and questions who benefits from the prevailing patterns of resource production.

1.3. Contribution to literature

This thesis offers a valuable contribution to existing literature within forestry governance and human geography, situated within contemporary debates regarding governance, institutions,

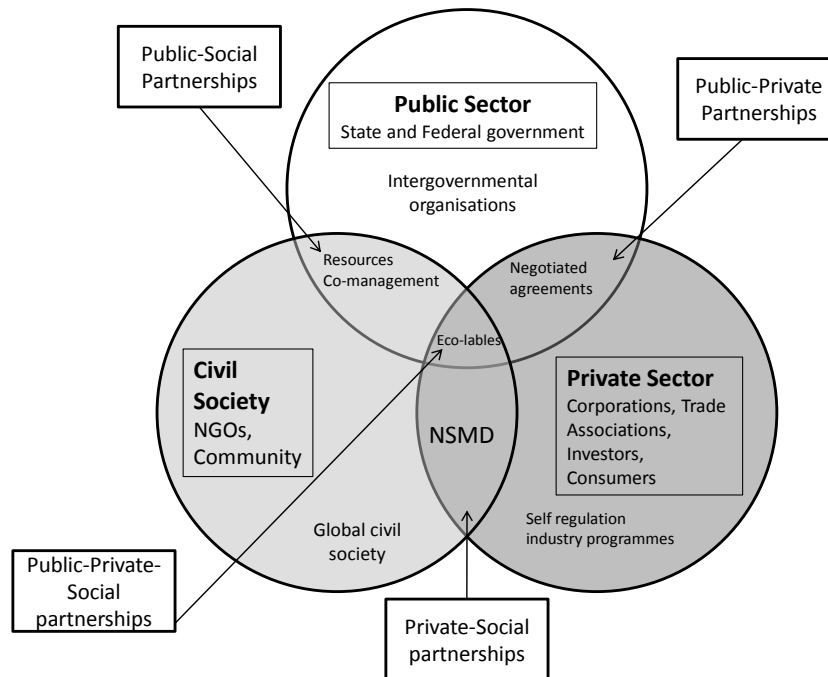
legitimacy, and performativity. As a research agenda, governance is gaining increasing importance (Delmas and Young 2009). This is on account of rising global interconnectedness across environments, societies and economies, leading to flows of influence and materials. Increasing global interdependencies have resulted in a greater need for attention to cross-scale issues and a new process of collaborative management through networks of political, state, corporate, and civil society actors. Globalisation and decentralisation have led to the decline of the state and provided an avenue for new forms of market based environmental governance (Lemos and Agrawal 2009).

In response, Corporate Social Responsibility (CSR) has become an institutionalised feature within the contemporary landscape of advanced industrial economies; the concept that corporations should engage in environmentally or socially responsible behaviour has become a legitimate expectation (Brammer et al. 2012). Certification systems are often grouped under CSR and attempt to reward environmentally responsible business practices through positive recognition and market initiatives. Their distinct feature is that they do not appeal to the state for rule making authority, but are driven by stakeholders who demand such products (Auld et al. 2009).

One example of such an environmental management system is forest certification, which comprises of a set of international environmental norms, based on third-party auditing of performance based standards, and is developed by non-state actors such as NGOs and industry associations. This has created a new form of ‘network governance’, whereby governance has shifted from government to network regulation. A ‘credibility alliance’ has created new spheres of authority through a network of actors from environmental NGOs, forestry and policy sectors, and business spheres (Eden 2009). This new form of non-state market driven (NSMD) governance utilises the market to ameliorate environmental problems

(Cashore 2002). Figure 1.1 shows the position of NSMD governance in relation to other environmental management systems.

Figure 1.1: Mapping Environmental Management Systems



Source: Delmas and Young (2009)

One aspect of this thesis considers the roles of actors within the network of forest certification. The direction that environmental governance takes depends on the commitment of a network of disparate actors (Eden 2009). Whilst gaining legitimacy through a network of actors, governance systems also interact and are embedded within demographic, technological and cultural forces. It is important to assess the actual fit and distinctive features of the settings an environmental mechanism is being placed within in order to reach conclusions about the effectiveness of governance systems (Delmas and Young 2009). A governance system therefore needs to be both politically feasible and tailored to the specific problem (Young 2009).

1.4. Contribution to theory

In order to examine the fit of bamboo within forestry institutions, the thesis adopts three theoretical lenses: institutional framing, legitimacy, and performativity. Each element of theory will be addressed in the following section.

1.4.1. Institutional framing

This thesis examines bamboo's fit within international forestry institutions. Analysis of institutional frames pays attention to the sources of constraints and inertia that keep policy discussions anchored in assumptions and models which do not necessarily have an adequate institutional fit (Hoffman and Ventresca 1999). According to North (1990:3):

“Institutions are the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction.”

Nature is increasingly something produced under the conditions of the capitalist economy, whereby representations are grounded equally within its material processes of production and distribution. Both nature and its representations have been produced historically in the context of global power relations (Christophers 2006). Since institutions are a construct of society, society is much more engaged in reproducing existing institutions than producing new ones (Vatn 2005); institutions are therefore isomorphic in that they resemble others (DiMaggio and Powell 1983). However, this isomorphic process can be viewed as ‘ceremoniously’ reflecting the institutional environment with its procedures and practices, and thus is not necessarily efficient or effective (Meyer and Rowan 1977). North (1999: 140) highlights the need to deconstruct institutions and investigate institutional framing:

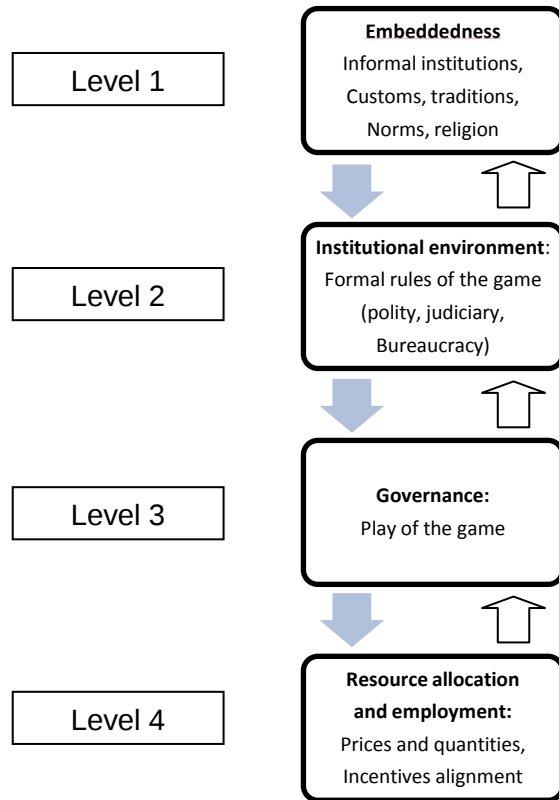
“Informal constraints matter. We need to know more about culturally derived norms of behaviour and how they interact with formal rules to get better answers to such issues.”

This focus on informal constraints is fundamental to the theoretical foundations of this thesis. As previously mentioned, the social construction of forestry is explored through analysing its institutional framing. To facilitate an examination of institutions further, Scott (1995) deconstructs institutions into three distinct models: regulative, normative and cognitive. Regulative models of institutions are based on legal sanctions; normative models are morally grounded, and cognitive models of institutions refer to the collective construction of social reality embodied within public activity. Cognitive models of institutions are considered ‘taken-for-granted’, whereby action occurs within the context of wider and prior symbolic frameworks and systems of categorisation (Hoffman and Ventresca 1999). For instance, we approach the world from situated perspectives, situated by—but not reducible to—our own interests and capacities and by our own particular historical and geographical position in the world (Castree 1995). The institution of ‘forestry’ can be considered a cognitive institutional model. In short, the shared conceptualisation of a forest has become a shared taken-for-granted reality. However, instigating change within the cognitive field is challenging because the political and cultural nature of cognitive institutional models means the framing and boundaries of the institution are not always perceptible. In order to initiate change, efforts must incorporate strategies that address all aspects of institutions- regulative, normative and cognitive (Hoffman and Ventresca 1999).

To explore institutions further, Williamson (2000) perceives four levels of institutions: 1) embeddedness, 2) the institutional environment, for example the ‘formal rules of the game’, 3) governance regarding the ‘play of the game’, and 4) resource allocation (Figure 1.2). From a geographical perspective, it is important to understand how these levels interact, through

analysing place-specific, historical circumstances that explain social outcomes (Neilson and Pritchard 2009). This is particularly relevant when considering the fit of forest certification in non-Western societies and, particularly in this case, the interplay with non-timber species.

Figure 1.2: The economics of Institutions



Source: Adapted from Williamson (2000) In Neilson and Pritchard (2009)

Much governance literature has attempted to conceptualise the importance of the cultural or institutional ‘space’ in which certification or standards operate. Whilst these issues will be explored in more depth in the following chapters, it is helpful to reflect on their basic premise. For instance, forest certification benefits from the conceptual frameworks of technological zones, organisational fields, and communities of practice. The technological zones of forestry are explored as a conceptual tool to assist the understanding of how bamboo is changing forestry institutions. Barry (2006) articulates ‘technological zones’ as an assemblage that accelerates and intensifies agency in particular directions, with unpredictable

and dynamic effects. In this instance, forestry as an institution of resource governance is an assembly of technological zones. Technological zones do not exist in isolation from other institutions or correspond to the territorial space of the nation-state. The spaces established through their development implies:

“... the need for analysis of the historical construction of particular political and economic spaces, and the specificities of the materials, practices and locations which they transform, connect, exclude and silence.” (Barry 2006)

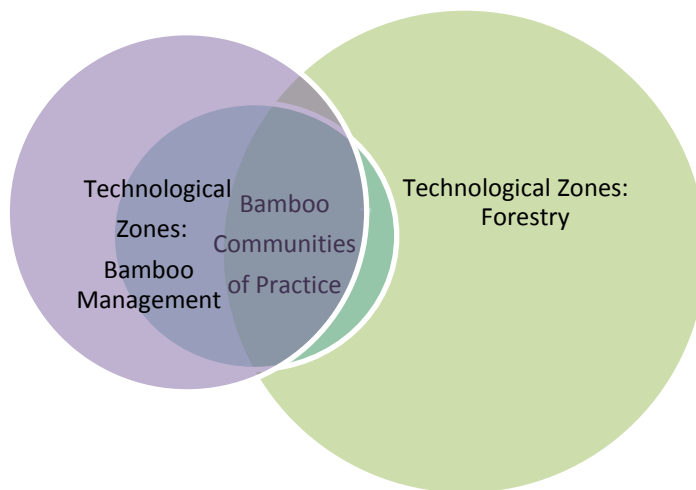
Within technological zones are organisational fields and, connected to these, communities of practice. It is important to distinguish between organisational fields and communities of practice. An organisational field establishes new codes of conduct (Hoffman 2001), which in this case is forest certification. Dingwerth and Pattberg (2009) conceptualise organisational fields as a set of commonly accepted core norms.

“The increasing density of interaction among the field’s members, and the success and legitimacy ascribed to the field’s key players by the outside world [helps] to solidify the organizational field until it eventually [develops] a ‘life of its own.’” (Dingwerth and Pattberg 2009)

Communities of practice, on the other hand, are the actors that shape organisational fields. For instance, communities of practice shaped the earliest experiments with forest certification leading to the rise of the FSC. Communities of practice are therefore viewed as the innovators, instigators, and collective entrepreneurs for new forms of transnational governance (Bartley and Smith 2010). Bartley and Smith (2010) highlight that the communities of practice related to FSC were rooted in the collective convictions and knowledge base of participants. Furthermore, it is historically situated communities of practice that are responsible for the development of new forms of governance, not isolated

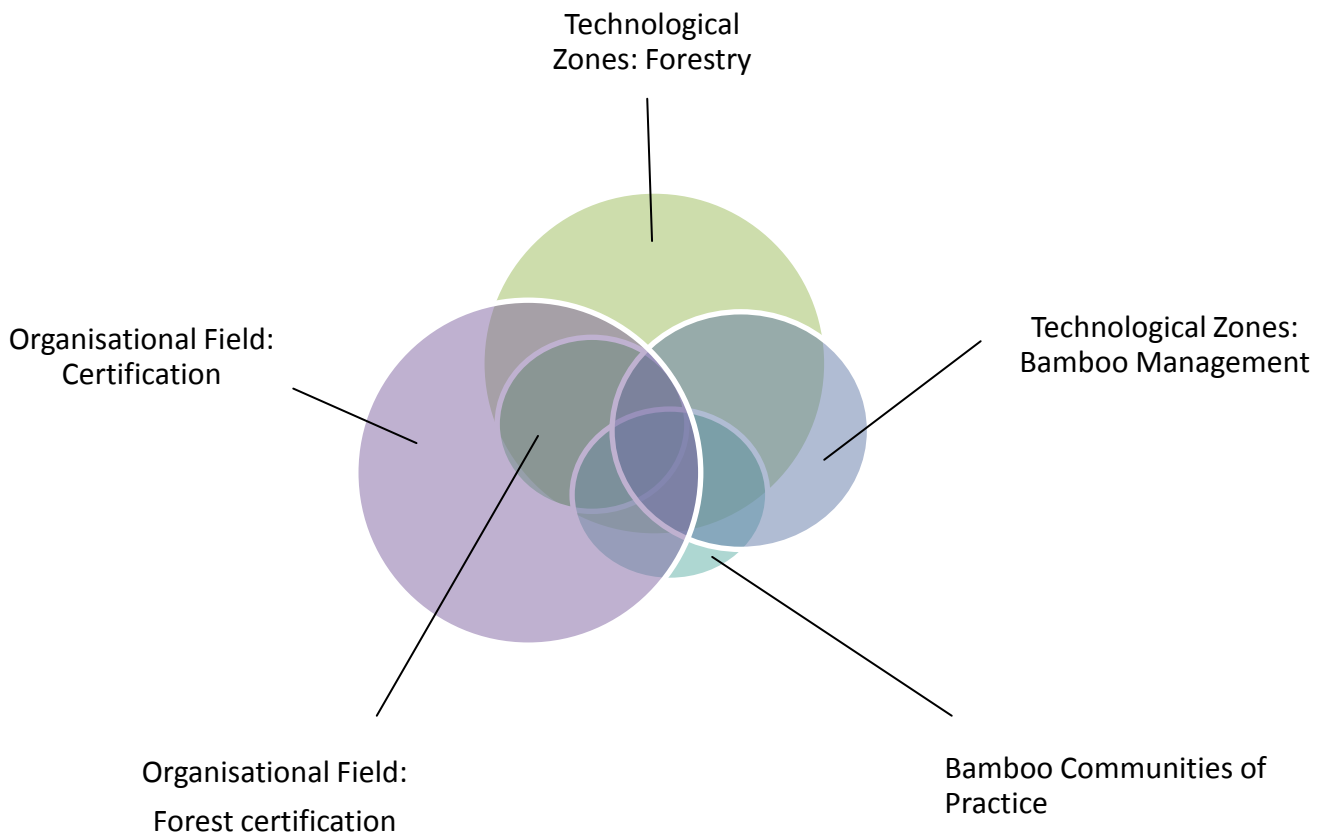
calculating actors. This highlights the importance and strength of actor networks in instigating change.

Figure1.3: The technological zones of forestry and bamboo communities of practice



Source: Author

Figure 1.4: The shifting technological zones of forestry and its relationship to the organisational fields of certification and bamboo communities of practice



Source: Author

A change has occurred in both the traditional technological zones of forestry and bamboo's role within the zones (from figure 1.3 to figure 1.4). In some societies, such as China, bamboo has always been conceptualised as 'forestry' and has thus been included within the technological zones of forestry (figure 1.2). However, the technological zones of forestry have shifted to embrace political economy approaches to governance, such as market mechanisms. Within this new conceptualisation of the technological zones of forestry, bamboo has been embraced as a 'timber' product leading to greater involvement of the bamboo communities of practice within the technological zones of forestry (figure 1.4.). This

highlights not just the need to question the institutional frames and boundaries that bamboo has been placed within, but also the legitimacy of governance frameworks and mechanisms.

1.4.2. Theories of legitimacy

As previously identified, two elements of legitimacy are explored in the thesis. Firstly, the thesis examines the legitimacy of NSMD governance within China. Secondly, Sharpfs (1999) two dimensional concept of legitimacy, which incorporates input (procedures) and output (effectiveness) is used to deconstruct the legitimacy of forest certification for bamboo. The study recognises legitimacy as the perception of others that the existence and actions of an organisation (or governance system) are desirable, right, and proper within some socially constructed systems of values, norms and beliefs (Suchman 1995). Crucial to institutional-cultural understandings of legitimacy is the recognition that legitimacy is socially constructed and emerges out of a subject's relation to rules, laws, norms, values and cognitive frameworks in larger social systems (Deephouse and Suchman 2008) which varies over space and time.

Cashore (2002) developed a legitimacy-based analytical framework to facilitate research into “the dynamics between the emergence of NSMDs and the conditions under which they create policy.” Cashore's choice of legitimacy as an analytic is based upon the recognition that legitimacy and power are constitutive of each other (Stinchcombe 1968) and hence NSMD governance approaches (in the case forest certification) must accrue legitimacy in order to change a state of affairs. Cashore's framework draws on work in cultural-institutional perspectives of legitimacy, as applied to organisations and institutions by Suchman (1995). The legitimacy that external audiences may grant an organisation can fall into three categories (Suchman 1995): pragmatic, based on short term material interest, moral

legitimacy, based on the belief that supporting the actions of the organisation in question is the ‘right thing to do’ and cognitive legitimacy, because it would be unthinkable to do otherwise (Cashore 2002). In short, the degree to which any certification scheme accrues legitimacy will vary between countries, cultures and eras.

Beetham (1991) argues that non-liberal democracies are more concerned than liberal-democracies about the erosion of the societal basic belief system and the threat of being superseded by a further legitimate political order. In such cases, it is particularly necessary for states to maintain and reproduce legitimacy, through the maintenance of rules and the reproduction of beliefs. Fundamental to the legitimacy of power is the need for an authoritative source of rules (Beetham 1991). In this thesis, China’s response to the institution of forest certification is examined. Although the certification ‘threat’ has been perceived as a challenge to many countries sovereignty (Cashore et al. 2006), in China a ‘Non-State Market Driven’ governance instrument could conflict with ideas of an ‘authoritative source of rules’. Therefore, the system needs to be adapted to fit within the legitimate political order.

Recently, forest governance literature has drawn attention to the fact that forest certification systems are more intertwined with states than previously recognised (Bernstein 2001; Bartley 2007; Gale and Haward 2009; Cadman 2011): in many situations the state establishes the institutional infrastructure that underpins markets and remains the preeminent legitimiser, public monitor, and buyer of timber products (Overdevest 2010). In recognition of this, Cadman (2011) suggests that governance is moving to new hybrid forms of state/market/civil society governance, which are better adapted to the complex reality of the twenty-first century.

The legitimacy of the certification ‘blueprint’ is explored in the case of Chinese forest governance and as a governance mechanism for bamboo. The practice of market driven, third-party audited governance that is supported by a network of non-state actors captures the procedural practice of certification. Within this model, the audit has become a solution to a technical problem and also redesigned the practice of governance (Power 1997). In short, third-party auditing has become a legitimate form of governance by which to verify sustainability. It is therefore important to understand how the ‘blueprint’ is translated, facilitated and adapted within different governance contexts.

Apart from analysing the legitimacy sought for certification at both state and international levels, another strand of legitimacy theorising concerns the legitimacy of the certification instrument itself. Sharpf’s (1999) two dimensional concept of legitimacy has been adapted to highlight the governance structure of input legitimacy (as a formulaic accepted process) and output legitimacy (on the ground effectiveness) (Elgert 2012; Schlyter et al. 2009; Auld and Bull 2003). Input (or procedural) legitimacy of certification has received more attention than output legitimacy (Schlyter et al. 2009; Auld and Bull 2003), because political scientists have tended to focus on transparency, accountability, deliberation and participation in forest governance over forest level effectiveness (Schlyter et al. 2009). The thesis examines the input and output legitimacy of current and potential certification schemes for bamboo in order to deconstruct where the legitimacy of bamboo certification is upheld or challenged. Either high input legitimacy or high output legitimacy can compensate for a lack of the other (Backstrand 2006). Whilst effectiveness may be seen as an important asset, Steffek (2009) identifies the United Nations legitimacy as resting with procedural (input) forms of legitimacy rather than its effectiveness (output legitimacy). Whilst institutions are only legitimate if they are perceived as such (Pierre and Peters 2005), institutions change when the parameters of legitimacy are challenged (Johansson 2012). It is therefore important to

ascertain what elements may challenge an institution and what elements maintain an institutions' legitimacy.

1.4.3. Performativity

This thesis considers the performative role of forest certification for sustainable bamboo management. A dynamic analysis of the role of certification through the lens of performativity can uncover how certification might create different realities for different actors. Performative certification implies certification is active in co-producing outcomes. Put simply, performativity 'does things' rather than just describing an external reality that is not affected (Mackenzie 2006). Through the lens of performativity, contemporary geography has exposed the dynamics of power and exploitation (Houston and Pulido 2002). Calling actors performative or activities performances emphasises their ability to have effects and create realities (Law and Urry, 2004).

A number of empirical applications of performativity have started to emerge regarding the processes of green markets and certification (Kortelainen 2008; Konefal and Hatanaka 2011; Hoogstra 2012). For instance, the efforts of ENGOs were performative for certification because they did not describe an already existing green consumer, but produced it. Moreover, the greening of timber and pulp markets are not isolated and self-sustaining economic processes, but actively performed by a network of actors (Kortelainen 2008). Likewise, Konefal and Hatanaka (2011) argue that third-party certification is performative because it is an ongoing process of network construction; if the standards are to be adhered to, enrolment and translation have to be continuous practices. In many cases, the standards used are the outcome of strategic actions, political manoeuvring, and negotiations amongst actors. In short, they are influenced by relations of power (Konefal and Hatanaka 2011).

Apart from certification instruments, places are performative. Places are always emerging and in the process of becoming, and thus place making is relational, political and performative (Buizer and Turnhout 2011). For example, Buizer and Turnhout (2011) tell the story of how citizens organised themselves to promote an area they valued. The place was created through discursive and material practices by using their expertise, naming, mapping and creating ways to signify the different values of the area. This allowed for the creation of an area of power and exclusion through articulating certain values and characteristics whilst ignoring others. Through a focus on one site of consumption and production, this thesis presents a case study in India which explores two linked issues: the global ‘branding’ of sustainable cities and sustainable product certification. Whilst both the city and certification reproduced neoliberal spaces of governance, a performativity lens highlights the political outcomes of envisioning different ‘realities’.

1.5. Broader scope of the study

The thesis considers bamboo’s fit within international forestry policy, therefore analysing the current institutional frames in a number of contexts. The legitimacy of forestry institutions is questioned in different spatial and cultural settings. The thesis builds upon a number of scholars’ work on governance and enables a deeper understanding of path-dependent institutions, as well as suggesting future directions for environmental governance. However, far from being a thesis which aims only to discuss the marginalisation of one Non-Timber Forest Product (NTFP), it hopes to use bamboo as an example of institutional framing of ‘natural’ resources. In this way, the thesis aims to broaden the scope of natural resource management by highlighting the socio-historical embeddedness of ‘natural’ resources and their relationship to practice.

The research focuses primarily on the interplay of Forest Stewardship Council (FSC) bamboo certification within local institutions (in China and India). It analyses the legitimacy of applying global norms of practice to a local context. As already mentioned, this work differs significantly from other studies which have looked at the certification of NTFPs because of bamboo's ambiguous position in policy documents. The constraining factors are identified through examples of definitions, practice and policies, which aim to highlight the need for the reassessment of forestry policy regarding bamboo. Moreover, the research points towards the need to be mindful of the unintentional exclusion of plant species, outside of the traditional Western frame of understanding. This is a timely thesis for a number of reasons. Firstly, China is increasingly gaining more prominence on the world stage, both as an economic and political power. With increased pressure on forestry resources, the forestry administration is determined to upscale sustainable forest management. This entails adhering to global notions of sustainability through market mechanisms, and localising processes to enable a degree of autonomy that leads to the development of forest management within the country. Secondly, China has recently achieved Forest Stewardship Council (FSC) bamboo certification for some of the most intensively managed areas in the country. There is increasing controversy amongst experts regarding the efficacy of the mechanism to truly bring about sustainable bamboo management.

Thirdly, on a more global scale, one of the crucial issues with up-scaling bamboo management is that within the 1,200 species of bamboo there are three different rooting structures—monopodial (diffuse) sympodial (clumping), and amphodial (mixed)—each with distinct policy and management needs. To focus purely on the intensively managed monopodial stands in China would ignore the vast areas of sympodial bamboo, which demand attention to flowering and propagation of sterile species. It is therefore important to consider the challenges within the world's second largest bamboo nation, India. The country

will have many lessons for other bamboo nations, which, unlike China, manages predominantly sympodial species.

Fourthly, sustainable development has been the focus of corporate social responsibility since the late nineteen eighties, leading to a wave in 'green' consumerism. However, global consumption has increased rather than declined, leading to the need to reconsider the role of substitute resources. Bamboo has an important role to play. The challenges of creating a frame for sustainable bamboo management are significant, but given the potential of commercial bamboo forestry to promote sustainable development, provide alternatives to timber products, sequester carbon, and restore degraded land such an initiative could generate far reaching benefits for humanity and the environment.

1.6. Structure of the thesis

The thesis comprises of a collection of four papers, all under review in different journals. Due to the format of the papers and this thesis as a whole, bibliographies are included at the end of each chapter. Further information regarding the contributions of co-authors is contained in Appendix 1. Each paper adheres to the associated word limit and formatting requirements of the target journal. Since each article has its own literature review, the thesis does not contain a single, designated literature review. Instead, themes and theoretical contributions within the thesis, as a whole, are outlined in the introduction.

Chapter 2 provides the methodology for the thesis, which reflects on the building of networks, ethnographic research and shadowing Forest Stewardship Council (FSC) audits.

Chapter 3 outlines the overarching theme regarding the social construction of bamboo. It presents an analysis of the challenges arising from the institutional framing of forestry

conceptualised predominantly as treed lands. The first paper, “Can’t see the (bamboo) forest for the trees: Examining bamboo’s fit within international forestry institutions” traces the socio-historical reasons why bamboo’s potential is yet to be realised, particularly within international policy. It identifies the key differences between bamboo and timber and presents examples of the implications of bamboo’s adherence to key timber instruments, such as forest certification, trade procurement policies, timber legality verification and carbon mechanisms.

Following on from the institutional framing of forestry, **Chapter 4** presents the second paper: “Forest Certification with Chinese Characteristics: State engagement with non-state market driven governance”, which examines the transformation of forest certification within forestry institutions in China. It analyses the legitimacy of certification outside the cultural framework responsible for its production. It examines the interplay of certification norms within Chinese institutions of forest management, through an analysis of legitimacy afforded to the state, third-parties and NGOs actor network. It describes how certification standards, practices and associated neoliberal market discourses are being translated within China’s state controlled capitalism and how the state is facilitating certification to respond to international demand.

Considering the organisational field of forest certification, **Chapter 5** presents the third paper: “Who’s Sustainability Counts? Reflections on an Indian Oasis and the drive for certified bamboo”, which presents a case study of the performativity of bamboo certification within India. This paper traces a controversial development in India called Lavasa, which aims to tap into a new eco-city trend of urban development. This study follows the Forest Stewardship Council (FSC) certification process. A seemingly easy model of bamboo certification used to verify sustainable practices, FSC certification assisted in identifying underlying existing local tensions regarding land tenure, indigenous people’s rights, areas of potential danger due to landslides and inequitable pay for women. The interplay between the

local vision and the international verification standard is analysed. It highlights the tensions between globally codified environmental standards and emerging visions of sustainability.

Following on from the case study of bamboo certification in India, **Chapter 6**: “The legitimacy of bamboo certification: Unpacking the controversy and the implications for a ‘treelike’ grass” presents a more global approach by examining the rise of bamboo communities of practice. It builds upon the topics developed throughout the thesis by focusing on legitimacy, the bamboo vs. timber concerns amongst experts, and the cultural performativity of standards within different contexts. Principally, the paper examines the input (procedural) and output (effectiveness) legitimacy of current and potential certification schemes for bamboo. These different foci within legitimacy are considered in order to deconstruct where the legitimacy of bamboo certification is upheld or challenged. The paper traces the escalating controversy surrounding bamboo certification, with a case study of FSC bamboo plantations in China¹. It identifies the various attempts at FSC certification globally and points towards the various certification schemes that are being conceptualised globally. Finally, it offers some reflections on the challenges currently faced.

Lastly, **Chapter 7** attempts to draw together the research questions and themes set out in the introduction and individual papers. It reflects on the findings and broader implications of the research.

¹ During field research conducted in 2010, only China had FSC certified bamboo. At the time of writing, Colombia received FSC certification for bamboo plantations in 2011, and EcoPlanet Bamboo have received FSC certification for their Nicaraguan bamboo plantations in 2012

1.7. Key findings

This thesis has explored bamboo's fit within forest governance mechanisms. In short, conceptualization of forestry as treed lands, or bamboo being perceived as 'treelike' has affected policy choices for bamboo. Bamboo's inclusion within the forestry frame has affected the governance of the resource as it 'becomes timber.' Whilst the research has shown that bamboo *can* fit within mechanisms designed for trees, what is important is whether the mechanism enables the plant to be effectively developed and managed as a natural resource within the context in which it is housed. A new space needs to be created for bamboo amongst its overlapping current institutional frames in forestry, agriculture and horticulture.

In a world of globalisation where the political economy has turned plants into commodities, we need to consider the socio-historical embeddedness of 'natural' resources and their relationship to practice. Fundamentally, the thesis highlights the need to examine how natural resources and their social construction interact or conflict with other constructions and governance structures in different societies. The field of natural resource governance should be mindful of the performative role governance instruments play in constructing or maintaining realities. This would enable the deconstruction of the socio-historical values on which governance instruments are constructed allowing for more appropriate and legitimate modes of governance to operate within local contexts. Moreover, by analysing input and output legitimacy of governance, it allows practitioners to pinpoint the opportunities and challenges of adopting such instruments. In short, modern institutions should be created and adapted to facilitate the development of natural resources which reflect the reality and challenges of the 21st century.

1.8. Limitations

The thesis aims to present a current account of bamboo's marginalisation within international forestry policy. I am aware that international and national policy can move swiftly, therefore this thesis aims to present a historical record of bamboo policy when the thesis was written. I have attempted to read literature in both English and Chinese; however, I am aware that Chinese policy moves quickly and that my research is constrained by access and availability of information regarding my topic. Although my research was conducted in Chinese, it is constrained by my linguistic abilities as well as the willingness of participants to supply information. These limitations are further exacerbated by the research conducted within India, where I do not speak local languages and have not spent a considerable amount of time working within the country. The aforementioned limitations are explored further in the methodology section.

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CHAPTER 2: METHODOLOGY

2.1. The Field

My fieldwork was conducted in China and India between March and September 2010. The Indian research involved key informant interviews conducted in Maharashtra state in Mumbai, Pune, Lavasa, Kudal, and Goa during March and September 2010. As an integral part of the research, I shadowed an FSC audit in Kudal and Lavasa. Figure 2.1 illustrates a map of Maharashtra state, detailing the areas in which I was working.

In China, I conducted fieldwork between April and September 2010, involving key informant interviews in Beijing, Shanghai, Changsha (Hunan), Hangzhou (Zhejiang), Anji (Zhejiang), Xishuangbanna (Yunnan), Kunming (Yunnan), Linan (Hunan) and Chishui (Guizhou). As with the Indian research, I shadowed a local FSC audit, this time in Chishui in Guizhou. Figure 2.2 illustrates the density of bamboo forestry within the provinces, providing an indication of the location of each of the research sites.

My project and extensive fieldwork was supported financially by a number of different sources: primarily through the British Inter-University China Centre (BICC) 3 and a half year studentship, fieldwork, and language grant from the Economic and Social Research Centre (ESRC). I also received conference funds from the Universities China Centre London (UCCL), Oxford University St Cross College and School of Geography and the Environment. The Indian fieldwork was financially supported by the International Network for Bamboo and Rattan (INBAR).

My research was principally conducted in China with a case study in India, facilitated by INBAR. 'The field' consisted of six areas of research: 1) conferences and workshops, 2)

visits to FSC sites, 3) FSC audit shadowing, 4) visits to potential FSC sites, 5) interviews in areas with FSC bamboo (direct stakeholders), and, 6) interviews with indirect stakeholders (e.g. NGOs, academics). The logistical complexity of the six types of research field prevented their separation into a systematic process. Interviews were arranged around various people's timetables, availability, conferences and timings for audits.

From September 2009 to January 2010, I attended a 'difficult language training programme' as part of my ESRC studentship at Tsinghua University in Beijing (through the Inter-University China Programme – IUP), which improved my language skills to enable me to conduct interviews in Chinese. During this time, I also utilised the various libraries and resources available in Beijing to inform my research.

My starting point for this research was a number of contacts that I collected through my previous work for INBAR since 2005. I was also able to draw on contacts gained through living and working in China for over four and a half years. As Thogersen and Heimer (2006) highlight, access to field sites relies on good contacts, particularly in China. I worked with the support of three key organisations that helped to facilitate access to field sites in both China and India, and the opportunity to join two FSC audits: INBAR, the Chinese Academy of Forestry (CAF), and the China National Bamboo Research Centre (CBRC).

The process of gaining access to other key informants was ascertained by attending and presenting at conferences since 2009. These conferences also acted to inform the development of the research. The conferences included: the International Conservation Agriculture Congress, New Delhi, India 2009; the UN Common Fund for Commodities Workshop: "Certification for commodities The opportunities and challenges for the rural poor", Beijing 2009; "China, Bamboo, Biodiversity and Climate Change Workshop" for Chinese experts, Linan, China (in Chinese) 2009; "The VII World Bamboo Congress",

Bangkok, Thailand 2009; “The XXVII International Association of Agricultural Economists (IAAE) Congress”, Beijing, China 2009; “The X European Conference on Agriculture and Rural Development in China (ECARDC)”, UK 2009; “The XI International Union for Forestry Research Organisations (IUFRO)”, Seoul, South Korea 2010; “Forests, Markets, Policy & Practice 2010 in China Annual Conference”, Beijing, China; The Programme for Endorsement of Forest Certification Schemes (PEFC) “Stakeholder Dialogue: Development of Forest Certification in Asia Pacific & Revision of PEFC Requirements for Forest Certification Systems”, Kuala Lumpur, Malaysia 2010; the INBAR “Congress on Bamboo and Rattan”, Shanghai, China; “The Association for American Geographers (AAG)”, Seattle 2011 and New York 2012, USA; “The Institute for Australian Geographers (IAG)”, Wollongong, Australia 2011; “The China Postgraduate Research Conference” 2012, Hong Kong and “The World Bamboo Congress”, Antwerp, Belgium 2012 (Appendix 3).

As previously mentioned, I was able to shadow an FSC audit due to contacts I had previously made within China. The audit was conducted at a pulp and paper mill in Chishui, Guizhou which required Forest Management Unit (FMU) and Chain of Custody (COC) FSC bamboo for overseas markets. The audit shadowing process helped to understand the processes involved in a pre-assessment and actors involved. It supported findings from other parts of the field research that examined sites before the pre-assessment in Yunnan and certified areas in Zhejiang. The pre-assessment informs all the chapters, but is referred to in chapter 6 in particular.

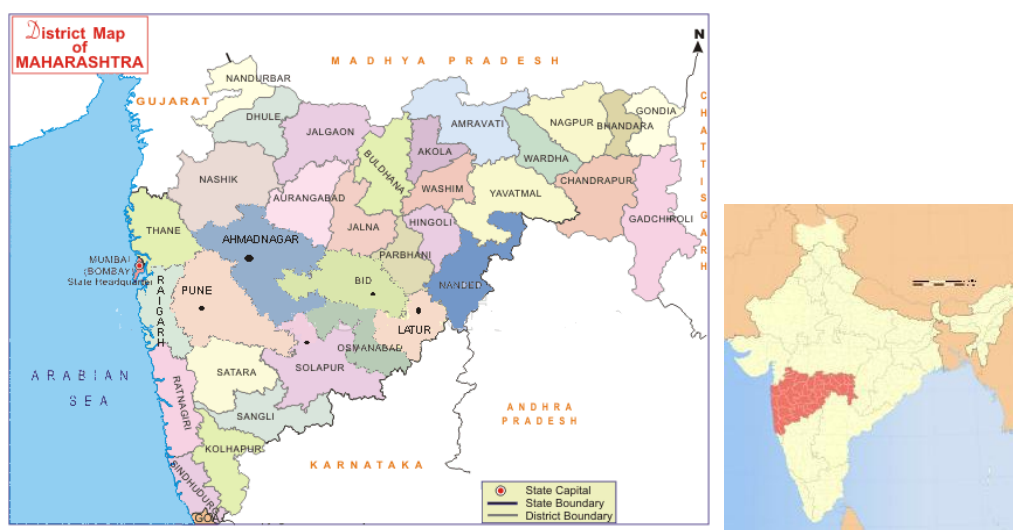
Apart from being an important part of the field research, the audit also assisted in the identification of the major groups of actors, including third-party auditors, academia (e.g. consultants that were working as auditors), factory owners and staff. Key actors participating in key informant interviews included: certification bodies (SGS, Woodmark, Rainforest

Alliance, GFA), Non-Governmental Organisations (WWF, Greenpeace, The non-profit Forest Trust (TFT), World Agroforestry Centre (ICRAF) , the Forest Stewardship Council (FSC), Programme for the Endorsement of Forest Certification (PEFC), inter-governmental organisations (INBAR), government research institutes (the Chinese Academy of Forestry/ National Centre for Bamboo Research China), academia (Zhejiang Forestry University; Renmin University), the State Forestry Administration (SFA), and companies requiring certification. Although these stakeholders were often ascertained through networking, conducting fieldwork in rural areas in China and India involved negotiating access.

Hornsby-Smith (1993) distinguishes two types of research setting: 1) ‘closed’ settings where access is controlled by gatekeepers as well as, 2) ‘open’ settings where access is freely available, but not always accessible without difficulty. My research involved negotiating access to closed settings which relied on a number of gatekeepers. Because ethical issues arise from whether to get ‘covert’ access without the participants’ knowledge or ‘overt’ access based on informing subjects and getting their agreement often through gatekeepers (Charmaz 2006), I made my research objectives 'overt' at the outset by explaining the aims of my project. Due to relying on gatekeepers, I utilised the snowballing sampling approach. Snowball sampling involves forming networks; those networks expand through participants’ suggestions and referrals. The benefit of snowballing is the trust that exists amongst participants (Silverman 2006). This provided access to an otherwise closed group of participants. For example, to access the FSC sites and companies that planned to get certification, I used INBAR contacts. These companies then passed on further contacts. I attained access to academics through CBRC, which enabled further networking within the universities.

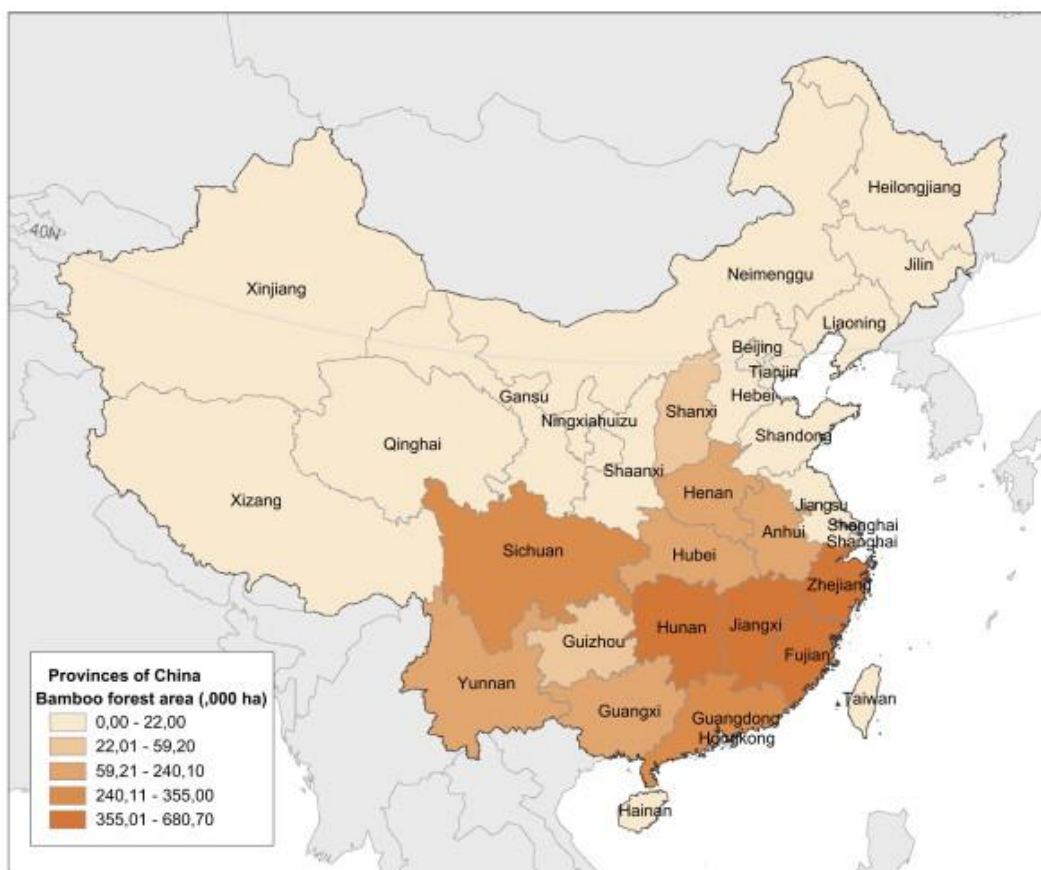
CHAPTER 2

Figure 2.1: Map of Maharashtra in India



Source: Maharashtra Government 2012

Figure 2.2: Map of bamboo forest area in China



Source: Mertens et al. 2008

2.2. Design

In terms of design, this thesis adopts a pragmatic approach to research methodology. From a pragmatic perspective, the practical outcomes and usefulness of an approach are considered more important than its consistency within a certain philosophical position. Pragmatism, as a research methodology, therefore regards philosophical debates between positivism, interpretism and critical realism with scepticism (Denscombe 2010). In terms of epistemological assumptions, pragmatism highlights that knowledge is provisional and a product of our times; a truth today may not hold true in the future.

Pragmatism is a philosophy that is particularly compatible with mixed methods approaches that have been adopted throughout my study; the traditional dualism between quantitative and qualitative methodology is perceived as unhelpful; therefore, research should concentrate on integrating techniques. This does not mean that pragmatism is not reflexive with theory or has naïve assumptions about knowledge generation. Rather, pragmatism identifies that knowledge can be generated with a mixture of approaches (Denscombe 2010).

The study utilised grounded theory as a research methodology. This is because grounded theory provides the opportunity for flexible guidelines rather than rigid prescriptions. It is based on the premise that methodology allows for the advancement of emerging ideas (Charmaz 2006). For instance, Glaser (2002) highlights that everything learnt in the research setting serves as data, although this may vary in terms of quality and relevance for emerging interests. The grounded theory approach of simultaneous data collection and analysis helps to inform the emerging analysis. In order to facilitate this, I kept a diary of my reflections on encounters, talks and discussions. This involvement in the research enquiry dispels the positivist notion of passive observation. The interviewee is therefore not a 'passive vessel'; knowledge from the interview is co-produced by the interviewer and interviewee (Holstein

and Gubrium 2004). Whilst grounded theory methods preserve an open-ended approach, they provide rigor through triangulation and mixed methods (Charmaz 2006). I was therefore aware of the coproduction of knowledge that resulted from conversations during my field research.

2.3. Approaches

2.3.1. Participant observation

I used ethnography to provide a means for exploring cultural values. Ethnography recognises culture as an abstract concept, accounting for the perceptions and ways in which people view their worlds. Ethnography classically involves three types of research: observing, interviewing, and analysing archives. In this approach, inductive enquiry in ethnography is associated with triangulation of data (Silverman 2006). Ethnography, as a methodological approach, involves four key features: 1) exploring the nature of particular social phenomena, 2) working primarily with unstructured data, 3) investigation of a small number of cases, and 4) analysis of data, which involves interpretations of meanings taking the form of verbal description and explanation (Atkinson and Hammersley 1994).

I used participant observation as a methodology when shadowing the official FMU and COC FSC audit of bamboo forests, areas of bamboo forests that are already certified, and areas identified as planning to adhere to FMU and COC bamboo certification in the near future. Participant observation was chosen as a methodology in order to understand the workings of the certification process on the ground. It also enabled a fuller understanding of the local conditions that could not be ascertained from interviews or archives alone.

2.3.2. Interviews

The research took a predominantly qualitative approach to research methodology. Although the audits provided some quantitative ‘yes/no’ responses, the study primarily dealt with attempting to understand social structures and perceptions which can be teased out effectively using qualitative approaches (MacNaughton and Urry 1998).

Semi-structured interviews are widely used in policy research, especially in terms of trying to understand underlying cultural or social issues. The goal was to ascertain breadth and depth regarding a wide variety of stakeholders’ opinions regarding certification in both case studies in China and India. The interviews were conducted predominantly in the interviewees’ office or a location selected by the interviewee. All interviewees were offered personal anonymity, but they were asked if their organisation could be named in the list of organisations participating in the study.

The empirical data took the form of semi-structured interviews, of which 52 were conducted in China and 41 in India (Appendix 2 lists the interviewees and Appendix 4 the pro-forma for the qualitative questionnaire). The key informant interviews were transcribed and manually coded for themes. The themes that arose from the transcript analysis formed the basis for discussion throughout the papers. I recorded the interviews when possible; however there were times when interviewees asked not to be recorded. For example, I have no taped accounts with government officials in China. Some academics in China and one member of FSC also asked not to be recorded because of the political nature of certification within the country.

As previously identified, I needed to rely heavily on networking in order to get access to participants to interview. For the four empirical chapters I identified three major stakeholder groups: 1) the bamboo communities of practice (Figure 2.3.), 2) forest certification

stakeholders (Figure 2.4) as well as, 3) actors involved in the India case study, which can further be divided into: a) actors within the Lavasa Corporation (Figure 2.5) and, b) actors responsible for governing bamboo in India (Figure 2.6). The figures show the range of categories of stakeholders interviewed (for a full list see Appendix 2). Although the figures separate the stakeholders into clear categories, they often overlapped or consisted of the same organisation. This means the interviewees cannot be divided into participants chapter by chapter, for the sake of the schematic however they have been divided into separate categories.

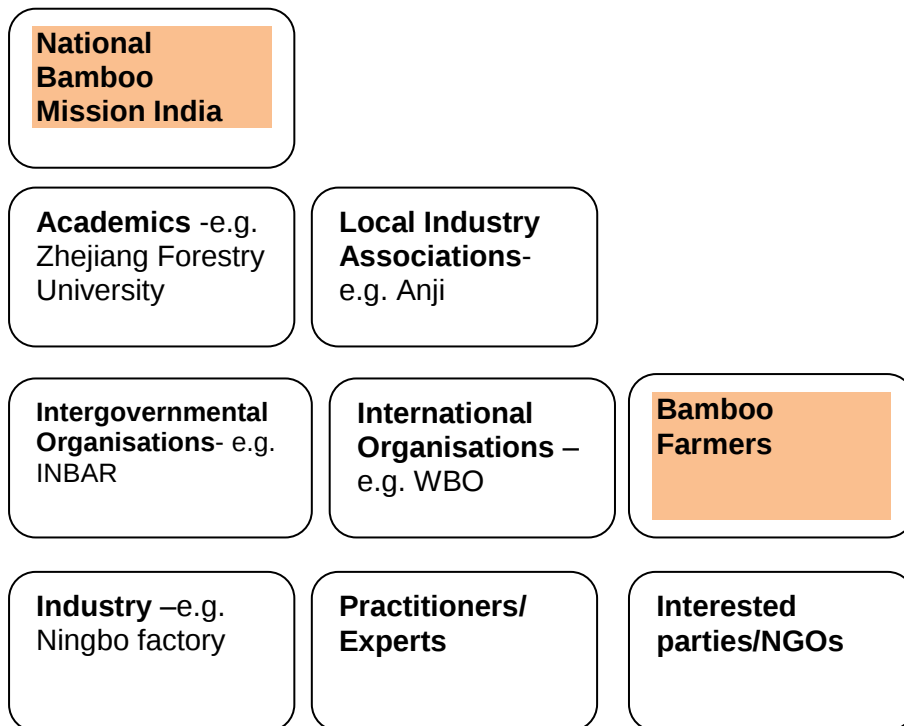
Each stakeholder group presented different challenges regarding access to interview participants. For instance, as identified in Figure 2.3, access to bamboo farmers was restricted. My access was entirely reliant on a guide within the area therefore this could have led to bias within the population. As indicated in both Figure 2.3 and Figure 2.6, it was difficult to gain access to members of the Indian government relating to the National Bamboo Mission. Although interviews were conducted, as demonstrated by Figure 2.6, these tended to be lower in the hierarchy and at the state level (Maharashtra). However, some participants (such as members of the Cane and Bamboo Technology Centre) were practitioners that also held positions with the National Bamboo Mission Steering Committee.

Regarding forest certification, Figure 2.4 illustrates the major stakeholder categories. The shaded area indicates the stakeholders I was unable to interview. I contacted Zhonglin Tianhe (Chinese certification body) via email and spoke to a representative at a workshop, but no one I contacted was willing to speak to me regarding my research. I also contacted the China Certification and Accreditation Association (CCAA), China National Accreditation Service for Conformity and Assessment (CNAS) and the China National Certification Administration (CNCA) via email, but again no one was willing to speak with me regarding my research. I

did not have adequate connections that could have facilitated access to any of the above mentioned organisations.

The benefit of the snowballing technique is that networking facilitates access to an increasing amount of contacts. However, snowballing can lead to bias in the data sample if the connected actors share a common set of values or beliefs. It could also lead stakeholders to actively manipulate a data sample by introducing certain stakeholders and not others with conflicting opinions.

Figure 2.3: Bamboo stakeholders map (shaded area indicates limited access to participants)

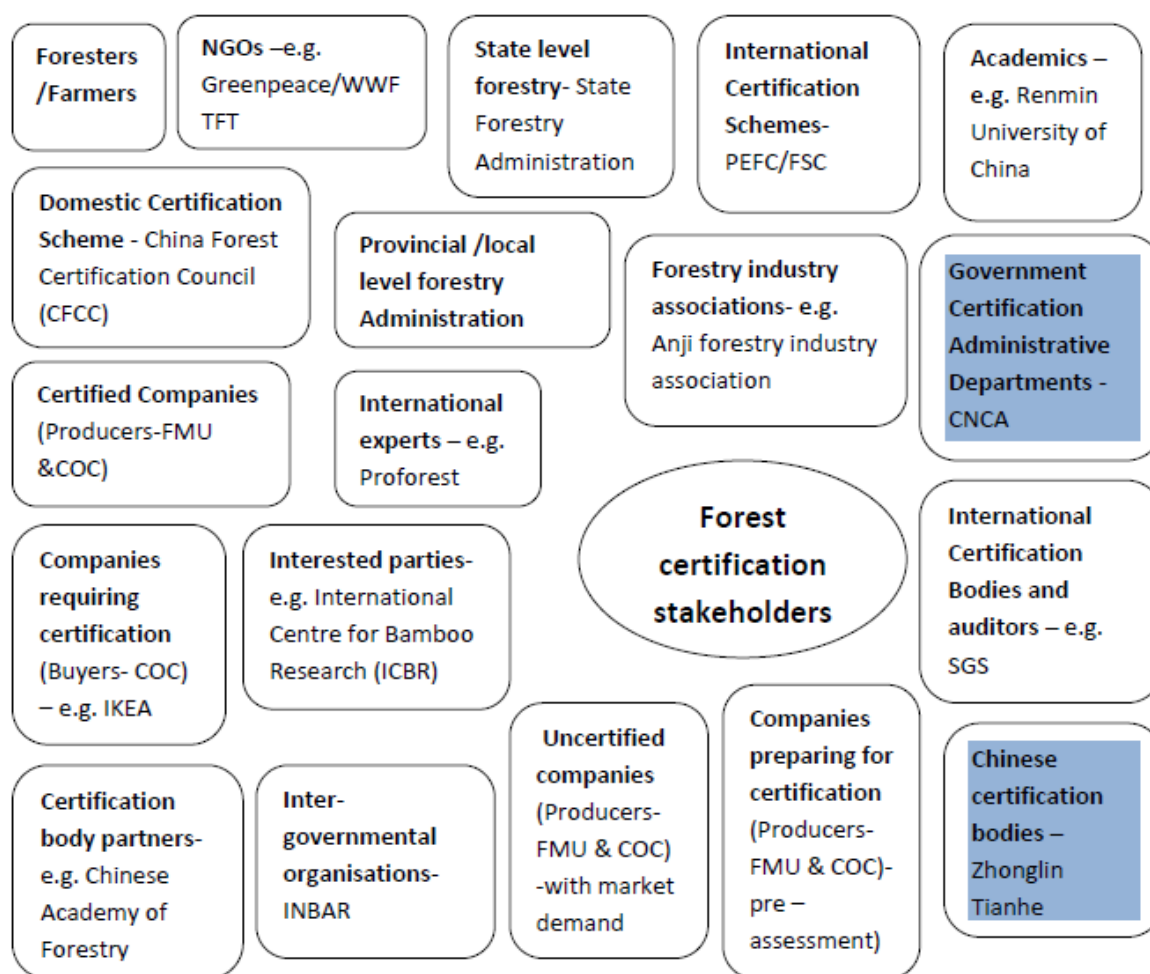


Key:

	Interviews conducted
	Limited access (although interviews were conducted)

Source: Author

Figure 2.4: Forest certification stakeholders map



Key:

	Interviews conducted
	No interviews conducted (due to limited access)

Source: Author

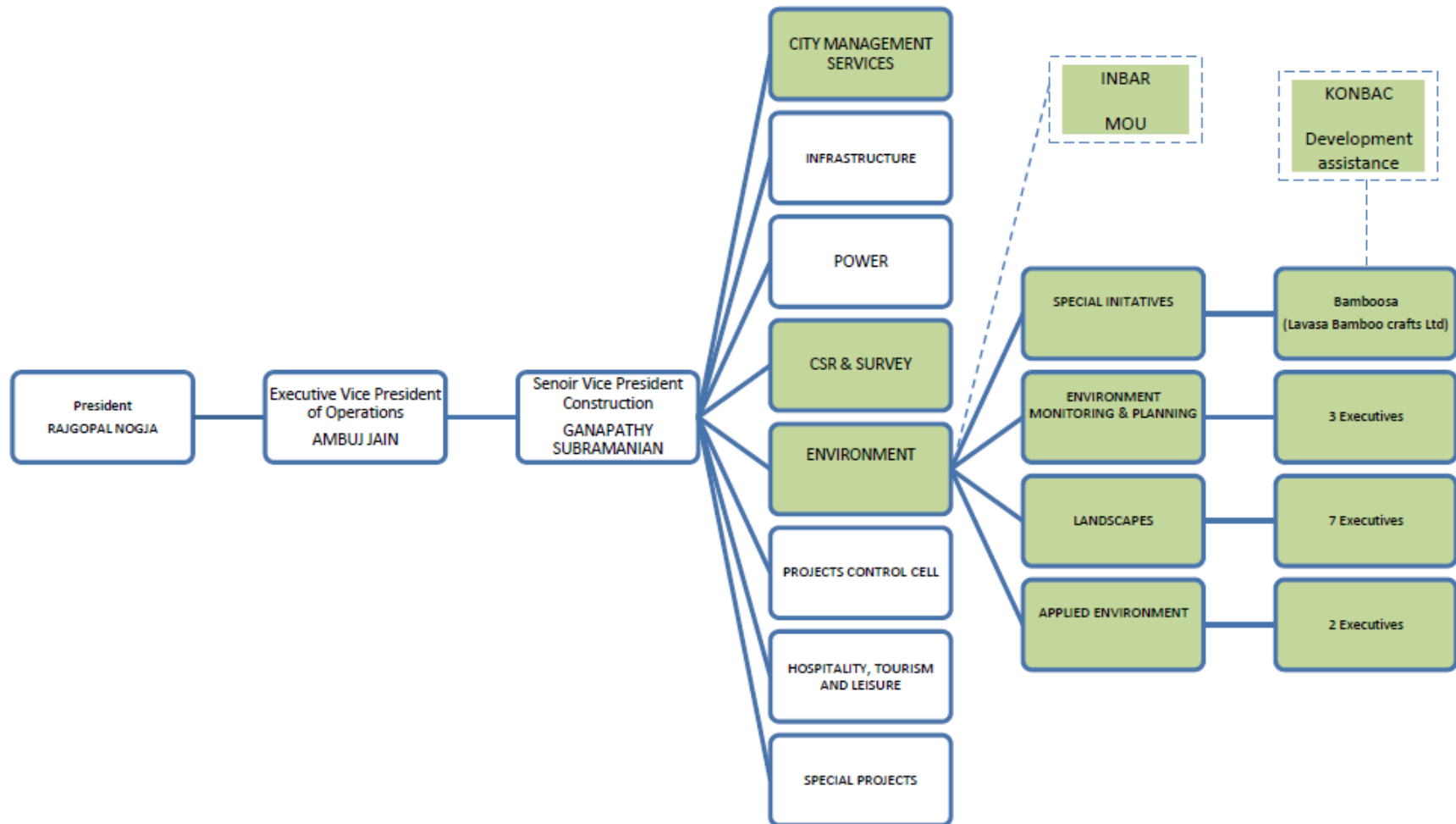
The case study research conducted in Lavasa involved conducting a series of interviews with staff from the Lavasa Corporation. Figure 3.5 identifies that I was able to access project management level employees from City Management Services, Corporate Social Responsibility (CSR) and the Environment departments. Due to my research being directly

related to the environment department, I was able to interview employees involved in all the project areas within the Environment department.

In India, due to the controversial nature of Lavasa Corp., I was told not to ask direct questions regarding land rights or tenure. My questions were screened before interviews were agreed. When interviewing farmers, it was difficult to get agreement to speak with many of them due to fear of the repercussions of speaking out; these interviews were not recorded and were predominantly conducted through interpreters of the local language Marathi.

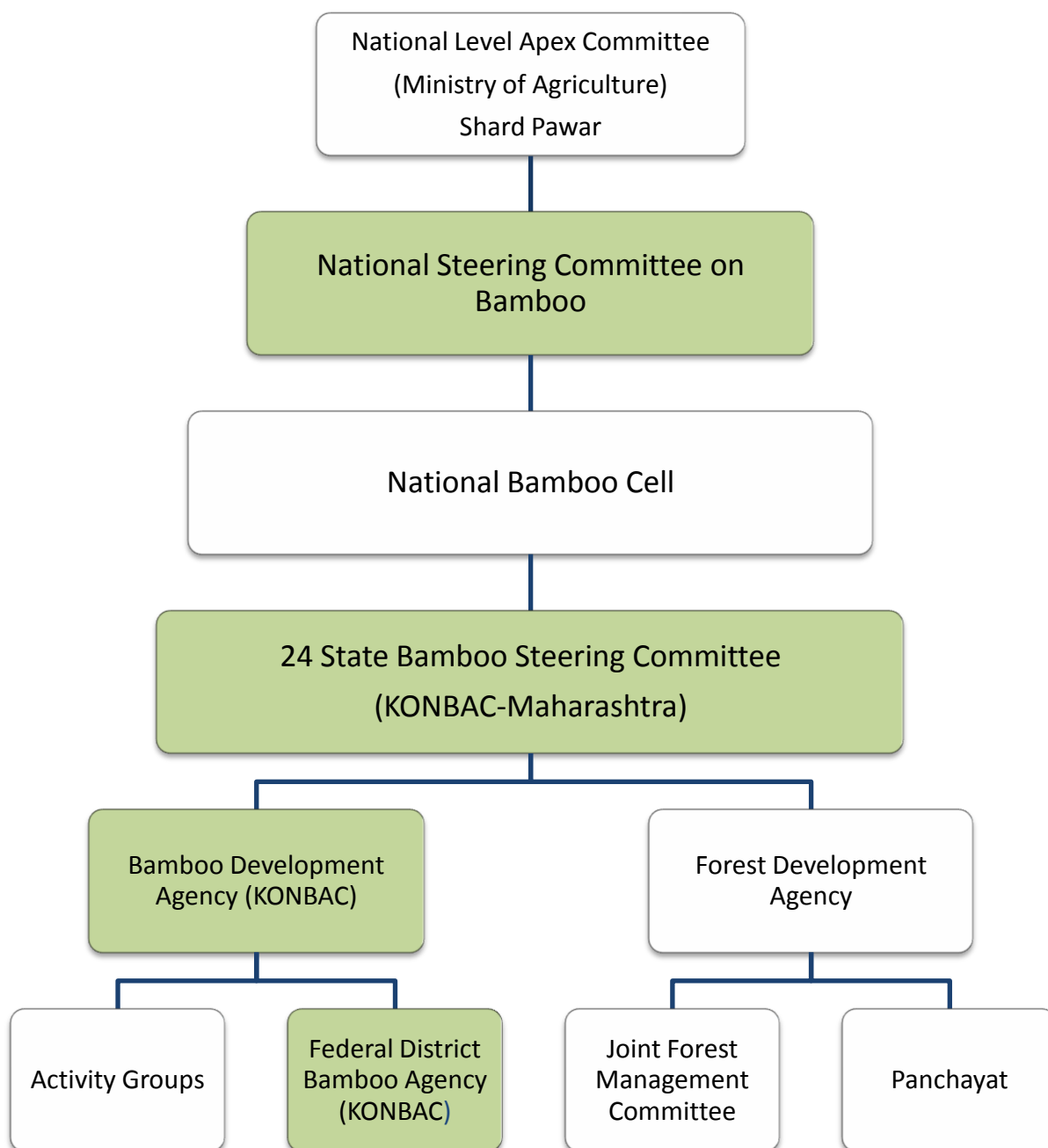
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Figure 2.5: Management structure of Lavasa Corporation Ltd. (shaded areas identifying participating departments in interviews)



Source: Author

Figure 2.6: Structure of the National Bamboo Mission in India, with reference to KONBACs position within the hierarchy (shaded area identifying participating departments in interviews)



Key:

	No interviews conducted (due to limited access or lack of relevance)
	Interviews conducted

Source: Author

2.3.3. Conference attendance

Attending conferences provided access to stakeholders that would have otherwise been difficult to ascertain. For example, a representative in the State Forestry Administration attended the PEFC conference in Malaysia. He was unable to speak English, which provided the perfect opportunity to speak with him in Chinese. He stated that I should contact him when I returned to China, which I did. His high ranking position allowed for successful snowballing amongst stakeholders within the government forestry department in China. In another case, a stakeholder was reluctant to speak to me in China due to the political nature of certification. When I met her at a conference in Seoul, South Korea, she felt more relaxed and willing to participate in an interview. As well as providing an opportunity to network with stakeholders, conferences also acted as a source of data, which facilitated the process of discovering themes for research enquiry.

2.3.4. Chinese language materials

I employed a research assistant in China to help collate Chinese secondary data, which may not have been accessible through Oxford University. For instance, there are a lot of journal articles about certification in Chinese, which are not available in the English language. The researcher I travelled with (Xia Enlong), from the Chinese Academy of Forestry (CAF), to potential and current certification sites, had done his PhD thesis on bamboo certification and his bibliography was mainly Chinese. This proved to be an invaluable resource. I also provided him with my English language bibliography. I visited Beijing library and compiled Chinese language sources, and read and translated various Chinese articles when necessary.

2.4. Data Analysis

As previously mentioned, Glaser (1978) highlights the importance of studying emerging data for themes as an iterative process. This helps to identify categories as a ‘conceptual element in theory’ (Glaser and Strauss 1967). These categories are transformed to codes. In research, coding is seen as central to the qualitative method (Lewins and Silver 2007). In my research, themes and codes were drawn from research diaries, conferences, audits, participant observation as well as transcripts. Since I had a variety of mixed methods from observing official audits, to conferences, to key informant interviews, I kept a research diary and coded themes as they evolved.

I used NVivo as a data storage system rather than relying on it. Bazeley (2007) notes that NVivo is a useful software package to organise data using a flexible coding system, however the interpretative task remains with the researcher. It is recognised that no qualitative software programme will present the most appropriate means to generate codes or provide insight on how different codes and coding techniques will help different types of analysis. The software itself is seen as a systematic management tool, and a searchable database for memos (Lewins and Silver 2007). Charmaz (2006) warns of novice researchers relying on NVivo and substantive codes because the results can represent a grounded description rather than theory. Charmaz (2006) advocates writing memos on codes to clarify categories and arising themes. Memos form the core of grounded theory, following up on ideas and questions that arise during the process of the work pushes the work forward. My research process was iterative and relied heavily on journal entries to formulate the direction of the research.

NVivo primarily deals with coding to identify the themes that are present within qualitative research. It often presupposes a constant in the observed population. My research however was an iterative process, based on trying to understand the differences of opinion within the network of actors. Although also attempting to find common threads, the different actors' viewpoints make it difficult to compare the dialogue directly or conduct systematic discourse analysis. The transcribed interviews were in both English and Chinese. It seemed futile to code at the lexical level. Instead I looked for recurring themes.

“The great pest of speech is frequency of translation. No book was ever turned from one language to another, without imparting something of its native idiom; this is the most mischievous and comprehensive innovation; single words may enter by thousands, and the fabric of the tongue continue the same, but new phraseology changes much at once; it alters not the single stones of the building, but the order of the columns.” (Johnson 1755; In Baker 1992; 46)

In Mona Baker's (1992) translation text 'In Other Words' she highlights the mistakes in interpretation that can regularly occur through the process of back translation (the act of translating from the source language into the native language, back into the source language). There is not a 'one-to-one relationship between word and meaning.' It therefore seems more appropriate to analyse overall meaning because of the potential for 'more-than words' communication, and to not minimise the analysis down to individual lexical units.

Cruse (1986) distinguishes four types of meaning in words and utterances: propositional meaning, expressive meaning, presupposed meaning and evoked meaning. Propositional meaning describes a real or imagined world, expressive meaning refers to the speakers feelings or attitude, rather than what words and utterances refer to, presupposed meaning arises from co-occurrence restrictions on what we expect before and after a particular lexical unit and evoked meaning arises from the dialect or register variation. In many cases in China, it was important to look for implied meaning because of the political nature of the topic.

Silverman (2006) highlighted that how we code or transcribe data is crucial to quantitative researchers, however many researchers just replicate the positivist model routinely used in quantitative research. According to this model, coders of data are usually trained in a uniform approach which is aimed at improving the reliability of the research method. Silverman (2006) highlights the pitfalls of verbatim coding with different coders revealing different ideas throughout the transcripts. Furthermore, with qualitative research there is the problem of reliability, due to how the researcher categorises the events described in ethnography. There is a tendency towards an anecdotal approach to use the data in relation to conclusions or explanations in qualitative research. The problem of validity arises when the researcher has made no attempt to deal with contrary cases (Silverman 2006). In this case, the breadth of the different methodologies allowed for recurring themes across the various approaches, which aided the reliability of the data set.

The themes that emerged from the qualitative data included issues related to: i) market/green barriers, ii) foreign value systems/cultural imperialism, iii) the promotion of ethical and social principles, iv) the inability/efficacy of certification to promote ‘sustainable bamboo management’/‘green washing’, v) corruption, vi) the politics of the ownership of a scheme, vii) the concept of a ‘forest,’ viii) legitimacy of the institutional framework of certification.

The themes helped to direct the semi-structured interview questioning and assisted in the framework of the papers. Table 2.1 illustrates the chapters the above themes are covered within and also identifies the research questions covered in each respective chapter:

- 1) How does bamboo fit within international institutions of forest governance and what are the implications for its management and development?
- 2) How is China responding to forest certification (Non State Market Driven - NSMD governance) and how is legitimacy being negotiated?

- 3) What is the performative role of forest certification for sustainable bamboo management?
- 4) How are bamboo 'communities of practice' responding to the inclusion of bamboo within the 'technological zones' of forestry and what are the implications for the legitimacy of forest certification?

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Table 2.1: Chart identifying the themes and research questions addressed within the respective chapters

Chapter	Theme								Research Question			
	i) Market/ green barriers	ii) Foreign value system/ cultural imperialism	iii) the promotion of ethical and social principles	iv) the inability/ efficacy of certification to promote 'sustainable bamboo management'/ 'green washing'	v) corruption/ clientelism	vi) the politics of the ownership of the scheme	vii) the concept of a 'forest'	viii) legitimacy of the institutional framework of certification	1	2	3	4
Chapter 3: Can't see the bamboo forest for the trees: Examining bamboos fit within international forestry institutions	X	X	X	X			X	X	√			
Chapter 4: Forest certification with Chinese characteristics: State engagement with Non-State Market Driven governance	X	X	X		X	X		X		√		
Chapter 5: Who's sustainability counts? Reflections on an Indian oasis and the drive for certified bamboo	X	X	X	X	X			X			√	
Chapter 6: The legitimacy of bamboo certification: Unpacking the controversy and the implications for a 'treelike' grass	X	X		X		X	X	X				√

2.5. Ethics

As stated previously, all the interviewees had informed consent. The principle ethical concern regarding the research was how to utilise the transcripts. I wanted quotes to be representative of all contrasting views that existed and not bias towards either party. There is a tendency for scholars to focus on anti-government narratives, particularly with China focused research. I did not want to present my research in the same vein, but struggled with how to present the highly political content. One of the reviewers of my paper “Forest Certification with Chinese Characteristics: State engagement with non-state market driven governance” criticised my initial draft for being too ‘friendly’ to the Chinese government. However, I did not want to write an anti-China narrative, which would be easy to create through bias use of data. In my amended draft, I attempted to provide a more balanced view through the use of quotations expressing several conflicting opinions.

In order to protect the identity of my participants, particularly in China (which is known for having less civil society and democratic activism than India), I only selected quotes which would not reveal the identity of interviewees. All the interviewees were listed in a database which allowed me to store information on participants. This information has not been included in the thesis because it would identify the participants.

2.6. Reflexivity of identity within the field

Weber (1904) highlighted that personal, cultural, moral and political values cannot be eliminated from the research enquiry; without the researcher’s evaluative ideas there would be no selection of subject matter and no meaningful knowledge of the concrete reality (Christians 2008). It is acknowledged that no researcher comes to the field without biases.

Therefore, it is important to maintain an awareness of self, reflect upon the way the researcher is viewed and the biases that are brought to the data (Silverman 2006; Rubin and Rublin 2005). Silverman (2006) noted that finding one's identity in the field is not just about professional affiliation; gender may be very important in the way participants define the researcher.

Increasingly, the gender of fieldworkers themselves is seen to play a crucial factor in observational research. Warren (2005) suggests that being a different gender from all or most of the fieldwork members may bring about different conditions of incorporation. However, with this awareness, incorporation can become a matter of negotiation between the researcher and members of the setting. Warren (1988) suggests that women can utilise the sexist assumption that only men engage in important work and therefore treat their 'invisibility' as a resource. McKeganey and Bloor (1991) argue that the roles of gender are negotiable; there needs to be a resistance from ascribing gender as an explanation for the outcomes of the research. Issues of social class and age also play an important role. However, Warren (1988) notes that the 'gender myth' is often applied by participants in the field who view the female researcher as being less threatening and having greater communication skills than her male counterparts.

From a personal point of view, my gatekeepers in China often introduced me according to my associated 'Chineseness'. As a white, middle-class, British woman in my early thirties, on face value there was little reason to trust me or allow me access to information, because of the strong Chinese, non-Chinese dichotomy (which is explained more fully later). My gatekeepers highlighted my 'Chinese credentials' by explaining how I had spent over 4 years living in the country, two of which were in a very poor area in Guizhou (which is considered underdeveloped, described as 'backwards': in Chinese 'luohou' 落后). I had learnt Chinese in

China and my partner of over seven and a half years at the time was British-born Chinese. My affiliation with, and associated subordination (regarding traditional gender roles) to a Chinese man appeared important in the introductory narrative. There was approval at the suggestion I was ‘practically married to a Chinese man’ and was ‘soon to become a Chinese wife and have Chinese children’. This intimate relationship with China has also been cited in the methodologies of other China researchers. For example, Kjellgren (2006) was referred to as a ‘son-in-law to China’ during fieldwork for marrying a Chinese woman. I felt this association assisted me in joining networks, as China has a strong sense of Chinese identity and a sense of ‘other’. I was described as a ‘中国通’ (Zhongguo tong) which is translated as a ‘China expert’, but since there is a clear distinction between ‘Chinese’ and ‘non-Chinese,’ it is the term used to describe a non-Chinese person who has reached a respected level of understanding of China, as determined by a Chinese person.

Kjellgren (2006) highlights the ‘widely popular Chinese-foreigner dichotomy’ but also identifies Ho (1998) as offering a list of interpersonal relationships that allow for connectedness. The strongest bond is blood and the weakest is casual encounters. Based on Ho’s work, the closer a foreigner can get to ‘Chinese blood’, the easier their access to Chinese networks. Nationalism is primarily a political principle (Eriksen 2002), which is consistently maintained within the Chinese identity and psyche.

I am however not naïve to the fact that my presence was used by the gatekeepers to gain or maintain ‘guanxi’ (create relations) and ‘face’. Having lived in China for a considerable amount of time, I understand that bringing someone who is perceived to be important (a researcher at Oxford University, intending to publish research) also allows the other party access to networks or strengthens bonds within the network. It is therefore a mutually beneficial situation to be introduced to a variety of actors within a network. Furthermore,

Warren (2005) identified the implicit or explicit ‘bargain’ that exists within fieldwork. The gift of time and attention may be seen as needing repayment. In this case I was aware of the mutually beneficial relationship and the desire to publish papers in English amongst my Chinese colleagues.

However, I also felt an acute awareness not to become too comfortable within the network, and to remind myself that I was a foreigner on Chinese soil; I had to be attentive about treading too close to political lines. For example, one government official suggested he would take me out to dinner to discuss the issues. He texted to say a meeting had over-run and would pick me up to have a chat anyway. One of the contentious issues regarding my topic was the government’s control of international third-party auditors and its plan to have a Chinese based system. The Chinese ‘third-party’ company would be directly linked to the certification system, so their third-party status is questioned. I tried to ask about its connection to or independence from the government (ironically just as we drove up to Tiananmen Square). He suddenly became very agitated and angry, repeating that they were ‘independent’ (独立) and had ‘absolutely nothing to do with the government’

(‘跟政府完全没有关系’). His response in itself was telling. He suddenly realised he had acted in a way that implicated the government, and changed the topic to small talk. We did not speak of certification again for the rest of the journey back to my hotel. Before I got out of the car, he asked what kind of visa I had. I told him a research visa and we both smiled. In this way he was making sure my research was legal and was checking what I was doing, rather than being altruistic to assist a foreigner with research about China.

In India I was unable to have such an acute awareness of the intricacies of how I was introduced, or the cultural context of my presence because I have had limited experience with

the country. The majority of interviews were conducted in English, but I also worked through an interpreter to interview bamboo farmers. I did, however, have a strong sense of gender awareness. I found the work environment very frustrating because I felt I was patronised; I was working in the Lavasa office which was almost 100% male. The men tended to treat me in a patronising and condescending manner. Moreover, women I encountered in the bamboo factories made a considerable effort to dress in their best and brightest saris which was a complete contrast to the situation I had encountered within China; female bamboo workers wore practical, bland clothing and did not demonstrate an overt necessity to act in a feminine way. I felt pressure to act in accordance with norms, therefore made more effort with my appearance and rode on motorbikes as local women did (on the side); in this way I felt that my male counterparts appeared to treat me with a greater level of respect for adopting local norms. I utilised the dismissive attitude towards me to my advantage. Since I believe I was not taken seriously by my Indian male counterparts, I feel I gained access to information where a male may have been treated with more suspicion or perceived as more threatening.

In the case of shadowing audits, I was asked to sign a confidentiality agreement in China stating that I would preserve the anonymity of participants. However, when I met the team, the interpreter for the auditor from America had not turned up, so I acted as the interpreter. This enabled me to ask clarifying questions and meant that I had to listen intently to directly translate on the spot. This changed the dynamic from an observer to an important part of the team. In India I represented INBAR as a consultant, which allowed me access to the site, but gave me more importance than the role of observer; again, I was part of a team rather than an outside observer.

In China, I was introduced to bamboo certification sites and academics working in the field by the CBRC who organised meetings and transport on my behalf. They believed the issues I

was researching needed more global recognition. By planning to publish in English, it would give the issue more publicity than if the issue were to be discussed in Chinese alone. This gave the impression that I had a duty to ‘represent the Chinese opinion’ rather than present objective research. The issue of certification is very controversial; at an INBAR conference in Shanghai, after presenting initial research findings one audience member stood up and criticised ‘people like [me]’ for imposing Western mechanisms on the developing world, as if I represented ‘the West’. Furthermore my talk had been addressing the need to *discuss* certification, not the need for everyone to *adopt* it. My position as a Westerner discussing certification was treated with suspicion, as it was believed I would naturally want to impose the ‘Western mechanism’ on bamboo. When it was established that this was not the case, it was problematic to explain that I did not adhere to the polarised views of being either for or against certification; my research intended to provide a critical analysis of the issues. Some stakeholders refused to speak to me because they were unsure of ‘what side I was on’ and therefore did not want to be misrepresented or dragged into the controversy. I was aware of being either perceived as ‘speaking on behalf of the Chinese people against certification’ or perceived as ‘a Western ambassador for certification’ which may have inadvertently influenced my research, even though I tried to make my position clear.

I also travelled to sites that aimed to adhere to bamboo certification with a researcher from the Chinese Academy of Forestry (CAF), primarily using my contacts from INBAR. As previously mentioned, he had written his PhD on bamboo certification. In that case we had quite an equal relationship, as we are the same age and had ‘guanxi’ (relations) based on having a network of similar contacts. We were able to reflect on the research from each of our different perspectives.

I had also intended to shadow another bamboo certification audit in China, however during my fieldwork a halt on all auditing was imposed by the Chinese government due to suspected corruption. This meant the second audit did not proceed in the timescale of my field research.

2.7. Limitations

“Questions of method are secondary to questions of paradigm, which we define as the basic belief system or worldview that guides the investigator, not only in choices of method but in ontologically and epistemologically fundamental ways (Guba and Lincoln 1994).”

Social science does not provide a set of procedures for reporting on a given reality, but it helps to produce realities. This means that realities can, in principle, be produced in other ways and that method cannot be purely technical (Law 2004). Reliability in qualitative methods is a contentious topic because qualitative research relies on interpretation and individual agency (Richards 2005). With this in mind, I acknowledge that my thesis is constrained by my own positionality and value system, access to data, my perceived role by the participants, my Chinese language ability, and inability to speak Marathi. It is a case study, not a longitudinal study, therefore it represents a period in time and its validity is temporal. Semi-structured interviews can also be very subjective and perceived to be guided by the interviewer (Bell 2005). Although semi-structured interviews co-produce knowledge with the interviewee, guiding the interviewee for topics or responses (which have arisen out of the grounded theory process) cannot be discounted.

2.8. Conclusion

This chapter explained how I executed collecting data for my doctoral research. A mixture of methodologies were utilised in order to gain access and insight into a potentially closed area of research in both India and China. The themes that have arisen from the fieldwork have formed the basis of the papers. Due to the ethnographic and qualitative approaches adopted, this chapter has sought to reflect upon the positionality of the researcher in an attempt to delimit the subjectivity of the outputs. The triangulation of data from conferences, interviews, participant observation, and archives intends to provide the data with greater reliability. However, this research process it is still recognised as an interpretation and production of a reality.

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PLATES 1-7: MONOPODIAL AND SYMPODIAL BAMBOOS

One of the major contentious issues amongst bamboo communities of practice is the management implications between monopodial and sympodial bamboos. These issues will be addressed initially in Chapter 3, and later in Chapters 5 and 6. Plates 1-7 aim to assist the reader with a visualisation of the differences between monopodial and sympodial bamboos to accompany the following chapters.

Plate 1: Sympodial bamboo growing in a clump on a homestead in India



Photo: Buckingham (2010)

Plate 2: Monopodial bamboo growing in a commercial forest in China

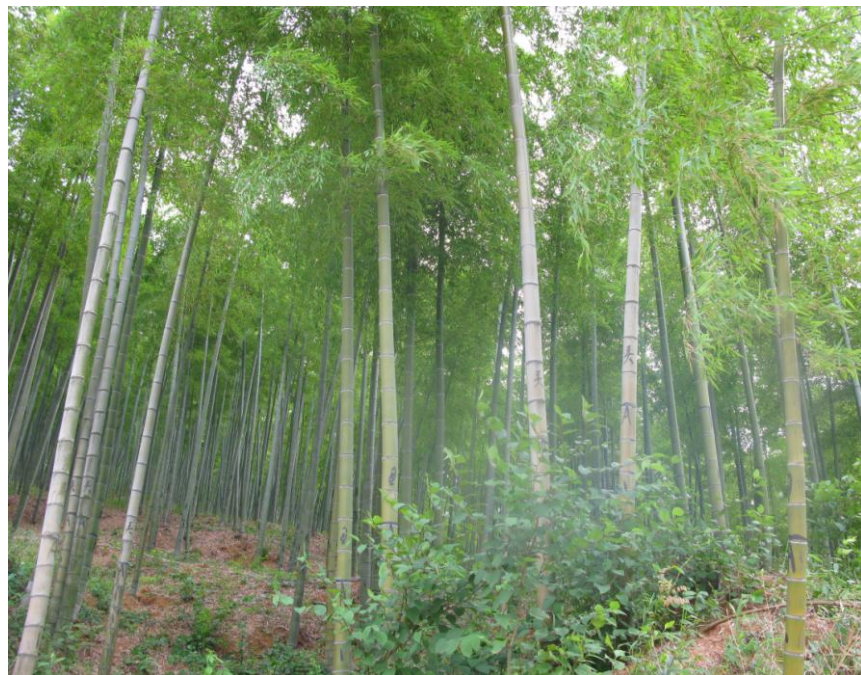


Photo: Buckingham (2010)

Plate 3: Basic structure of monopodial bamboo (leptomorph) rhizomes

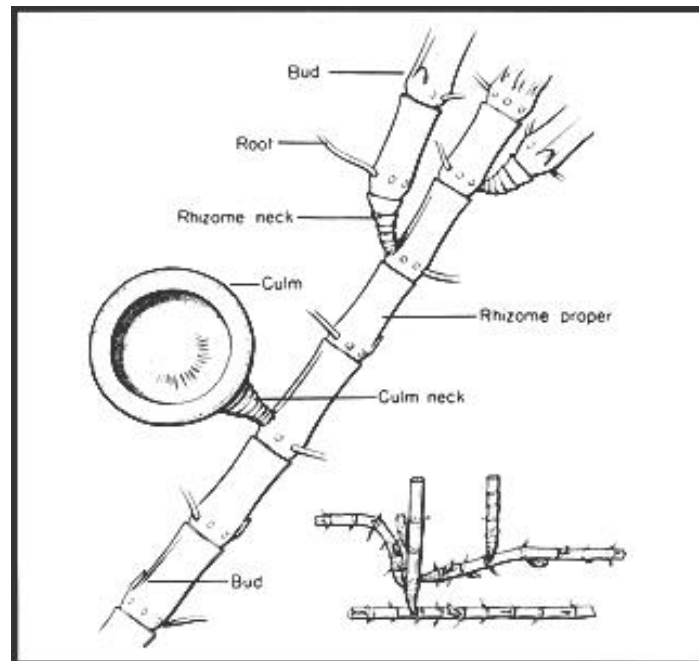


Image: INBAR 2012

Plate 4: Basic structure of sympodial bamboo (pachymorph) rhizomes

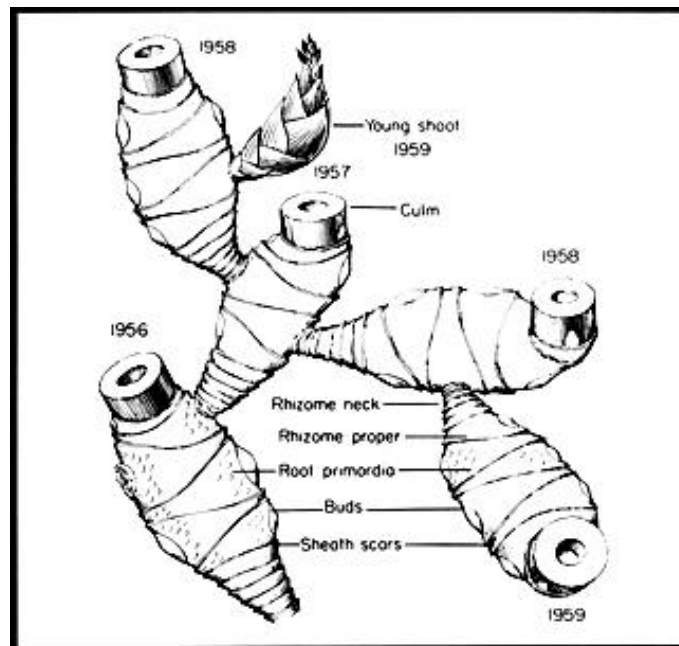


Image: INBAR 2012

Plate 5: Sympodial bamboo after flowering in India



Photo: Buckingham (2010)

Plate 6: Propagation of infertile species with cuttings in India



Photo: Buckingham (2010)

Plate 7: Nursery used to create bamboo plantations in India



Photo: Buckingham (2010)

CHAPTER 3: CAN'T SEE THE (BAMBOO) FOREST FOR THE TREES: EXAMINING BAMBOO'S FIT WITHIN INTERNATIONAL FORESTRY INSTITUTIONS

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Abstract

Over centuries, governments and international agencies have developed institutions to manage timber resources and conserve values provided by treed lands. Concerns regarding the sustainable supply of wood provide opportunities for the development of substitute resources, such as bamboo. Given the global expansion of bamboo at present, it is timely to examine the interplay between bamboo management and the traditional institution of forest governance. This paper provides a review of current forest mechanisms, namely Forest Stewardship Council (FSC) certification, timber legality verification and carbon instruments such as REDD+ (Reductions in Emissions from Deforestation and Degradation), and their applicability to bamboos. Whilst it is recognised that bamboo was not previously an abundant resource when compared to timber or part of the development of contemporary forestry institutions, innovation in natural resource management might be enhanced through a socio-historic re-evaluation of bamboo. Often considered a Non Timber Forest Product (NTFP), bamboo is unique as it 'becomes timber' within the global political economy, and therefore must adhere to timber regulations and norms. The paper examines bamboo as a case study within the lens of institutional framing. It aims to contribute to debates regarding cognitive institutional constraints on the development of substitute natural resources.

3.1. Introduction

The English phrase ‘can’t see the forest for the trees’ refers to an inability to see something obvious and captures a strong association between forests and trees. Wood and wood fibre from timber are natural resources vital to the functioning of society at all levels. In developing countries, wood based fuels are the dominant source of energy for more than 2 billion people. For instance, in Africa, over 90 % of harvested wood is used for energy (FAO 2010). However, developed countries often externalize their forest loss by importing forestry resources, which in turn contributes to higher rates of forest loss in poorer nations (Shandra et al. 2009). Although many sustainable forestry programmes have been implemented, 5.2 million hectares of forest were still converted to non forest use annually between 2000 and 2010 (FAO 2010). While economic and political changes underlie drivers of deforestation, agricultural expansion, wood extraction and infrastructure expansion prevail as immediate causes of deforestation (Geist and Lambin 2002); urban growth and agricultural exports are significantly correlated with forest loss (DeFries et al. 2010). With population projected to increase by 0.9 % per annum to 8.2 billion in 2030 (FAO 2011) and increasing consumption from rising economies such as China and India, pressure on forestry resources will be exacerbated. In the next two decades, the largest increases in population will occur in Africa (+235 million) and Asia and the Pacific (+255 million), which will increase their share of the global population to 18 % and 53 %, respectively (FAO 2011).

Over centuries, governments and international agencies have developed institutions to manage timber resources to protect and conserve values provided by treed lands. This responds in part to sustained capacity by powerful civil society organisations, for instance with respect to tropical deforestation. In contemporary forest policy, there is little doubt that climate change will profoundly impact most natural resource-based governance, leading to

changes in both national and global natural resources politics (Heltberg 2010).

Simultaneously, renewed concerns about resource scarcity and sustainable supply apply to wood and wood fibre. Whilst eco-labelling can be an effective policy instrument for sustainability, more fundamental changes in the valuation of the world's natural resources are needed (Dauvergne and Lister 2010). As environmental history has shown, crisis in natural resources brings innovation (Hobhouse 2004).

Bamboo cultivation is expanding in China and other countries (Khalil et al. 2012). Given this potential, it is timely to examine the interplay between bamboo management and institutions of forest governance. This article is based on a literature review and insights from being part of the bamboo communities of practice since 2006. It draws upon participation at conferences, being a member of online forums, working as a consultant for bamboo organisations and doctoral research. It seeks to outline bamboo's institutional constraints, with the intention of laying foundations for further empirical research. First, the paper outlines the conceptual lens of institutional frames. Second, the paper addresses the materiality of bamboo. Third, it considers the institutional framing of bamboo within bamboo nations. Finally, as bamboo 'becomes timber' within the global political economy, its fit within contemporary forestry policy is discussed along with the related implications for natural resource management.

To consider resources 'natural' is a contentious issue. Bridge (2011) argues that all resources are 'cultural appraisals about utility and value.' For instance, plants are natural and cultural artifacts, shaped by particular histories, local and global priorities, funding patterns, and institutional hierarchies (Schiebinger 2004). Furthermore, plants are not considered only as individuals, but collectives or assemblages (Head and Atchison 2008). Bamboo is framed

within the forestry assemblage, which in a global sense is largely based on European notions of treed landscapes governed within forestry institutions.

Institutions are, according to North (1990), the ‘rules of the game in society’, or ‘the humanly devised constraints that shape human interactions.’

“We need to know more about culturally derived norms of behaviour and how they interact with formal rules to get better answers to such issues.” (North 1990)

Institutions can be divided into regulative, normative, and cognitive models (Scott 1995).

Regulative models are based on legal sanctions; normative models are morally grounded and cognitive models of institutions refer to the collective construction of social reality embodied within public activity. Cognitive models of institutions are considered ‘taken-for-granted’, whereby action occurs within the context of wider and prior symbolic frameworks and systems of categorisation (Hoffman and Ventresca 1999).

Analysis of institutional frames allows for attention to be paid to the sources of constraints and inertia that keep policy discussions anchored in assumptions and models which do not necessarily have an adequate institutional fit (Hoffman and Ventresca 1999). In this case, nature is increasingly something produced under the conditions of the capitalist economy whereby representations are grounded equally within its material processes of production and distribution (Christophers 2006). This paper will examine the interplay between cognitive and regulative models of institutions. It aims to examine how the management of bamboo fits with a selection of forest governance mechanisms designed to promote responsible management practices.

3.2. The value, materiality and development of bamboo

3.2.1. The development of the industry

The rapid growth rates of bamboo means that it can be harvested more frequently than comparably short-rotation silviculture species (e.g. Eucalyptus) (Kumar and Sastry 1999). Although not a panacea (Lobovikov et al 2012), bamboo could contribute as a valuable material in the face of global forestry resource deficits. Bamboo is a potential replacement for two essential natural resources: timber and plant based fabrics. Bamboo has approximately 1,500 recorded uses and has vast versatility (Ranjan 2001). It can have a tensile strength stronger than steel (Platts 2008), is edible, a potential biofuel (Scurlock 2000), a substitute for fibreglass (Jiang et al. 2012), and a construction material, acting as scaffolding, housing, as a reinforcement in concrete (Ghavami 2005), and bio-composites to replace synthetic/petroleum based products (Khalil et al. 2012). As a viscose fibre, bamboo has many superior properties to cotton including breathability and durability (Wang and Xu 2009) and more recently, developed as a ‘sustainable’ material for toilet tissue (Baker 2012). This has prompted some to coin bamboo the ‘timber of the 21st century’.

Unlike silvicultural forestry, where over 1,000 tree species have been developed for timber (Sutton 1999); relatively few bamboo species are utilised commercially: 58 species produce ‘timber’, 18 are used for pulp and paper, and 56 for edible shoots (Li and Kobayashi 2004). Bamboo is predominately perceived as a timber substitute and valued as such. However, bamboo is not a tree, it is a grass. Bamboos belong to the Gramineae family, of the subfamily Bambusoideae, with approximately 1,200 species. Botanists have found bamboo difficult to classify due to its flowering characteristics. Some species flower at intervals as long as 120 years (Jiang 2007). Bamboos are considered the fastest growing plant on earth: some species

grow approximately 75 – 400 mm per day (Kumar and Sastry 1999), and can grow on marginal land unsuitable for agriculture (INBAR 2003).

Bamboo species are distributed predominately within tropical and sub-tropical areas. There are few species in temperate zones, and bamboos are absent from the native floras of Europe (McClure 1966). From a socio-historic perspective, this is significant because European colonial powers predominantly shaped and enforced institutions of forest management that exist today. In short, the concept of forestry as treed lands has shaped forestry institutions and policy.

Countries in Asia, Africa and Latin America are assessing their bamboo resources, but authoritative statistics for bamboo are lacking. Bamboo area is difficult to assess because species often occur as patches within forests or as clusters outside them. However, preliminary findings based on information from 33 bamboo-rich countries indicate the total area of bamboo forestry, or bamboo with exploitation potential, is about 31.5 million hectares (Table 3.1: FAO 2010).

Table 3.1: Bamboo area by country and region (1990-2010)

Country/ Region	Area of bamboo (1 000 ha)			
	1990	2000	2005	2010
China	3 856	4 869	5 426	5 712
India	5 116	5 232	5 418	5 476
Total Asia	15 412	16 311	16 943	17 360
Total Europe	0	0	0	0
Total North and Central America	37	37	37	39
Total Africa	3 688	3 656	3 640	3 627
Total Oceania	23	38	45	45
Total South America	10 399	10 399	10 399	10 399
World	29 560	30 442	31 065	31 470

Adapted from FAO (2010) Forestry Resources Assessment

Globally, China has the fastest growing bamboo sector. It has increased by 54% since 1970 and now represents 2.8% of total forest lands (SFA 2009). Recognised as a valuable resource in China, bamboo forest area has increased in response to logging bans (along the Yangtze River because of flooding) both in terms of surface area (32%) and density of culms within the forest (41%). This has resulted in a large increase in bamboo culms and shoots harvested (590% and 1050% respectively) (Ruiz-Perez 2004). There has been significant investment in bamboo forestry within China, which has led to the predominance of one valuable commercial monopodial ('treelike') species, *Phyllostachys heterocycla* var. *Pubescens* known as Moso. This forms the extensive even stand forests familiar from Chinese films. Moso now accounts for approximately 72% of the total bamboo area in China and over 90% of the bamboo economy (Dou and Yu 2008).

In recent years, Chinese technological innovations and supply chain efficiencies have increased the range and competitiveness of bamboo products. As a result, there is currently public sector investment of US \$40 million in Mekong countries with the aim to replicate the China model. The bamboo sector in the region, which is currently valued at \$260 million, employs 400,000 people and is predicted to expand to \$1.2 billion employing 1.2 million people by 2017 (Marsh and Smith 2007).

Bamboo development is expanding across many countries, with technology transfer from China to African countries being one of the major means of South-South cooperation within the Agricultural and forestry sector since the 1990s (INBAR 2012a).² In Latin America, the development of commercial plantations by Ecoplanet Bamboo has changed local perceptions of bamboo as a previously valueless resource (Woodridge 2012). Likewise, many multinationals are utilising bamboo in high-end markets with notable clients being BMW and the Body Shop who utilise bamboo as an alternative to timber (Mosobo 2010).

3.2.2. Bamboo physiology and management challenges

Whilst bamboo has potential in timber substitute markets, there are significant management challenges involved in developing the resource. At the World Bamboo Congress 2012, there was a call amongst experts to separate bamboo and silvicultural methodologies and conduct further research to understand the basics of bamboo physiology and taxonomy. Currently, the number of bamboo species is unknown, and the growth physiology and characteristics are not fully understood. There are concerns that wild claims surrounding bamboo as a ‘wonder plant’ could potentially undermine the development of the resource. Claims of its inherent

² At the time of writing the African Agriculture and Forestry Research Centre is being established by Chinese experts. It intends to develop bamboo as a key resource across Kenya, Ethiopia and Ghana.

environmental sustainability, as well as its utility as a replacement to timber cannot be fully realised without further research and development.

Compared to silvicultural forestry, academic research on bamboo cultivation is in its infancy. However, it is understood that as a grass, bamboo requires different management techniques to trees. As monocots, plants such as bamboo and palms do not exhibit secondary growth by the production of concentric annual rings like trees. They cannot increase in girth by adding layers of cells as conifers and woody dicots, and the maximum diameter of a bamboo stem is determined at sprouting (Shaanker et al. 2004). Table 3.2 illustrates a simplification of the key differences between bamboo and trees (adapted from the World Bamboo Organisation). Although a simplification, table 3.2 demonstrates a clear differentiation between growth patterns, rooting structure, flowering patterns, competitiveness characteristics, fertility and longevity. Fundamentally, bamboos are classified according to three different rooting structures—monopodial (diffuse) sympodial (clumping), and amphodial (mixed)—which have distinct policy and management needs (Jiang 2007).

Table 2.2: Key differences between bamboos and trees

Variable	Bamboo	Many timber producing species
Growth	Reaches its final height in 2-4 months Growth occurs in one year with a single cylinder	Tend to keep growing throughout their whole lifetime Grow wood rings
Rooting structure	Rhizomes serve as the trunk; the culms are the branches off the trunk. Bamboos have three distinct rooting structures: monopodial (diffuse), sympodial (clumping) and amphodial (mixed)	Have roots, trunks and branches
Flowering patterns	The majority of bamboos are monocarpic flowering once in cycles. Depending on the species bamboos flower once in 3 to 120 years	Mature trees often flower and set seed on an annual cycles
Competitiveness characteristics	Can outcompete trees or other plants for access to sunlight, nutrients and water through rhizomes and ‘invasive’ characteristics	Competes through height in the canopy
Fertility	Many bamboo species are infertile (or have infrequent flowering and therefore seeds are in short supply) and require vegetative propagation techniques	Many tree species are fertile
Longevity	Culms can decay after 5-8 years without harvesting. The mother plant tends to die after flowering	Can last centuries

Based on World Bamboo Organization (2012)

The export of Chinese and Japanese imagery of bamboo forests in film and art has influenced Western perceptions of bamboo forests. Those depicted are invariably Moso forests, the key species that China has commercialized. Although bamboo forests are often conceptualised as ‘treelike,’ only one commercial species is monopodial and ‘treelike’, the other sympodial (clumping) species have different management challenges (table 3.3). The reality of the bamboo forest or small-scale homestead in other bamboo countries is far removed from China’s industrial plantations.

Table 3.3: The key global commercial bamboo species

Species	Area	Use	Rooting structure
<i>Bambusa vulgaris</i>	Tropics	Construction medicine, shoots	Sympodial (diffuse/clumping)
<i>Chusquea culeou</i>	South America	Furniture, handicrafts, construction	sympodial
<i>Dendrocalamus asper</i>	(Sub-)Tropics	Construction, pulp, shoots	sympodial
<i>Dendrocalamus giganteus</i>	(Sub-)Tropics	Construction, pulp, shoots	sympodial
<i>Guadua angustifolia</i>	South and Central America	Construction, furniture, handicrafts	sympodial
<i>Melocanna bacfera</i>	Southeast Asia	Construction, shoots	sympodial
<i>Oxytenanthera abyssinica</i>	Africa	Construction, handicrafts, shoots	sympodial
<i>Phyllostachys edulis/ Pubescens</i>	China	Industrial products, shoots	Monopodial (treelike)
<i>Yushania alpina</i>	East Africa	Construction, weaving, furniture	sympodial

Adapted from Hoogendorn, C (2012) INBAR Presentation WBC

The two key bamboo producing nations, China and India, have different management needs due to the ‘treelike’ or ‘non-treelike’ status of their respective bamboos. Moreover, like many other grasses, bamboos grow until they flower, produce seeds and then die. Flowering bamboo is either gregarious (periodic), sporadic (irregular), or both. Flowering intervals of gregarious flowering species range between 3 to 120 years (Shaanker et al. 2004). Chinese experts claim either that Chinese Moso bamboo flowers at the longest interval of 120 years or management techniques have eradicated flowering. In short, flowering is not a significant management concern in China. Table 3.4 is a simplification of the key challenges faced by the two countries which are further elaborated below. This demonstrates that bamboo’s

‘agency’ needs to be managed and suitable instruments developed for the governance of the resource.

Table 3.4: Major challenges of bamboo management in China and India

Country	Major challenges of bamboo management
China	Monocultures, intensive harvesting, chemical residues, soil erosion
India	Flowering, propagation of species, lack of seed and planting materials

Source: Author

Since the 1960s, China’s monopodial Moso forests have been intensified using high yielding cultivation techniques involving removal of trees and undergrowth. As a result, the current challenges facing sustainable bamboo management in China are monocultures, intensive harvesting, soil loosening, tending, insecticide, pesticide and chemical residues (Fu and Lou 2002), erosion and depletion of soil nutrients (Xu et al. 2008). As markets increasingly demand bamboo from sustainable sources, China has invested in Forest Stewardship Council (FSC) bamboo certification, which aims to address some of these management issues.

Although some management gains have been shown (through reductions in chemical and fertiliser use and attempts to create more areas of mixed forestry within monocultures) to a large extent the gains have been minimal. The lack of significant changes in practice between certified and non-certified areas suggests a more bamboo specific management approach needs to be formulated in order to address these challenges (Buckingham and Jepson forthcoming; Chapter 6).

In contrast, India has predominantly sympodial bamboo species. The key management challenges are dealing with mass die off after flowering and assuring supply of planting material linked to developing improved propagation. Traditional regeneration of bamboo utilises seeds or vegetative techniques. However, both methods of propagation are beset with

problems, which restrict their large-scale use. For instance, a range of propagation techniques are in use including tissue culture. These issues are embraced through the development of methods to store large quantities of seeds available during gregarious flowering, developing vegetative propagation through rhizome offsets, culm cuttings, and the development of tissue culture methods for mass propagation (Williams 1994). To have successful sympodial bamboo plantations requires a successful nursery to sustain plantations. Moreover, vegetative propagation faces challenges due to the age of the ‘clone’ plant, affecting the timescale of flowering and subsequent die off.

A traditional Indian saying states that when the bamboo flowers, famine, death and destruction will soon follow. For instance, in the region of Mizoram, mass flowering of bamboo and sudden availability of fruit led to an explosion of the rat population which ravaged other crops and led to famine (Shananker et al. 2004). Such ‘agency’ identifies a key way in which bamboos separate themselves from both trees and other NTFPs regarding management techniques. Due to a lack of research, the frequency of bamboo flowering is often unknown, although the International Network for Bamboo And Rattan (INBAR) are creating a flowering database to try and systematically track the flowering habits of bamboos globally (INBAR 2010).

The effective management of flowering can avert disaster and maintain the sustainable supply of the resource. In the Northeast of India, the Cane and Bamboo Technology Centre (CBTC) in Assam has created an independent national certification system for nurseries, which was accepted nationwide in 2007. The certification system aims to document propagation dates in a bid to aid the prediction of flowering cycles and enable the propagation of mixed age ranges on plantations and homesteads. The age of the mother-plant affects the onset of flowering. Bamboo needs to be propagated through cuttings; therefore, the quality of stock can cause

concern for the farmers because an old mother plant may be susceptible to flowering. This concern is exacerbated because the availability and quality of seed can be in short supply.

Although many sympodial species have more frequent intervals in flowering, monopodial species have challenges regarding ‘invasiveness’. Sympodial bamboos develop in branched clusters close to the parent plant and have pachymorph rhizomes that turn upwards as soon as they are formed. Monopodial bamboos however are known as ‘runners’ which can be highly invasive and difficult to manage. Running bamboos such as *Phyllostachys* (the main Chinese commercial species) develop from long, leptomorph rhizomes, which grow horizontally under the soil. Rhizomes of monopodial (running) bamboos can grow to more than 10 metres in a year (Shaanker et al. 2004). This invasiveness potentially creates challenges if not managed adequately.

Japan acts as a warning for the need to adapt to social and economic changes when developing bamboo forests within a country. Moso was imported as an exotic species from China to create commercially viable plantations. However, culm production fell from approximately 170,000 tons in 1990 to 35,000 tons in 2009 (Watanabe 2012). The reasons for this fall have been identified as: 1) Market decrease; 2) Availability of substitute resources; 3) Importation of bamboo products; 4) Intensive labour and low pay associated with bamboo cultivation; and 5) Aging skilled labour (Watanabe 2012). Apart from the economic and social implications, there are severe ecological consequences from the decline in management. Moso is increasingly expanding into the afforestation area of young Japanese cedar (Watanabe 2012) and broadleaf forests (Okutomi et al. 1996). Bamboo’s invasiveness is a direct result of the decline in management and utilisation (Watanabe 2012).

Whilst the Japanese example provides a lesson on the importance of aligning management of bamboo with the market, the response of bamboo forests following the 2008 snow disaster

demonstrates the plant's resilience during extreme climatic events. In 2008, the worst snow disaster for 100 years hit China. It had devastating consequences for the country, destroying 1/10th of forestry resources (Xinhua 2008). Whilst bamboo was crushed below the weight of the ice, within a short period of time many stands had recovered and were contributing to livelihoods, unlike the timber, which could take years to regenerate. Bamboo's robustness has significant implications for natural resource management under threats of climate change.

3.3. Institutional framing of bamboo

3.3.1. Bamboo in China

Chinese bamboo utilisation dates back to the Neolithic Age, some 5,000-6,000 years ago. Bamboo was actually utilised in many cases before wood; it was used to make paper in China in the 9th century, nearly 1,000 years earlier than Europe. Su Dongpo, a famous poet in the Song Dynasty (960~1279CE), once declared: "I'd rather eat without meat than live without bamboo" (Yang and Hui 2010). Furthermore, bamboo is one of four most admired plants in China, alongside the plum, orchid and chrysanthemum, known as the 'four gentlemen' or the 'four men of honour'. The characteristics of the plants are highly admired and traditionally people aspired to have the same qualities as them. The merits of bamboo were summarised by renowned Tang poet Bai Juyi (772-846): its deep root denotes resoluteness, its tall, straight culm represents honour, its hollow interior modesty and its clean and spartan exterior exemplifies chastity. He concluded that bamboo warrants the title 'gentleman' (Baidu 2008). This resoluteness is exemplified in the Chinese saying "bamboo bends, but it doesn't break."

3.3.2. Bamboo in India

Whilst China enjoys a positive historical and cultural connection with bamboo, the same is not the case with other nations. In India and other developing countries, bamboo is considered ‘poor man’s timber’ and associated with lower castes or classes that have traditionally utilised the material. For instance, bamboo has played an important role in providing traditional building materials and the rural cottage industry for the poor in India (Nair and Sreedharan 1986). The ‘low caste’ association is impeding the development of the bamboo sector. This has led designers and investors in India to attempt to target high end product markets to gain support for the resource from the elite (Rao et al. 2009). Moreover, the Indian government has created two bodies: the National Bamboo Mission (under the Ministry of Agriculture) and the National Mission for Bamboo Applications, thereby recognising the vital need to upscale the rapidly renewable resource due to natural resource deficits.

In India, colonial forestry has impacted bamboo forestry significantly. Although potentially a large industry, cultural and legal constraints have thus far inhibited the development of the extensive resources within the country. In 2011, the Indian government overturned regulation which had listed bamboo as a tree under the Indian Forest Act since 1928. Classed as a ‘tree’ ensured that cutting, selling or trading in bamboo became the monopoly of the government and gave the forest bureaucracy control over an estimated US\$225 million bamboo trade. Now classified as a ‘grass’, the change could have profound implications for forest dwellers who will not be subject to the same strict controls and tax regulations (Sethi 2011).

3.3.3. Other bamboo nations

Whilst bamboo has strong cultural connotations in both China and India, this is often not the case outside of Asia. Bamboo has traditionally played an important role in the lives of people in Vietnam (Quynh 2002) and Malaysia (Mohmod et al. 2002) amongst others, but in Latin America, where there are significant resources bamboos are generally seen as a forestry resource of little significance (Londono 2002). For example, in Ethiopia bamboo stands are poorly managed and have traditionally been seen as ‘no man’s resource’ (Liese 2002). This is however changing with capacity building from Chinese experts. In Ethiopia, over 80% of the city residents use wood for cooking, which has led to significant deforestation. In 2005, forest cover represented less than 3% of the land area. Experts are assisting local communities to replace wood with bamboo charcoal through biomass energy projects (INBAR 2012a).

3.3.4. Bamboo in the West

Whilst bamboo offers many opportunities as a substitute resource to timber (amongst other materials), historically this substitutability has also inhibited it from gaining predominance as a highly valued plant in its own right. Without the independence of niche crop status, bamboo’s quality as a potentially rapidly renewable substitute resource has been largely overlooked. This can be illustrated by reflecting on how early European empires grew as a direct result of plant and resource exploitation (Schiebinger and Swan 2005). In colonial European markets, the global trade in crops focused on developing markets for new exotic species such as spices, tea and coffee with no European equivalent (Hochstrasser 2005). Bamboos were not native to Europe and during this period may have presented little exotic charm, lacking the exoticness of ubiquitous plants such as sugar, cotton, potatoes or tea. Europe already had local materials (e.g. willow, poplar) serving the main uses of bamboo. As

a result, there was no economic incentive to trade bamboo or establish overseas plantations in European colonies. Within the British Empire, there was the need for timber for ships and railways. This need could easily be satisfied by timber resources, without the need for seeking alternative substitute resources.

In addition, the ‘forest’ plays a significant role in the ‘cultural imagination of the West’. Ritter and Dauksta (2012) highlight that throughout history, forest values have changed and new functions have emerged. Moreover, the cultural and symbolic roles of forests have not received the same attention as the ecological, productive, and social functions. However, forests and treed landscapes are bound up with all kinds of cultural constructions of national identity (Harrison 1992). As timber shortages became acute in the 19th century, preservation, conservation and management of forestry became a key concern globally. At this time romantic illusions surrounding the forest within literature were cultivated to aid the conservation drive. These romantic notions are still popular today (Radkau 1997). Trees are symbols of life but also of wilderness. Trees are seen to ‘breathe’ for the planet, frequently represented as the ‘lungs’ of the Earth, as spiritual, mythological and part of gendered landscapes (Jones 2002).

Unlike the cultural romanticism surrounding the institutional frame of treed landscapes, bamboo is known for its aggressive weedy tendency (Williams 1994). The advent of modern agriculture in the late 19th century changed approaches to plant management, framing a strong division between weeds and other plants. A weed is defined as: an herbaceous plant not valued for use or beauty, growing wild and rank, and regarded as cumbering the ground or hindering the growth of superior vegetation (Crosby 2004). However a ‘weed’ is not a scientific term. All definitions of weeds regard them entirely from a subjective human perspective.

“Plants become weeds when they obstruct our plans, or our tidy maps of the world. If you have no such plans or maps, they appear as innocents, without stigma or blame....A plant might be innately beautiful and perfect in form, but not if another of its innate qualities was ambition.” (Mabey 2010)

Weeds are considered to be ‘pioneers of secondary successions or colonizers’ specializing in the occupation of ground stripped of plants by landslides, floods and fires. Without the “opportunistic invaders”, the loss of topsoil could have degraded large areas of valuable agricultural land (Crosby 2004). Emerson described weeds as plants whose values are yet to be discovered (Emerson 1985).

Whilst the creation of forestry science (as treed lands) was established in the late 19th century, it wasn’t until after WWII that most of the global institutions present today, such as the United Nations and its various agencies, the World Bank and International Monetary Fund (IMF), came into existence. Their origins and mandates are a product of specific political and economic forces framed within a particular vision of world political structure and economic development. These institutions have become such a familiar part of the international relations landscape that we assume their permanence (Harris 1991). Although slowly changing, Western forestry instruments are locked in path-dependent institutions which persist in the absence of the socio-historical forces responsible for their original production. Whilst treed lands still occupy a significantly larger area than bamboo lands and thus sheer abundance has clearly made treed lands a priority, it needs to be recognised that the social construction of plants has informed modern institutions and instruments, and that these institutions and instruments have limited the development and scope of bamboo.

Bamboo is often classified in the matrix of a forest as an NTFP. Some believe NTFPs have long been undervalued by government policy makers; NGOs and scientific researchers have directed most of their attention to wood based products (Shanley et al. 2002). Many

alternative and substitute crops face a lack of investment and strong competition, with a few commercial plants leaving little room for other resources (Fortenbury and Bennett 2001).

However, in many ways bamboo is unique as an NTFP: it can constitute a part of or be the forest. It can reach arbitrary defined criteria to become a ‘tree’ and be traded as one (explored in the next section).

Whilst Scott (1998) highlighted that plants that are valued become ‘crops’, and species that compete become ‘weeds’, bamboo is in a more complex situation. As previously discussed, bamboo nations have varying cultural relationships with bamboo and therefore different perceived ‘value’. The ‘radical simplification’ of forests to a single commodity during colonial times allowed trees to become valued as ‘timber’ (Scott 1998). However, whilst forestry practices have developed to acknowledge the multi-functions of ecosystem services, bamboo has become valued as ‘timber’ and traded as such. The fact that bamboo has ‘become timber’ is representative of the institutional order which equates forests with treed lands. This sense of institutional order is an epistemological space specific to a particular time period (Foucault 1966). Whilst forestry science can no longer be considered the product of one school of thought, it is important to understand how inclusion within the forestry institutional frame affects bamboo development.

3.4. Bamboo cultivation and international institutions of forest governance

The conceptualisation of forests as treed lands has a profound effect on the mechanisms that are imposed upon bamboo as a substitute resource to timber. Forest governance mechanisms such as forest certification, REDD+, timber legality verification instruments, government procurement policies and trade laws are being developed and are utilised across different

scales. Whilst the instruments and actors driving them differ widely, the treatment of bamboo is still rooted within its relationship to timber and treed lands. Table 3.5 presents three key forestry governance mechanisms identifying bamboo's place within the respective instruments. Forest Certification, timber legality verification and REDD+ will be explored further in more detail.

Table 3.5: Bamboo within contemporary forest governance

Instrument	Actors driving the mechanism	Instruments governance	Definition of bamboo	Bamboo guidelines
Forest Certification	NGOs Industry	Environmental and social criteria Third-party auditing	"Bamboos can be certified as a Non Timber Forest Product (NTFP) within the matrix of a forest, or as 'treelike' within plantations or natural forests" (FSC 2010)	Yes
Timber Legality Verification (Government procurement policies; Trade laws)	Global governments	Supply chain governance Third-party auditing 'due diligence' mechanisms	EU timber regulation "Covers almost all timber products-bamboo...[is] covered if part of listed HS codes" (Hinrichs 2011)	Yes
REDD+	Intergovernmental Organisations	Reducing Emissions from Degradation and Deforestation Plantation management Biodiversity conservation	Uses the IPCC definition of forests. "Includes bamboo...provided that height and canopy cover criteria [of trees] are met." (Eggleston et al. 2006)	No

Source: Author

3.4.1. Forest Certification

In the late 1980s there was growing demand from environmental groups and industry for new policy tools to regulate forest conversion and legality within timber markets. Negotiations

regarding an intergovernmental forest convention were originally on the agenda of the UN Rio Summit in 1992 but years of subsequent negotiations have failed to reach consensus. Growing scepticism of the capacity and willingness of intergovernmental bodies to regulate forests and forestry combined with the rise of ethical consumerism prompted NGOs and timber retailers to initiate the creation of a forest governance mechanism independent of the state. This involved the founding of the FSC, a standard setting body governed by a membership of influential environmental organisations, notably the Rainforest Alliance, Greenpeace, Friends of the Earth, and WWF, and large retail companies, notably IKEA, Home Depot and B&Q (Klooster 2010).

Many building and construction standards now require certified materials, leading to pressure from the construction industry operating in alternative timber markets (Mosobo 2010). Similar pressure is now coming from the pulp and paper industry, notably for toilet tissue (Baker 2012). In 2012, 19 Forest Management (FM) and 351 Chain of Custody (COC) bamboo certificates exist, of which 13 FM certificates are in China³ and 6 from Colombia⁴ (FSC 2012).⁵

While FSC standards *can* be applied to bamboo, its application appears premature and unhelpful. In many countries, bamboo mainly grows as a small-scale horticultural crop on homesteads. Due to bamboo's regeneration, certification bodies operating in China have difficulty assigning bamboo to FSC definitions of natural and plantation forests, causing confusion over which standards to apply. FSC is in effect, forcing external notions of environmental auditing on a cultivation system without prior discussion on purpose and efficacy. This risks promoting confusion and hostility that could undermine trust and

³ The first certificate dates from 2008

⁴ The first certificate dates from 2011

⁵ EcoPlanet Bamboo has FSC certified plantations in Nicaragua however these are currently not listed on the database

credibility in FSC. Although globally NTFP smallholders have faced challenges reaching FSC standards regardless of the species, bamboo can be considered a unique case since it competes directly in timber markets. This creates market barriers for the majority of bamboo growers who lack access to external finance (Buckingham et al. 2011).

In 2005 in Brazil, FSC passed a motion to improve and expand its guidelines on bamboo and rattan forest certification (FSC 2005). Subsequently FSC's approach has not fundamentally changed. Their definitions continue to deploy a 'tree' as the benchmark for forestry understanding. For example FSC notes:

“There are many species of bamboo, the larger of which may be considered treelike. Larger areas of such bamboo are often referred to as ‘bamboo forests’. Bamboos can be certified as a Non Timber Forest Product (NTFP) within the matrix of a forest or as ‘treelike’ within plantations or natural forests” (FSC 2010).

Improvements in commercial intensive bamboo plantations are needed for the sustainable development of the resource (Buckingham et al. 2011). Some efforts are underway, for example under the Chinese State Forestry Administration, with the intention to seek the Programme for Endorsement of Forest Certification (PEFC) accreditation, as well as individual initiatives of bamboo organisations in Latin America, Africa, China and India to create bamboo specific certification (Buckingham and Jepson forthcoming; Chapter 4). Issues of national autonomy, applicability, cost, and stakeholder acceptability represent major challenges for the development of a bamboo standard.

By mid 2010, about 56% of the world's 355 million hectares of certified forests were in North America, 24% in Western Europe, and only 8% in Latin America, Asia and Africa combined (Bieri and Nygren 2010). The 'Northern' drive for certification has helped

institutionalise the instrument; however, bamboo is absent from these regions thereby underlining the need for frameworks suited to tropical and sub-tropical regions.

3.4.2. Timber Legality Verification

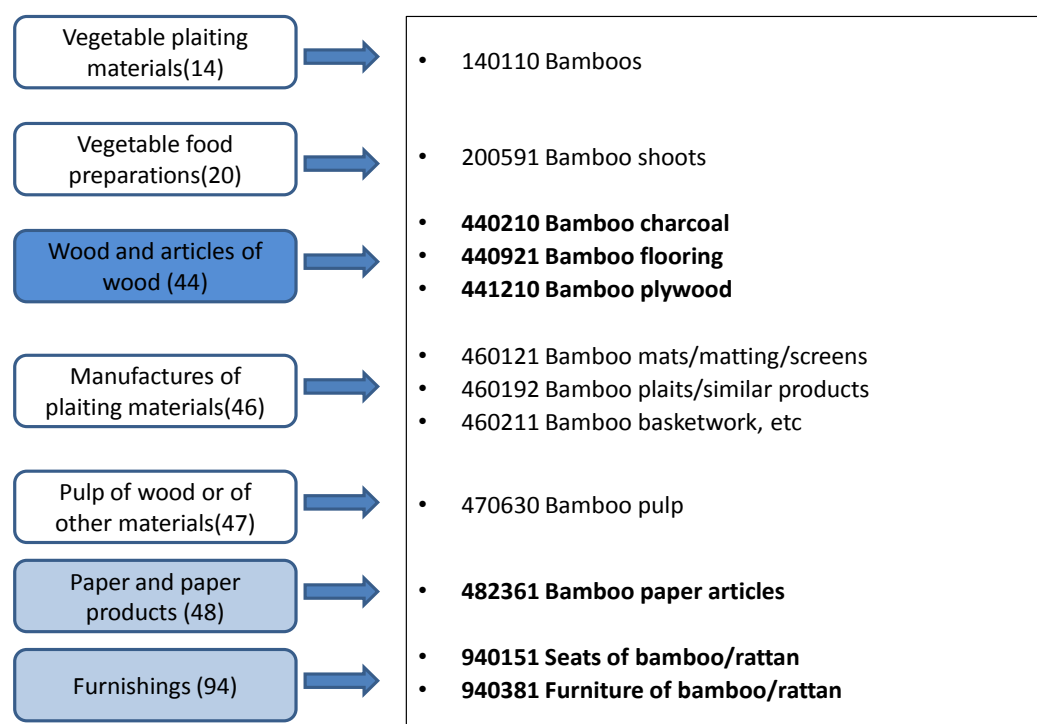
Certification was created primarily due to a lack of intergovernmental agreements to address legality of timber supplies (Arts and Buizer 2009). Although certification has seen widespread uptake in developed countries, certification has appeared particularly challenging in developing countries. Timber legality verification offers the first step in improving forest management (FAO 2009). At present, 12 countries have operational central government public sector procurement policies for timber and timber products. Apart from national level procurement policies, the European Commission is considering ways to promote broader green procurement with FLEGT (Forest Law and Enforcement, Governance and Trade) licences under Voluntary Partnership Agreements (VPAs) as a tool to prove legality of timber supplies. The EU has developed the EU Timber Regulation legislation and the US has amended the US Lacey Act to take measures to provide ‘due diligence’ procedures to track timber and timber products to combat illegal logging (Simula 2009). Legality verification is now emerging as a leading policy instrument with which to combat forest degradation and deforestation associated with illegal logging (Cashore and Stone 2012).

The Harmonised Commodity Description and Coding Systems (HS) enable countries to classify traded goods under a common coding system. At the international level, the HS for classifying goods is a six-digit code system, comprising approximately 5,300 article/product descriptions that appear as headings and subheadings, arranged in 99 chapters and grouped in 21 sections (INBAR 2011). This aids understanding of trade flows and the development of the bamboo industry. Currently bamboo is included under some categories of the ‘wood and

articles of wood’ section. The regulations could potentially be expanded to include bamboo under a number of other HS categories: 4,418: Builder’s joinery and carpentry, 4,419: Tableware and kitchenware, and 4,420: Statuettes and other ornaments (INBAR 2012b).

“ [EU Timber Regulation] covers almost all timber products, excluding recycled products, printed material - bamboo, rubber, rattan are covered if part of listed HS Codes” (Hinrichs 2011) (Figure 3.1).

Figure3.1: Harmonised System (HS) bamboo trade codes



Key

	Bamboo HS codes not covered under EU or US regulations
	HS codes covering EU regulation and the US Lacey Act
	HS codes covering EU regulation

Adapted from Hoogendorn, C (2012) INBAR Presentation WBC

There is currently no accreditation for legality verification systems because there is no common approach (Proforest 2011). Whilst legality verification promotes national sovereignty, it relies on third-party verification like certification. A key and unanticipated consequence that has emerged from US and EU legislation has been the increased uptake of forest certification in Indonesia and Malaysia to provide assurances of legality verification. In the Indonesian case, the state based forest certification scheme LEI has contributed to the development of the timber legality assurance systems TLAS (SVLK, *Standar Verifikasi Legalitas Kayu*) framed within VPAs (Cashore et al. 2010). Although forest certification is not yet accepted as ‘due diligence,’ country studies are showing there is potential for mutual support between legality verification and certification in a number of countries (Cashore and Stone 2012). This looks set to further institutionalise the need for forest certification for bamboo. This mode of legality verification, at least in the short term, could reinforce the need for certification until specific verification methodologies can be created for bamboo. Whilst HS codes provide data on trade flows, they also ensure that bamboo adheres to timber legality verification although bamboo legality has never been an international issue.

3.4.3. Reducing Emissions from Deforestation and Degradation (REDD+)

As previously mentioned, recent international forest policy has focused on the implications of tropical deforestation for climate change, biodiversity loss, and livelihoods. In particular, the efficacy of the REDD + (Reduced Emissions from Deforestation and Degradation) mechanism has dominated international discourse, with the ‘+’ denoting the enhancement of forest carbon stocks. As climate change is recognised as a global policy issue that needs immediate action, REDD+ is receiving growing attention for its potential role in abatement (Kanowski et al. 2011). It is estimated that the world’s forests store 289 gigatonnes (Gt) of carbon in their biomass alone. The period 2005-2010 saw an estimated 0.5 Gt global

depletion of carbon stocks, primarily because of a reduction in global forest area (FAO 2010).

The potential benefits and co-benefits of REDD+ related policy interventions are identified by Kanowski et al. (2011) as its relative cost-effectiveness when compared to other mitigation options, its potential to support biodiversity conservation and delivery of other environmental services and its potential to contribute to poverty reduction.

The application of carbon mechanisms to bamboo is problematic because of bamboo's ambiguous position regarding its relationship to timber. According to the Intergovernmental Panel on Climate Change (IPCC) and FAO, bamboos are classified as trees, as long as they meet certain criteria (Eggleston et al. 2006; FAO 2001; Lobovikov et al. 2012):

“Forest is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters in situ. Areas under reforestation that have not yet reached but are expected to reach a canopy cover of 10 percent and tree height of 5 meters are included, as are temporarily unstocked areas, resulting from human intervention or natural causes, which are expected to regenerate. Includes: areas with bamboo and palms provided that height and canopy cover criteria are met” (Eggleston et al. 2006:46).

When IPCC methods, definitions, and default parameters are applied to bamboo they are not appropriate, therefore many carbon calculation approaches are inadequate or inaccurate (Lobovikov et al. 2012). Whether bamboos can reach arbitrarily defined criteria for being a ‘tree’ is beside the point. The different ecologies and materialities of trees and bamboos need to be taken into consideration. For example, rhizomes are not roots but shoots, the ‘root/shoot- ratio’ is created for timber trees therefore there is the risk that the ‘belowground- aboveground ratios’ of bamboo are underestimated (Lobovikov et al. 2009). Bamboo growing stocks are usually assessed by weight, not volume; culms shrink and swell with water content (Liese 1985), and their specific density varies by age unlike timber (Lobovikov et al. 2012).

It is not the first time bamboo's fit within carbon mechanisms has been ambiguous.

Previously the Carbon Development Mechanism (CDM) placed the decision on countries Designated National Authorities (DNAs) to choose whether their forest definition for the CDM included bamboos. The CDM Executive Board decided in its 39th meeting:

“Palm (trees) and bamboos can be considered equivalent to trees in the context of Afforestation/Reforestation.” (Lobovikov et al. 2012)

When considering new carbon mechanisms such as REDD+, negotiating documents omit references to bamboo. Lobovikov et al. (2012) highlight that the definition of bamboos is ambiguous under carbon mechanisms and so many species will be relegated to the NTFP category, whilst others will be ‘treelike’. However, not considering bamboos as trees (or equivalent to trees) under REDD+ might make bamboo stands vulnerable to conversion or degradation which could contribute to national or international leakage. In spite of physiological differences between bamboos and trees, woody biomass of bamboos corresponds to that of trees and clearly differs from the biomass of grasses (Lobovikov et al 2012).

3.5. Conclusion

This paper has highlighted the socio-historical constraints that have, to some extent, impeded the development of bamboo as a resource through an examination of the institutional frame of forestry. Regarding bamboo, not as a panacea but as a potential substitute resource in face of increasing demand for alternative resources to timber, there are a number of cultural and institutional constraints that impact its development. Whilst China has a long history of

bamboo utilisation, in the West the conceptualisation of forests as treed lands has shaped governance and management strategies of the resource. Moreover, framings as ‘poor man’s timber’ or an invasive ‘weed’ have further constrained the potential for development. As a result of forests being perceived as treed lands, precautionary measures used to ensure sustainability have been placed on bamboo as it ‘becomes timber’ through certification, legality and carbon systems.

There are many policy implications that arise from this discussion, namely with the three forestry instruments discussed. It is clear that bamboo’s ambiguous position within policy is constraining development of the resource. Primarily, whether bamboo can be considered ‘treelike’ (which on the whole is the conceptualisation of Chinese bamboo forests) or ‘not treelike’ (which are generally sympodial, however, some species could through their height reach the IPCC criteria to become ‘trees’) denotes its fit within institutional frameworks. Therefore the perception and scope of bamboo resources needs to be extended, not just as a forestry crop, but also developed within agriculture and horticulture

The discussion of bamboos diversity highlights the parallel issue of tree diversity. The world’s timbers are household names (which can be from multiple species), such as mahogany, teak, ebony, oak, spruce, pine and elm (Russel and Cutler 2012). A variety of tree species ‘become timber’ whereas others are not favoured. Through this commodification process, from plant to ‘crop/resource,’ they risk ecological simplification in management approaches as a generic tree. For instance, the task of creating forest certification and thus a frame for sustainable management is complex. Globally, forests are highly diverse, from dry shrub-land in Australia to tropical rain forests in Brazil or Congo and boreal forests in Russia. Their management requirements also differ greatly, depending on the ecosystem and intended output (Rametsteiner and Simula 2003). Some argue that the management of planted forests

will increasingly parallel intensive agriculture, with the consequence that we may eventually get most of our wood from four or five species (Sutton 1999). The increasing importance of plantations for industrial wood could lead to as much as two-thirds of the world's industrial wood supply coming from the dominant forest plantation species in the world—*Pinus spp.* and *Eucalytus spp.*—by 2030 (Cubbage et al. 2010). Moreover, it is argued that forest certification for plantations legitimises a political economic model of unsustainable development based on unlimited demands for wood and paper (Klooster 2010). If it is bamboo's turn to be industrialised, it may be the case that bamboo will also face ecological simplification in management approaches. Certain species will be identified as 'valuable' leading to the predominance of commercial species. In this case, it is not a discussion about 'trees' and 'bamboos' with their vast diversity, it is more a case of the comparison of a valued commodity: 'tree timber' and 'bamboo timber'. The comparative institutional frames are therefore 'commercial bamboo' and 'commercial forestry'. The pressing challenge is therefore to find an institutional space that both fits the commodity and the plant's ecology.

In a world of globalisation, where the political economy has turned plants into commodities, we need to consider how natural resources and their social construction interacts or conflicts with other constructions in different societies. Since institutions are a construct of society, society is much more engaged in reproducing existing institutions than producing new ones (Vatn 2005); institutions are therefore isomorphic in that they resemble others (DiMaggio and Powell 1983). However, this isomorphic process can be viewed as 'ceremoniously' reflecting the institutional environment with its procedures and practices, whereby it is not necessarily efficient or effective (Meyer and Rowan 1977). In short, plants, which become valued as natural resources can become institutionalised within isomorphic frames without adequate attention to the efficacy of the framework.

Instigating change within the cognitive field is challenging because the political and cultural nature of cognitive institutional models means the framing and boundaries of the institution are not always perceptible. In order to initiate change, efforts must incorporate strategies that address all aspects of institutions—regulative, normative and cognitive (Hoffman and Ventresca 1999)—particularly with regard to developing new ‘natural’ resources to substitute existing ones in light of increasing pressures for sustainable development.

When considering the different forestry governance instruments, it is clear that a more inclusive certification programme is needed; certification that advocates clear changes in management for sustainable production. More research is required on the efficacy of forest certification for bamboo. Moreover, US and EU legality verification could further strengthen the need for certification as studies have demonstrated. To place bamboo within wood-timber legality verification systems (through HS codes) may allow for more comprehensive statistics of global bamboo trade; however, since illegal bamboo trading has never been raised as a pressing issue (unlike timber), legal verification appears unwarranted and may act as a further trade barrier before the industry is adequately commercialised. Finally, the omission of explicit mention of bamboo in REDD+ undervalues a potential contribution and further emphasises the conceptualisation of forests as treed lands.

At a micro level, being a tropical and subtropical plant, there are great gains to be accrued from developing livelihoods in less developed bamboo regions. With the vast array of potential uses, there are many potential management and technology advancement opportunities which could contribute to poverty alleviation. The challenges of creating a frame for sustainable bamboo management are significant. Crisis in the past has provided the impetus for change; we are moving into an age where we need to fundamentally reassess natural resource use. The commercial options bamboo presents are significant; however an

enabling institutional frame needs to be created to assist the plants development. At a macro level, this paper has aimed to demonstrate how plants, which become valued as natural resources, become institutionalised often within isomorphic frames without adequate attention to the efficacy of the framework.

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CHAPTER 4: FOREST CERTIFICATION WITH CHINESE CHARACTERISTICS: STATE ENGAGEMENT WITH NON-STATE MARKET DRIVEN GOVERNANCE

Kathleen Buckingham and Paul Jepson

Abstract

Forest certification is conceptualised as non-state market driven (NSMD) governance, whereby forces within the market are used to drive sustainable practices at the forest management level and throughout supply chains. Whilst recent scholarship has considered the ‘cross fertilisation’ and hybrid nature of the state and non-state in creating sustainable forest governance, these studies have tended to focus on national cases involving democratic countries where the ‘space’ for private standards and auditors is relatively unconstrained. This paper seeks to fill this gap through an examination of the entry of transnational forest certification approaches into China. Drawing on extensive fieldwork conducted in China during 2010, it traces the creation of a new forest certification scheme, which aims to be adopted under the Programme for Endorsement of Forest Certification Schemes (PEFC). The paper examines the legitimacy sought by the Chinese government on three fronts; to appeal to the differing needs of both international and domestic markets simultaneously, whilst ultimately assuming a legitimate form of (institutionalised) domestic governance which allows the government to maintain their authority over the mechanism and its operations. The paper focuses on the principles of NSMD governance through an analysis of the legitimate authority afforded to the state, third-parties and NGOs within China. It contributes to political geography by examining how isomorphic forms of institutionalised governance are reproduced within local settings, with the aim of adhering to both global norms of legitimate governance and domestic norms of legitimate power.

4.1. Introduction

Since China ‘opened up’ its economy in 1978 and entered into the WTO in 2001, government agencies are increasingly engaging with market standards such as forest certification. Forest certification arose in the early ‘90s in the context of NGO-led campaigns and boycotts targeting wood retailers and logging companies, disillusionment with efforts to create an international legal framework governing forestry, and broader trends relating to the rise of corporate social responsibility and market-based governance involving standards (Klooster 2010). Forest certification comprises of a set of international environmental norms, based on third-party auditing of performance based standards developed by non-state actors such as NGOs and industry associations. It both reflects and is constitutive of forms of ‘network governance’, whereby new spheres of authority operating beyond the state are created by what Cashore (2002) terms a ‘credibility alliance’ i.e. the formation of an alliance from environmental NGOs, forest industries, retail and policy sectors promoting a common and shared belief in the potential of non-state market driven (NSMD) governance approaches to ameliorate environmental problems (Cashore 2002).

Globally, two competing forest certification schemes have emerged: the Forest Stewardship Council (FSC), launched in 1994, spearheaded by a partnership of NGOs and retailers (FSC 2012) and the Pan European Forest Certification (PEFC), which began in 1999 (PEFC 2012a) and was formed by forest production industry interests, with considerable state support particularly in Finland, Sweden, Norway, Germany and Austria. This latter scheme became known as the Programme for Endorsement of Forest Certification Schemes in 2003, to reflect its revised global reach. PEFC can be understood as a move on the part of the forest production industry to weaken the spread and influence of FSC, which they considered a civil

society standard based on biased environmental activist perceptions of their industry (Gulbrandsen 2004).

Recent data puts the proportion of production forests certified at 9% globally with only 11% of these located in tropical countries. The forest area certified by PEFC now exceeds that of FSC (UNECE/FAO 2011), 243million ha of the 394m ha of forests certified are now under PEFC (PEFC 2012b; FSC 2012). The rise of PEFC is explained by the ability of countries to create their own standard, based on 7 meta-standard criteria under the ‘umbrella scheme’. This is in contrast to FSC’s comparatively rigid 10 principles and criteria, which must be applied universally and have limited scope for adaptation to the national context (PEFC 2012a).

A growing body of literature has examined the emergence of forest certification and the competition between FSC and PEFC (Cashore et al. 2004). Whilst recent scholarship has considered the ‘cross fertilisation’ (McDermott et al. 2008) and hybrid nature of the state and non-state in creating sustainable forest governance (Gale and Haward 2009; Cadman 2011), these studies have tended to focus on national cases involving democratic countries where the ‘space’ for private standards and auditors is relatively unconstrained. Less is known about how forest certification schemes gain legitimacy in more authoritarian settings, or those with strong state control over social and economic life. This paper seeks to fill this gap, through an examination of the entry of transnational forest certification approaches in China.

The analysis draws on extensive fieldwork conducted in China during 2010. It describes how China has acted to integrate forest certification within its state controlled capitalist approach⁶ and the implications this has had for the uptake of FSC and PEFC schemes. The paper

⁶ Since Deng Xiaoping coined the term "Socialism with Chinese characteristics" as the socio-political-economic guiding principle for China's modernization, the phrase "with Chinese characteristics" has become synonymous with the Chinese way of doing things in many Chinese policy documents (Chang 2011).

examines the legitimacy sought by the Chinese government on three fronts: 1) appealing to domestic markets, 2) appealing to international markets, and 3) assuming a legitimate form of domestic governance. The analysis draws on concepts of legitimacy within forest certification literature to examine and compare the interplay of the two forest certification schemes within Chinese institutions of forest management. Specifically, it examines how the Chinese State Forest Administration (SFA), academics, international NGOs, industry associations and auditors have responded to components of forest certification deemed central to their legitimacy internationally. The analysis considers the robustness of the institution of forest certification and the major factors that have helped to create the legitimacy of certification standards in the West, namely; 1) Its existence as a non-state market driven governance mechanism; 2) The use of third-party (and by implication, independent) auditors; and 3) NGO support (with the implication of environmental and social expertise).

This paper also contributes to recent scholarship exploring how forestry governance is witnessing a new mode of collective responsibility beyond the public/private dichotomy (Gale and Haward 2009; Cadman 2011). By adopting ‘strategic balance’ between conforming and differentiation to achieve legitimacy (Deephouse 1999), China can maintain the institutional ‘rules of the game’ (North 1990) both domestically and abroad.

4.2. Methodology

This paper focuses on the case of the Chinese government’s response to the entry of FSC and associated auditing companies since 2001. It draws on a review of Chinese language policy and academic literature on the topic. A series of 52 key informant interviews with forest stakeholders were conducted in China, namely with the State Forestry Administration (SFA), Chinese Academy of Forestry (CAF), certification bodies, the Forest Stewardship Council

(FSC), the Programme for Endorsement of Forest Certification (PEFC), NGOs, academics, industry representatives, and stakeholders at the forest and administration level. It is informed through participation in various international conferences and workshops in China, Malaysia and South Korea, as well as shadowing certification audits within China. The majority of interviews were conducted in Chinese, without the aid of interpreters. Due to issues of confidentiality, no respondents have been named and moderately political quotes have been used which would not identify the interviewees.

4.3. Legitimacy and forest certification

Cashore (2002) developed a legitimacy-based analytical framework to facilitate research into “the dynamics between the emergence of NSMDs and the conditions under which they create policy”. Cashore’s choice of legitimacy as an analytic is based upon the recognition that legitimacy and power are constitutive of each other (Stinchcombe 1968), and hence NSMD governance approaches (in the case forest certification) must accrue legitimacy in order to change a state of affairs. Cashore’s framework draws on work in cultural-institutional perspectives of legitimacy, as applied to organisations and institutions by Suchman (1996). The legitimacy that external audiences may grant an organisation can fall into three categories (Suchman 1995): pragmatic, based on short term material interest, moral legitimacy, based on the belief that supporting the actions of the organisation in question is the ‘right thing to do’ and cognitive legitimacy, because it would be unthinkable to do otherwise (Cashore 2002).

Weber (1964) was amongst the first to stress the importance of legitimacy (Parkin 1982). He applied the concept of legitimacy to governmental and corporate power structures, and proposed that subordinate actors regard an order as legitimate on the basis of either its

traditional nature, the charismatic qualities of its leadership (e.g. royalty) or because it is legally constituted. Under this view of legitimacy, subordinate actors accrue political and policy legitimacy from a governmental regime or other higher authority.

Central to studies of legitimacy is the premise that the government is not legitimate unless it is carried out with the consent of the governed. Parsons (1960) extended Weber's thinking to view legitimacy as the congruence of an organisation with social laws, norms and values (Ruef and Scott 1998). This broader framework has been taken up by organisational theorists and is useful because it can account for the political legitimacy accrued by non-state actors (such as Greenpeace in the 1970s), in the absence of governmental endorsement. Suchman (1995), in his influential work on strategic and institutional approaches to managing legitimacy, summarised legitimacy as the perception of others that the existence and actions of an organisation (or governance system) are desirable, right and proper within some socially constructed systems of values, norms and beliefs.

Because certification does not carry the same authority, power and legitimacy as state regulation (Beisheim and Dingwerth 2008), the identity of 'others' and the 'systems of values' in Suchman's definition matters when analysing the influence of certification schemes. This is recognised by Cashore (2002) in his assertion that private institutions (forest certification) must win the endorsement of legitimacy providing communities (Cashore et al. 2004).

Crucial to institutional-cultural understandings of legitimacy is the recognition that legitimacy is socially constructed and emerges out of a subject's relation to rules, laws, norms, values and cognitive frameworks in larger social systems (Deephouse and Suchman 2008), which varies over space and time. In short, the degree to which any certification scheme accrues legitimacy will vary between countries, cultures, and eras. For instance,

China exhibits a more state-centred form of ‘legitimacy’. Historically, Confucian values and the ideology of ‘Tianxia’ (which values order over freedom through harmony and hierarchy) (Barr 2011) support a more hierarchical societal structure. It is acknowledged that China is multifaceted in its business relations. However, from an institutional perspective, culture is recognised as a potential coordinating mechanism (Krug and Hendrichs 2000). Informal, culturally derived, constraints will therefore not change immediately in reaction to changes in formal rules (North 1990); therefore, the entry of new governance mechanisms will need to operate within the existing institutional structure.

Beetham (1991) argues that non-liberal democracies are more concerned than liberal-democracies about the erosion of the societal basic belief system and the threat of being superseded by a further legitimate political order. In such cases, it is particularly necessary for states to maintain and reproduce legitimacy, through the maintenance of rules and the reproduction of beliefs. Fundamental to the legitimacy of power is the need for an authoritative source of rules (Beetham 1991). In the case of forest certification, although the certification ‘threat’ has been perceived as a challenge to many countries sovereignty (Cashore et al. 2006), in China a ‘Non-State Market Driven’ governance instrument could conflict with ideas of an ‘authoritative source of rules’. Thus, the system needs to be adapted to fit within the legitimate political order.

In contrast to Chinese governance institutions, Western democracies operate under different societal ‘rules of the game’ (North 1990). An inherent belief in citizens as the ultimate holders of power is expressed in a wider range of governance actors (NGOs, Markets etc.) that create what Cashore (2002) terms ‘legitimacy providing communities.’ These enable policy instruments, such as forest certification, to create spheres of authority through

‘credibility alliances’ involving environmental NGOs and business operations within supply chains but where government actors may be peripheral (Cashore 2002).

Standards and certification operate internationally through global value chains and production networks. Consequently, certification approaches must be deemed legitimate in multiple systems of relations in normative structures: those spanning the transnational marketplace (e.g. related to sustainable forestry) as well as those governing forest resources nationally in the context of different political regimes and associated cultural institutions (Bernstein and Cashore 2004). Recently, forest governance literature has drawn attention to the fact that forest certification systems are more intertwined with states than previously recognised (Bernstein 2001; Bartley 2007; Gale and Howard 2009; Cadman 2011): in many situations the state establishes the institutional infrastructure that underpins markets and remains the preeminent legitimiser, public monitor, and buyer of timber products (Overdevest 2010). In recognition of this, Cadman (2011) suggests that governance is moving to new hybrid forms of state/market/civil society governance, which are better adapted to the complex reality of the twenty-first century. The implication for forest certification is that schemes that enable such hybridity will accrue greater reach and ‘market-share’ than those that do not.

NSMD governance is considered ill equipped to deal with scale effects arising from expanding global timber markets. Therefore, in order to facilitate the required scales of ecological sustainability, cooperation is often required from the state. However, the states response is dependent on the type of policy network operating and the political economy of the region (Gale and Howard 2009). Certification does not bypass the state (thereby transcending old configurations of power). Instead, standards are renegotiated or compromised as they enter political economies (Bartley 2010). For instance, studies have shown certification standards can mimic government policy approaches or produce ‘cross-

fertilisation between certification standards and government policies' (McDermott et al. 2008), or have the potential to 'ratchet up standards' (Cashore et al. 2007). Vandergeest and Unno (2012) argue that just as in the colonial period, the Thai state response to aquaculture certification has been to implement legal and regulatory reforms to counter the perceived encroachment on national sovereignty.

Objection to the 'threat' of an externally imposed governance mechanism has been identified in many countries. The idea of FSC was initially rejected by the US (Cashore et al. 2007), Indonesian (Cashore et al. 2006), Canadian, and Australian timber industries (Gale and Haward 2009). Whilst some governments have supported FSC, others have objected to this form of external civil society regulation by helping to develop alternative, competitor schemes such as CERFLOR in Brazil, MTCC in Malaysia, and LEI in Indonesia. Such schemes are considered to preserve national autonomy and sovereignty by respective governments and as more compatible to domestic circumstances. However, such schemes have struggled to gain international recognition and have come under pressure from environmental and social actors for their deficiencies (Cashore et al. 2006). Some countries, notably Malaysia, in 2002 switched support from FSC to PEFC, despite opposition from NGOs. By 2012, there were 32 endorsed PEFC national certification schemes (PEFC 2012a)

Whilst global processes, such as the rise of FSC, are significant, they need to be translated and managed locally to be successful and influential. In Sweden for example, state actors helped to support and legitimise private forest certification (Bostrom 2010; Hysing 2009). In Sweden, an enabling state had a strong influence on private governing arrangements. The state was instrumental in facilitating, supporting and shaping the ground rules of governance (Hysing 2009). Although the 'non-state' of NSMD governance does not imply the state is not

involved (Vandergeest and Unno 2012), it is important to consider how the state accommodates an external notion of sustainability within its own governance structure.

4.4. The entry of certification into China

Three significant factors prompted China's engagement with forest certification: 1) the entry of China into the World Trade Organisation in 2001, and the need to engage with discourses of global sustainable forest management, in preparation for this, 2) a desire to improve national forest management given impetus by flooding in 1998, and, 3) the rise of procurement policies by Western importer markets (Europe and US) and timber legality verification regulations and policies.

Officials in the Chinese State Forestry Administration (SFA) noted that due to China's position as the second largest importer (Wang et al. 2003) and the third largest exporter of forestry products in the world (Han et al. 2004), there was internal recognition of the need for China to improve its image and position in global markets. This became an imperative as China pursued its candidacy (approved in 1986) for inclusions as a full member of the WTO (Bhattasali and Martin 2004). Consequently, in 1995 the Chinese government provided funding for the Chinese Academy of Forestry (CAF) (Guan 2001) to research principles and criteria for sustainable forest management (Li et al. 2007), as part of preparations for reaching international forestry standards.

As well as this international dimension, there was also a strong domestic driver that gave internal political and policy support for certification. This was a growing political and policy awareness of the risks to social and economic development caused by a history of forest

mismanagement.⁷ This was brought to a head by the catastrophic floods in 1998 which killed an estimated 2,000 people, destroyed 2.9 million homes, and damaged over 9 million ha of crops. The cause of the floods was attributed to deforestation (which had accelerated during the 1990s economic boom) and this marked a shift in China's forest policy: a logging ban was initiated in the Yangtze region along with policies to increase forest land to 40 million ha above 2005 baselines by 2020 (Wang 2010).⁸

The connection between Chinese interests in certification schemes and established international schemes was consolidated with a symposium in 1999 (Yu and Xiao 2004). After the first Chain of Custody (COC) certificates entered China in 1998 (Liu et al. 2010), there was impetus for the World Bank, WWF, and the State Forestry Administration to convene a symposium. This resulted in the funding and establishment of a forest certification centre in CAF in 2001 (Zhou et al. 2004). This external donor assistance was coordinated to coincide with the first two Western certification bodies entering China (SGS and SmartWood) (Lu and Li 2002) and the first forest management unit in China receiving FSC certification (Liu et al. 2010). The FSC and PEFC offices were finally established in Beijing in 2007.

The third driver for certification regards public procurement and timber legality verification. Public procurement policies for timber and wood products are increasingly becoming one of the key drivers of forest certification development efforts (Chen et al. 2011). At present, twelve countries have operational central government public sector procurement policies for timber and timber products. Belgium, Denmark, France, Germany, Japan, the Netherlands, New Zealand, Switzerland and the UK all accept FEC and PEFC within their procurement

⁷ For example, China experienced massive deforestation during the Sino-Japanese war in 1937; by 1948 less than 8% of China's original natural forests remained. Following the Communist Revolution in 1949, deforestation continued as a consequence of mass land conversion (Wang 2010).

⁸ Wang 2010 Presentation on CFCC, at PEFC stakeholders dialogue

policies. Whether PEFC can provide proof of both legality and sustainability has been subject to intensive criticism by NGOs in the UK. However, non-PEFC endorsed national schemes have problems getting accepted in the public procurement policies of export markets as they need to be assessed separately from FSC and PEFC, resulting in extra costs being borne by the timber supplier. From the marketing point of view, such independent national schemes have limited value for export customers as their label has no inherent brand value (Simula 2009).

Apart from national level procurement policies, the European Commission is considering ways to promote broader green procurement with FLEGT (Forest Law and Enforcement, Governance and Trade) licences under Voluntary Partnership Agreements (VPAs) as a tool to prove legality of timber supplies. The EU have developed the EU Timber Regulation legislation and the US have amended the US Lacey Act to take measures to provide 'due diligence' procedures to track timber and timber products to combat illegal logging (Simula 2009). These legal instruments can be considered a response to forest certification.

Certification was created in part due to a lack of intergovernmental agreements (Arts and Buizer 2009), with one of the aims to address illegal logging in tropical forests (Gale and Haward 2009). However, the uptake of the instrument has been predominantly within temperal/boreal forests, thereby not achieving widespread uptake in tropical regions and not overcoming one of the initial challenges set out by certification.

There is currently no standardised accreditation for legality verification systems (eg. FSC/PEFC) because there is no common approach (Proforest 2011). Whilst legality verification promotes national sovereignty, it relies on third-party verification like certification. A key and unanticipated consequence that has emerged from US and EU legislation has been the increased uptake of forest certification in Indonesia and Malaysia to

provide assurances of legality verification. Although forest certification is not yet accepted as ‘due diligence,’ country studies are showing there is potential for mutual support between legality verification and certification in a number of countries (Cashore and Stone 2012) including Ghana (Carlsen et al. 2012).

The drive for forest certification by the Chinese government can therefore be understood as a pragmatic approach to multifarious perceived challenges within the industry. However, because the concept of standardised cultivation was historically absent from China’s forest governance, Chinese scholars initially viewed certification as a request to adopt a foreign and inappropriate mechanism, Chinese scholars framed it as a ‘green barrier’ (Tian et al. 2003) and identified and articulated ten key challenges facing FSC within China: 1) the lack of adequate market drivers for FSC domestically, both at the consumer and industry level, 2) the high cost of certification (including both direct and indirect costs), 3) the difficulty of guaranteeing the quality of the certificate by different certifiers (Liu et al. 2010), 4) the domination by foreign certification bodies in the market, 5) inadequate awareness of certification domestically (Wang et al. 2003), 5) risks regarding potential changes in market trends and associated demand, 6) inadequate supply of certified timber, 6) lack of capacity within the industry (Tian et al. 2008), 7) inadequate development of the forestry industry regarding coverage, productivity, resources and distribution (Wang et al. 2003) , 8) lack of harmonisation of domestic laws and market demands, 9) lack of a unified forest management system to develop transparent chain of custody, 10) lack of rigor within the system, leading to the potential for uncertified products to enter the market (Tian et al. 2002). This list of limitations served to undermine the legitimacy of the FSC standard among key state actors within China.

This challenge to FSCs legitimacy within China was further compounded by both Chinese scholars and industries arguing the need for the government to play the central role in providing encouragement, support, regulation and policy to aid the industry in certification adoption (Huang et al. 2009). The case for a government-led certification process was strengthened by the fact that all forestland in China is state owned and NGOs are relatively weak. Therefore the government can act swiftly without opposition from civil society. Furthermore, individual countries procurement policies in part drive certification, and the government is best placed to respond and assimilate forest governance changes into policy (Hu et al 2007).

In order to retain more government control regarding standard setting some countries have chosen PEFC over FSC. However this has brought with it many challenges regarding the approval of their national certification programmes (Xu et al 2005; Simula 2009). PEFC has been identified as a suitable system for China. Three key reasons were identified: 1) It is ideologically more appropriate than FSC, as a state and industry led rather than NGO led standard (Han et al. 2007), 2) The feasibility of a Chinese certification label rests on attaining international recognition (Tian and Liu 2003), which is possible through endorsement under PEFC, 3) Chinese forest management requires significant improvement, for instance, PEFC provides an opportunity for industry to improve their environmental and social credentials without having to adhere to the high requirements of FSC (Hu et al. 2007).

Chinese scholars have been looking to examples from other countries to inform their decision regarding the creation of national standards accredited under PEFC (Yu 2003). However, whilst many countries have created forest management standards under PEFC, few developing countries have created their own schemes (Table 4.1). In addition, China's governance structure makes the application of PEFC to the local system rather unique. This is

because of the dynamics of the authoritarian structure, which will be explored within this paper. The Chinese Forest Certification Council (CFCC) certification scheme aims to act as a single, coherent national forest certification scheme within the Chinese market and to be accredited and recognised internationally by PEFC' (McKenzie and Durst 2005).

Table 4.1: Countries with PEFC forest certification and management units

Country	Certified forest (ha) under PEFC
Australia	10,108,276
Austria	2552,706
Belarus	8,536,500
Belgium	289,050
Brazil	1,260,164
Canada	109,560,588
Chile	1,913,521
Czech Republic	1,854,614
Denmark	246,104
Estonia	878,468
Finland	21,068,333
France	5,040,679
Germany	7,396,949
Italy	763,272
Latvia	1,622,027
Luxemburg	29,038
Malaysia	4,588,821
Norway	9,115,902
Poland	4,642,295
Portugal	216,154
Russia	643,874
Slovak Republic	1,219,557
Spain	1,239,103
Sweden	10,998,289
Switzerland	205,723
United Kingdom	1,298,047
USA	35,418,109
Total	242,717,093

Source: PEFC 2012b

4.5. Chinese Non-state actors

NSMD governance, by implication, relies on a network of non-state actors, but this network takes a unique form throughout China. The Chinese notion of civil society is very different from the Western concept (Menefee and Nordveit 2011). In the West, civil society emphasises freedom of association, competition among diverse social organisations and a social field independent of the state (Kang and Han 2008). In China this is not the case, and indeed the word NGO is problematic. Non-governmental organisation (feizhengfu zuzhi) can be viewed as subversive because ‘non’ (fei) can be interpreted in Chinese as ‘anti’ (fan) (Spires 2011). This semantic association exacerbates an already sensitive situation regarding the Chinese government’s strong prohibition against any political organisations outside the state (Ma 2002). Moreover, there is an understanding that NGOs gain legitimacy from the failing legitimacy of the state (Collingwood 2006).

The emergence of FSC in the West is consistent with Beck’s thesis of the counter state whereby NGO narratives tend to be regarded with a high degree of credibility (Beck 1992). This is witnessed by the success of NGO’s advocacy in influencing governmental or corporate policy (Unerman and O’Dwyer 2006). In contrast, in authoritarian states, NGO operations are often contested and their existence challenged (Heurlin 2010). Publics may view NGOs as “self-appointed judges in a field where they have inadequate understanding, limited experience and no legitimate right to regulate in the first place” (Gulbrandsen 2004). This contrast has implications for the perceived legitimacy of certification entering China and its facilitation as a governance mechanism by the state.

Chinese scholars note the need to encourage NGOs and civil society to participate in certification so as to reflect the prominent role of NGOs in environmentally sensitive Western

markets, (such as in North America and Europe), however they also recognise the major challenges in replicating similar levels of NGO engagement and acceptance in Chinese society (Hu et al. 2007). In China, the model of civil society is considered a ‘state led civil society’ (Frolic 1997) or ‘semi-civil society’ (He 1997) under a ‘graduated mode of control’, whereby the state controls society selectively. This is fundamentally different from either totalitarianism or Western civil society (Kang and Han 2008). The term ‘contingent symbiosis’ characterises the relationship of civil society and the state in China; the concept captures the fragility and mutual benefits of the NGO-government relationship: as long as social organisations refrain from democratic claims making (Spires 2011) and do not challenge the government, they will be allowed to operate without interference (Kang and Han 2008).

Alongside NGOs, third-party auditing and auditing companies have also become a non-state governor of environmental problems. The provision of third-party certification services in China has, to date, been conducted by US and European led certification bodies (Liu et al. 2010). Fostering trust in the third-party system is a major hurdle in China due to cultural concerns. In principle, certification is based on independent auditing, transparency, standardisation, and scientific assessments; however, in reality auditing companies differ regarding their interpretation of the standards. This leads to different conclusions, scores, and outcomes (Zhang et al. 2007) raising concerns regarding nepotism, clientelism, and corruption and creating a major hurdle to constructing the trust necessary for those schemes to operate.

Whilst the practice of audited governance, supported by a network of non-state actors, has become the blueprint for many certification schemes, Gulbrandsen (2009) notes that the spread of accountability arrangements for certification appears to be driven more by

expectations than the institutional function of these arrangements. This leads to the ‘flow of popular organisational recipes’ (579) whereby the audit has not only become a solution to a technical problem, but has also redesigned the practice of governance (Power 1997). Third-party auditing has become a legitimate practice to verify ‘sustainable practices’ throughout industry and agriculture. Hu et al. (2007) highlight the need for the government to monitor certification bodies since they profit from awarding certificates. Robust mechanisms are perceived as essential and required to ensure transparency without corruption to guarantee the success of the system (Hu et al. 2007).

Third-party certification (TPC) is embedded within social, political, and economic networks. Given that TPC is a highly competitive business, Hatanaka and Busch (2008) argue that it is difficult for certification bodies to be completely independent actors. McDermott (2012) identified major variations in trust amongst certifiers in British Columbia, with certifiers most trusted by environmentalists, distrusted by the industry, and vice-versa. Hatanaka and Busch (2008) argue that rather than further devolving government responsibilities to non-governmental actors, governments should take an active role in governance. A legitimate role for governments may be overseeing the accreditation of certification bodies and monitoring TPC activities. Such government regulation may limit inconsistencies amongst TPC results.

Distrust in TPC is particularly prevalent with ISO certification. In China, ISO 14001 certification has been found to be compromised through the cultural practice of ‘guanxi,’ which are the norms of reciprocity. Quite different from Western approaches that view ISO 14001 as a voluntary standard, the Chinese government is pursuing this international standard as a major policy instrument. As a result, the government is creating pilot projects and encouraging state-owned enterprises to certify. Fee schedules for ISO 14001 have been set up by the government and foreign certification bodies without approval cannot operate (Fryxell

et al. 2004). However, unlike Hu et al. (2007) and Hanaka and Busch (2008) the major policy implications of Fryxell et al. (2004) was to advocate the delinking of Chinese certification bodies from the government and open the market to more foreign based organisations. They believe this would administer competitive pressure and lead certification bodies to compete on their quality rather than administrative affiliation.

4.6. The government led process

At present there are two schemes being developed within China: the Working Group for the FSC Chinese specific standards and the governments own standard under the Chinese Forest Certification Council (CFCC), which aims to be accredited under PEFC. The politics of the FSC Working Group has been debated amongst stakeholders, with differing views arising regarding government involvement. Some believe that the government has been instrumental in providing the environment for certification to flourish,⁹ whereas others believe the Chinese Academy of Forestry (CAF), which hosts the Working Group, has created inertia in an attempt to develop the Chinese scheme with reduced competition from FSC.¹⁰

The SFA believes that the market should not be the primary regulator of certification because demand for certified products is limited, particularly in Asian markets. In order to drive prioritised purchase of certified forest products, China envisions following a similar path to Japan by developing public/government procurement policies.¹¹ In order to streamline the process, reduce proliferation of schemes, and create harmonisation within the market, the SFA has asked FSC repeatedly to accredit CFCC in order to allow for greater harmonisation

⁹ Interview 7

¹⁰ Interview 46

¹¹ Lu 2010 Presentation given at the International Network for Bamboo and Rattan; July 2010

across schemes.¹² However, since FSC operates a standard and not a meta-standard like PEFC, accrediting the CFCC is impossible under current FSC guidelines.¹³

The CFCC/ PEFC is gaining legitimacy within the State Forestry Administration on account of it being able to adopt more ‘culturally appropriate’ terminology, whereas FSC is losing, or failing to establish legitimacy because it is considered inflexible regarding issues that are contentious in China, such as indigenous peoples’ rights, plantations, and land tenure.¹⁴ In the FSC criteria, no land conversion to plantation forestry is permitted after 1994 (FSC 2009). This has been identified as a constraint by many stakeholders in support of the government led standard. The new 2010 PEFC checklist claims to prohibit conversion. However, this is restricted to conversion of primary forest, not other types of natural forest with significant human use. In fact, most forest conversion occurs in forests already impacted by human use (PEFC 2010).

The flexibility to adapt PEFC standards has enabled contentious issues such as ‘indigenous peoples’ to be removed.¹⁵ For example, FSC principle 3 states: ‘The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognised and respected’ (FSC 2010). Some interviewees suggested that the definitions and terminology of the new Chinese standard allows the government to avoid obligations to local people and enables ‘greenwash’ through land conversion to certified ‘sustainable’ forests¹⁶. For instance, one government level interviewee noted that:

¹² Interviews 25 and 32

¹³ Interviews 7 and 32

¹⁴ Interviews 5, 25 and 33

¹⁵ “If you check with the government department, we have no indigenous people at all....so principle three of FSC is not fully applicable”(interview 47)

¹⁶ Interview 46

“[In] our standard we do not mention land conversion...land conversion in all countries is allowed...we need to think that some behaviour may not be environmentally sound but that it is lawful.”¹⁷

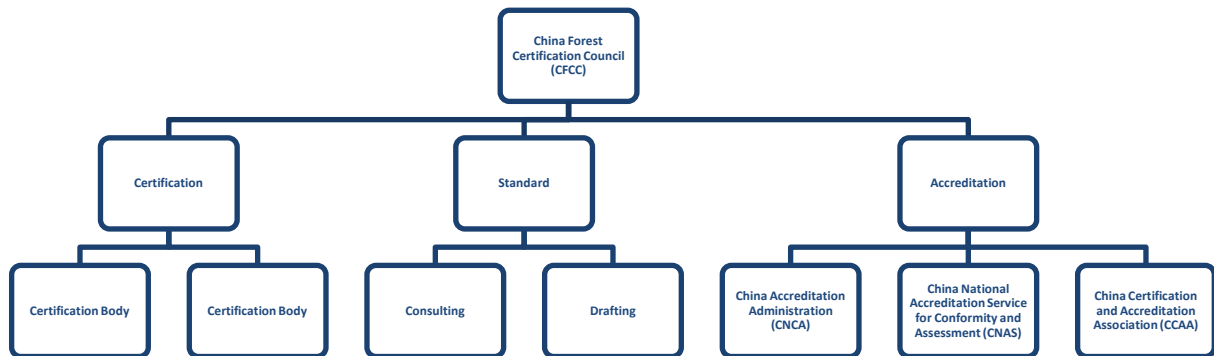
Other countries that have attempted to create their own standards and verify them under PEFC have faced challenges regarding land conversion.¹⁸ The Chinese certification administration system represents a key divergence from global PEFC practice through having different departments responsible for the regulation of certification (Figure 4.1). This is perceived (predominately by the government) as an initiative to limit the possibility of clientelism or corruption, whilst properly regulating certification practice within the country and protecting Chinese business interests.¹⁹ The CFCC is divided into three departments, certification, standards, and accreditation. Although many government and academic stakeholders support a move towards ‘certification with Chinese characteristics’ that redefines key aspects such as land conversion, indigenous people and tenure, it is also the case that those not in support have no voice to speak out.²⁰

¹⁷ Interview 47

¹⁸ Interview 25

¹⁹ Interview 32

²⁰ Interview 47

Figure 4.1: China Forest Certification Council (CFCC) administration chart

Adapted from Yu, Ling CFCC Presentation Beijing 2010

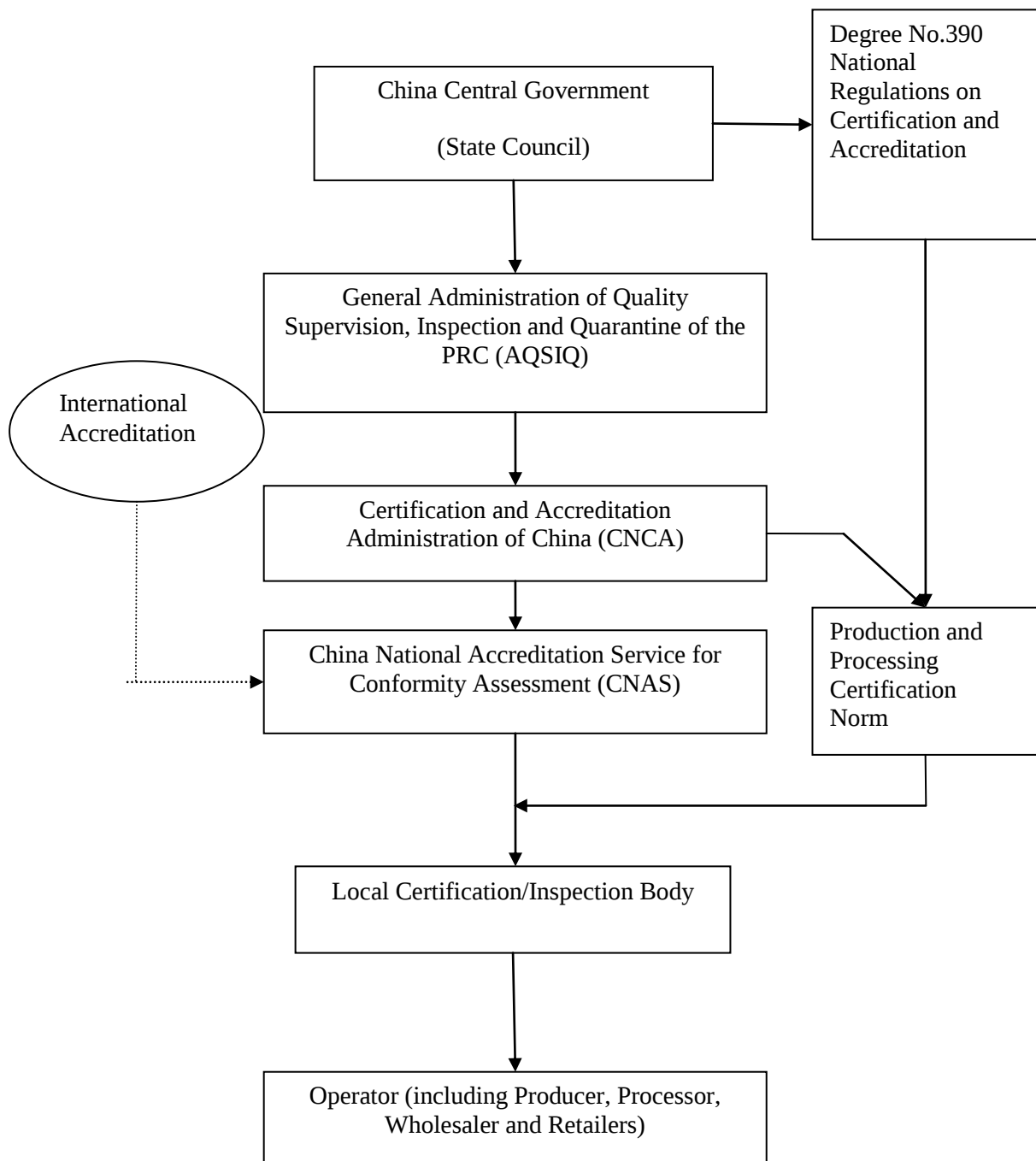
4.7. Government regulated third parties

Third-party certification bodies must adhere to strict regulations when operating within China. For instance, every new certification system audited needs prior permission from the China National Certification Administration (CNCA). Certification activities undertaken without approval risk being halted and the company involved faces heavy fines. This is not limited to forestry, and covers all industry and agricultural certification systems. A limited number of international certification bodies are ratified to conduct FSC certification within China. Significantly, in 2010 there were no Chinese certification bodies ratified.²¹

The current Chinese certification and accreditation system is outlined in Figure 4.2. The two governmental agencies (the Certification and Accreditation Administration of China- CNCA, under the General Administration of Quality Supervision, Inspection and Quarantine of the

²¹ Accreditation Services International (ASI) are responsible for managing the FSC programme

PRC; and the China National Accreditation Service for Conformity Assessment – CNAS under the CNCA) acts as an approval body; and as an official accreditation body respectively. The other role of CNAS is to encourage the adoption of Chinese norms, and their international validation. The scheme also contemplates the involvement of the private sector through the local certification/inspection bodies. These entities should first register with and be approved by CNCA and accredited by CNAS before the certification operation starts (Xie et al. 2010). Since the implementation of the Regulations of the People's Republic of China on Certification and Accreditation (Degree No. 390 of the Chinese State Council) issued in 2003, most foreign certifiers are adopting different cooperation methods with their Chinese partners so as to get approval from CNCA. Some work as subcontractors, whilst others have established joint venture companies with Chinese partners (Xie et al. 2010).

Figure 4.2: Chinese certification and accreditation system

Source: Xie et al. 2011

The Regulations of the People's Republic of China on Certification and Accreditation note:

“Any unit or individual shall not engage in certification activities without approval.” These

regulations have the effect of raising the cost of doing business in China such that the international certification companies must form partnerships with Chinese companies. For example, Article 10 stipulates that certification bodies must meet a number of requirements in order to operate in China:

- (1) Having fixed premises and necessary facilities;
- (2) Having a management system that meets the requirements of certification and accreditation;
- (3) Having a registered capital of not less than 3,000,000 Yuan (US\$457,000); and
- (4) Having not less than ten full-time certification personnel in relevant fields (CNCA 2010).

Furthermore, the rules and regulations certification bodies must adhere to are constantly evolving. Many certification body representatives and academics noted the fluid nature of the law; requirements are frequently introduced suddenly without written regulations. Moreover, one academic believes the administration process is purposefully ambiguous, allowing for the government to retain ultimate power and authority over activities and regulation interpretation. The government therefore has the power to renegotiate terms without prior warning or concrete legislation.²² Some certification bodies stated that it is difficult to ascertain what is considered legal or illegal because of the shifting requirements. This makes it difficult to ascertain the level of risk involved in investing large amounts of capital; the market is in its infancy and regulations are constantly evolving and shifting.²³

The administration system enables the Chinese government to have control over the forest industry. More importantly, however, is the drive to localise the system: a certification with

²² Interview 52

²³ Interview 23

‘Chinese characteristics’ approach prioritises Chinese business interests and reduces reliance on foreign businesses, specifically auditors. Many foreign certification bodies are frustrated by the administrative barriers that prevent them from operating autonomously.²⁴ Instead of allowing the flood of international certification bodies into the country, the CNCA is limiting and controlling certification bodies’ activities, therefore potentially creating a new domestic dominated model for certification activities.²⁵

However, to guarantee the sustainability of this approach, local capacity must be developed. Forest management unit representatives have complained that hiring foreign auditors’ wastes time and money; interpreters need to be hired, and local conditions are not understood.²⁶ Although frustrated by the stringency of requirements imposed upon them, certification bodies operating in China recognise the need for the government to closely regulate certification within the country, particularly regarding issues of corruption. Indeed, a number of certification bodies accuse each other of taking bribes and not adhering strictly to requirements. One auditor said he was offered a bribe to certify a forestry industry before it had reached the required standards.²⁷

Forest auditors believe that the presence of the ISO process standards in China is at least partly to blame for misunderstandings between auditors and businesses. ISO are systems standards, whereas FSC is a performance standard. Because industries misunderstand the fundamental differences and requirements which must be met before certification is granted, this leads to tensions between certification bodies and industries.²⁸

²⁴ Interviews 9, 23 and 51

²⁵ Interview 47

²⁶ Interviews 14, 19 and 45

²⁷ Interview 5

²⁸ Interviews 5, 9, 23, 26, 50 and 51

During June 2010, CNCA forced all forest certification bodies to halt their activities to control the potential problems of standardisation highlighted by an FSC meeting.²⁹ Under FSC regulations, COC can be achieved before the Forest Management (FM) unit is available. In some cases no forest management unit was sought, leading to the potential for destroying the reputation of the whole system.³⁰

In a bid to further localise and standardise certification bodies, the first Chinese based certification body, Zhonglin Tianhe³¹ forest certification centre, was established under the guidance of the SFA in 2009. The independence of Zhonglin Tianhe to operate as a ‘Third-party’ has been questioned by a number of certification bodies; they insist that close ties with the government indicate it is actually a second party.³² The government however maintains Zhonglin Tianhe’s ability to operate autonomously from the state.³³ Although the only certification body licensed to certify forests in China,³⁴ Zhonglin Tianhe is still unable to audit FSC due to international regulations prohibiting certification bodies from auditing FSC unless accredited internationally. Although international bodies are not officially accredited by the CNCA, they are currently responsible for all forest certification activities in China.

The legal challenges of auditing within China are exacerbated further by the ‘price wars’ identified within the forest certification industry. The CNCA has set pricing schedules for many auditing systems within the country, however there is currently no system for forest certification.³⁵ Some certification bodies have highlighted that the government should devise a pricing system for forest certification to avoid prices dropping to low levels with the risk of bribery and corruption. Many stakeholders are concerned that the quality of auditing will be

²⁹ Interview 32

³⁰ Interview 7

³¹ 中林天合

³² Interviews 5, 9, 46 and 51

³³ Interview 25

³⁴ Zhonglinlinhe presentation, September 2010, Beijing

³⁵ Interview 23

impacted as the price of certification is driven down. Others believe the government has no ability to influence price since certification is a market mechanism. The only factor that can be controlled by the government is quality assurance within the marketplace.³⁶

Figure 4.3 attempts to show a schematic of the governance field of the certification administration and State Forestry Administration. Although housed under the SFA, there is no direct control over the members within the governance field, however the certification administration of CNCA, CNAS and CCAA govern the actions of all certification operations within the field. The Accreditation Services International audit FSC, and the standards are coproduced by CCFC and CAF. At the time of writing, FSC and Rainforest Alliance were housed under the CAF and Rainforest Alliance had an MOU with both Zhonglin Tianhe and CAF to audit and provide capacity building for FSC.

4.8. Government organised NGOs

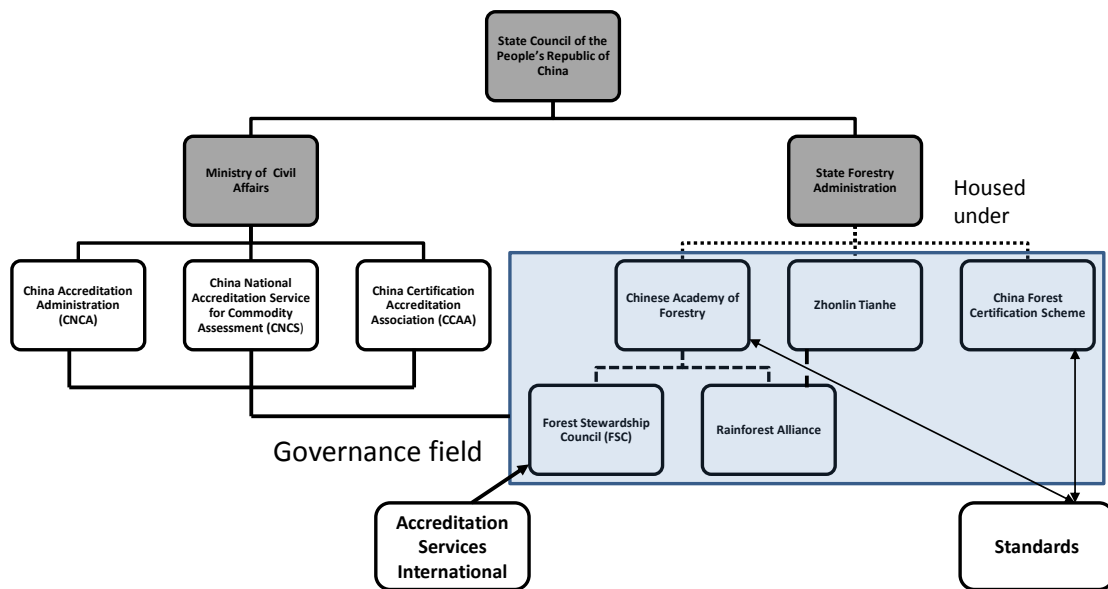
Participation from the forestry industry, civil society, industry representatives, and NGOs drives certification globally. Supporters of the FSC model have highlighted the complex actor network that is involved in every level of certification in China, which demonstrates a highly controlled ‘top-down’ hierarchy (Figure 4.3). Authority filters down from the state level, with different layers of bureaucratic administration that further control operations. Although the FSC standards working group has existed since 2007, standards have yet to become operational. Some informants point towards certain actors purposefully sabotaging the system to slow down the FSC system and allow time for the creation of the Chinese system.³⁷ Others noted that standard setting has been slow because the deliberative democratic process is considered culturally inappropriate. Most group members are not used to interacting in open

³⁶ Interviews 4,5,23 and 9

³⁷ Interviews 8, 28, 46, 50 and 52

discussion and are often unwilling to engage in public criticism of other participants' opinions.³⁸

Figure 4.3: A schematic of the interconnectedness amongst key certification actors in China



Source: Author

In the context of this state-society relationship, PEFC has operational legitimacy. In short, the central role of the state in developing forest certification is conducive to the institutionalised governance structure operating within the country. The Chinese government plans to ratify their national programme under PEFC when the process is completed within the next couple of years.³⁹ Although PEFC has come under scrutiny by INGOs, the SFA are confident this will not be replicated in China due to government control over NGOs operating in their

³⁸ Interview 7

³⁹ Interview 25

jurisdiction. In China, INGOs are only allowed to operate in China with the permission of the central government. They do not enjoy the same public confidence as their Western counterparts. Government departments are more critical of the role organisations such as WWF have played in establishing FSC therefore their legitimacy as independent parties is questioned.⁴⁰ To criticise the PEFC system would be paramount to criticising the Chinese standards themselves, which would risk the ability of INGOs to operate within their borders.⁴¹ One INGO noted that they cannot object to the standards, but they do not have to actively promote them either.⁴² Moreover, there is a grey area regarding the legality of INGOs in China. Within China, foreign companies require investment or Chinese partners in order to achieve official legal status,⁴³ thus as one interviewee noted:

“Greenpeace in China is illegal...so if the government wish to stop all activities in Greenpeace they can. Only WWF [is legal], all the other ENGOs are illegal...so if Greenpeace do anything against our government it is very easy to stop them, just throw them out.”⁴⁴

Although some interviewees disregard WWF’s support of FSC, since it is ‘WWF’s baby’, others are sceptical of government control over WWF itself, suggesting that they work for the government therefore are afforded legal status.⁴⁵

4.9. Discussion

International forest policy is offering a valuable opportunity to redefine our understanding regarding the relationship between norms, governance, and international institutions

⁴⁰ Interview 52

⁴¹ Interview 25 and 12

⁴² Interview 12

⁴³ Interview 50

⁴⁴ Interview 47

⁴⁵ Interview 46

(Dimitrov 2005). Forest certification was created to ameliorate environmental issues through the market. China is adopting an international certification mechanism and applying ‘Chinese characteristics’ in order to enable China to operate effectively within international forestry markets whilst maintaining the autonomy to operate under a state-led governance system.

The viability of NSMD governance mechanisms rests on whether they can simultaneously gain legitimacy among ‘core audiences’ in domestic and international spheres (Cashore 2002). Since NSMD governance operates within and through networks, governance networks are not guaranteed power, but are precarious and must be continually reproduced, standardised, and normalised (Callon 1991). In the West, trust is placed in non governmental agencies and third parties to provide independent verification; their legitimacy is taken for granted. Although there have been studies which question the trust placed in third-party-auditing (McDermott 2012) and NGOs (Gulbrandsen 2004), the framework of NSMD governance has thrived because we fundamentally place trust in its institutional framework supported by its ‘credibility alliance’ (Cashore 2002). Fundamentally, certification mimics the role played by institutions throughout history to reduce uncertainty in exchange (North 1990). China however traditionally operates under contrasting organisational principles to the West. The state is more in control to define the legitimacy framework, which is not based on deliberative democratic principles. In this case, cognitive legitimacy is therefore aligned with concepts that construct Chinese social reality.

Returning to Beetham (1991), in non-liberal democracies it is particularly necessary for states to maintain and reproduce legitimacy, through the maintenance of rules and the reproduction of beliefs. Historically, Confucian ideas of social order and the ideology of ‘Tianxia’ have been embedded within society, identifying a clear hierarchy of authority with legitimacy afforded to and by the government. A shift towards an NGO led, third-party based system

would conflict with current forms of cognitive legitimacy. The Chinese forest certification core actor assemblage therefore places non governmental actors at the periphery, not at the core. In contrast, the core legitimising actors in the original FSC framework are NGOs, industries, third parties, and experts, supported by a periphery of actors (e.g. the state) that also help legitimise certification. The Chinese model however is seeing a different assemblage of pragmatic legitimacy. The key actors include the state, state administration and experts with the periphery constituting NGOs and third parties amongst others. The actor assemblage within Chinese forest certification has shifted the power of ‘core audiences’ and their perceived importance.

The move to a more hybrid or government system is not exclusive to China. Historically, objection to FSC has resulted in the creation of PEFC-endorsed schemes throughout countries as diverse as Indonesia, Brazil, Canada, and Australia. Moreover, scholars have highlighted how non-state governance does not imply a bypassing of the state (Bartley 2010; Vandergeest and Unno 2012). What has been seen in the Chinese case is an effort to seek legitimacy from international and domestic markets whilst not compromising on institutional modes of domestic governance. As the aquaculture case demonstrated by Vandergeest and Unno (2012), the certification ‘threat’ was seen as neo-colonial, which drove national reactions and policy.

In the Chinese case, pragmatic legitimacy could be ascertained through PEFC certification. This would allow access to pre-existing audiences and already legitimate institutions. The implications of a move towards PEFC certification are significant for a number of reasons. Firstly, China is potentially a huge market for PEFC therefore increasing PEFC area significantly. Secondly, China is increasingly becoming the model for development that other countries are seeking to follow. With such a large potential programme, NGOs would have to

reconsider the implications of following country led standards of sustainable forest management over no programme whatsoever, which could lead to more heterogeneity in the forest certification sector.

As a pragmatic environmentalist, China could be negotiating and accommodating a new form of governance domestically which allows for government supported, non-state market driven governance. Indeed, actors such as WWF gain legitimacy as policy actors in part because of their ability to operate and extend influence beyond North America and Europe. For instance, NGOs in Canada and Indonesia sought to influence consumers in Europe by advocating for FSC in order to improve their negotiating situation with the industry at home (Elliott and Schlaepfer 2001). However, such a move by INGOs could not happen in China as it could jeopardise their ability to work within the country. Thus, these developments may represent a conundrum for international conservation NGOs: to stick with the ‘gold’ standard of FSC or embrace PEFC which allows for more autonomy at a local level.

With the Chinese government able to make rapid policy changes as an authoritarian state, certified forest land area will increase on an unprecedented scale without the ‘hindrance’ of deliberative democratic processes. This will increase the proportion of PEFC vs. FSC forest area and also align PEFC with Chinese economic power. As such, the legitimacy accorded to FSC from claims to be the global standard could be undermined. Already PEFC has the greatest area of certified forests in the world; however, once China reaches its aim to create nationwide certified forest area, the PEFC/FSC dynamic will be greatly changed. Currently, FSC has the greatest uptake within developing countries. It will be interesting to see if developing countries follow the Chinese example or continue to opt for FSC. As more countries move towards developing their own standards, particularly in developing regions such as Indonesia, Malaysia and Brazil, it will be interesting to see whether FSC could

become a largely Northern/Western certification tool. On the other hand, PEFC could either gain dominance in developing countries as a framework which is more conducive with negotiating sovereignty, or represent too much of an administrative burden regarding the creation of national standards. Although a market mechanism, the SFA have stated that they are not concerned about the relative PEFC and FSC demand, believing that buyers will have to opt for PEFC if it proves to be the only viable option.

Whilst PEFC ‘explicitly champions national sovereignty’, giving a greater role to forest owners and business interests (Cashore et al. 2006), it is still necessary for states to adopt the institution of certification through isomorphic practices of the ‘umbrella meta-standard’. In short, the global political economy limits the available options to act autonomously. Whilst organisations are driven to incorporate practices and procedures that are institutionalised in society, which leads to isomorphism (Meyer and Rowan 1977), China was faced with the triple challenge of attempting to achieve legitimacy on three fronts: to satisfy international markets with a legitimate market mechanism, satisfy the need to elicit domestic support for sustainable forest management by utilising a specifically Chinese symbol of forest management (which suggests autonomy from international schemes), as well as fundamentally finding acceptable ground to allow a NSMD governance mechanism to facilitate sustainable forest management within the country.

The pragmatic response by the Chinese government to respond to overseas demand for forest certification by creating their own scheme has caused controversy amongst some stakeholders. They question the schemes ability to achieve sustainable forest management. This isomorphic process can be viewed as ‘ceremoniously’ reflecting the institutional environment with its procedures and practices, whereby the formal isomorphic institution is not necessarily efficient or effective (Meyer and Rowan 1977). To satisfy both international

and domestic markets, like many other PEFC nations, the Chinese government can be seen to be utilising ‘strategic balance’ (Deephouse 1999). There is a tension between the need to be the same and the need to be different; by conforming, actors can demonstrate their legitimacy but by differentiating they can reduce competition. Deephouse (1999) therefore identifies that there needs to be a balance between competition and legitimation. The theory of strategic balance addresses the relations among strategic similarity, competition, legitimacy and performance. The need for legitimacy limits an organisation’s ability to differentiate into specialised niches, but strategic balance allows for intermediate levels of differentiation where an organisation benefits from reduced competition while maintaining its legitimacy. This ‘strategic balance’ could enable the state to receive both domestic and international support for certification, whilst not compromising on domestic governance practices.

Whilst there appears to be more support for the PEFC system over the FSC within China, PEFC have yet to receive an application from the CFCC standard. Supporters of the PEFC spoke of ‘insecurity’ regarding their position within China until official paperwork has been signed.⁴⁶ Although pursuing their own standard, China has incorporated key FSC insights into their scheme. When assessing the FSC model, China is making concerted efforts to overcome key issues regarding the lack of market drivers, high cost and quality of auditing bodies. In order to limit corruption and maintain quality, the government has created further enhanced layers of legality through the CNCA, CNAS, and CCAA. This has resulted in many actors feeling they lack autonomy and has led to controversy surrounding the perceived impact of a top down model of bureaucracy. Opponents of the Chinese scheme have raised serious concerns about the implications of new interpretations of land conversion and indigenous people’s rights, whilst others welcome a move to certification with ‘Chinese characteristics’. However, even those stakeholders that appeared to support the Chinese

⁴⁶ Interview 33

system admitted not being able to speak openly about their objections. Furthermore, as the PEFC operates as an umbrella scheme, the origin and therefore controversy surrounding having a Chinese mechanism on the market will be disguised under the universally recognised label of PEFC.

The most critical feature of NSMD governance is that governments do not create or require adherence to the rules (Cashore et al. 2007). Currently China does not *require* adherence to certification, but does have the intension to have nationwide certification. This implies that the system could be mandatory in future. There is a government led response to ISO 14001 with implemented pricing structures for certification bodies; it will be interesting to see whether forest certification follows the same path. Certification has been shown, if working in conjunction with domestic public policy requirements, to have an important impact on curbing some challenges (Cashore et al. 2007). Moreover, with the number of procurement policies requiring certification and the potential for synergy with timber legality verification, certification is set to be further institutionalised.

The CFCC model signifies a hybrid model of governance with government, operating as a more state led model than many initial studies presented state engagement with ‘Non State Market Driven’ governance. However, the study supports increasing scholarship looking at the ‘novel ways’ the state interacts with NSMD governance mechanisms (Bartley 2010). China adopts a state-society relationship, whereby the state controls society selectively, which is fundamentally different from totalitarianism and Western civil society. The quality assurance of third-party auditors has come under question, as well as the neutrality of NGOs. Deliberative democracy in certification is not an institutionalised practice in China and therefore not as appropriate when creating a certification mechanism. It is early in the history of forest certification in China. It will be interesting to watch how the system evolves and in

what ways China will influence approaches to certification within other countries. Moreover, as China initiates procurement policies for certified products to overcome a lack of market drivers, the implications for forest certification trade are significant.

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PLATES 8-13: BAMBOO CERTIFICATION SITES IN INDIA

The following chapter presents a case study of a new development in Maharashtra in India called Lavasa. Plates 8-13 provide a pictorial representation of the area to accompany the narrative.

Plate 8: Lavasa Town, Maharashtra, India



Photo: Buckingham (2010)

Plate 9: Lavasa area, Maharashtra, India



Photo: Buckingham (2010)

Plate 10: Indigenous peoples' settlements in the Lavasa area, Maharashtra, India



Photo: Buckingham (2010)

Plate 11: Area designated for bamboo plantations in Lavasa, Maharashtra, India



Photo: Buckingham (2010)

Plate 12: The Forest Stewardship Council (FSC) pre-assessment in Kudal, India



Photo: Buckingham (2010)

Plate 13: The Forest Stewardship Council (FSC) pre-assessment, bamboo factory in Kudal, India



Photo: Buckingham (2010)

CHAPTER 5: WHO' S SUSTAINABILITY COUNTS? REFLECTIONS ON AN INDIAN OASIS AND THE DRIVE FOR CERTIFIED BAMBOO

Kathleen Buckingham

Abstract

This paper traces a controversial development in India called Lavasa. Lavasa is a new hill station being created in Maharashtra, which aims to tap into a new eco-city trend of urban development. In order to ascertain 'world-class' status, the city requires globally recognised standards. This study follows the Forest Stewardship Council (FSC) certification process. This seemingly easy model of bamboo certification assisted in identifying underlying existing local tensions regarding land tenure, indigenous people's rights, potential landslide areas and inequitable pay for women. Through a focus on one site of consumption and production, the paper explores two linked issues: the global 'branding' of sustainable cities and sustainable product certification. Whilst both the city and certification reproduced neoliberal spaces of governance, a performativity lens highlighted the political outcomes of envisioning different 'realities'. The paper argues that the concerns of distributional equity are a major challenge developing countries face in advancing sustainability.

5.1. Introduction

Lavasa is a new hill station being created in Maharashtra, India that aims to tap into a new eco-city trend of urban development exported from the North (Myllyla and Kuvaja 2005). Aspiring to become a ‘benchmark for sustainability in Asia,’ Lavasa Corp. aims to develop the first grading certification system for sustainable cities (Lavasa 2010). The city is positioning itself as ‘sustainable’ with the aspiration to become the first Indian city to appear on the Global Liveable Cities Index.⁴⁷ However, currently a standard for sustainable cities does not exist, so Lavasa Corp. is researching benchmarking and standards to ascertain sustainability. Public recognition of sustainability credentials is an integral part of the Lavasa Corp’s vision and the development intends to have ‘minimal impact on the environment’ by means of:

“...preservation through optimal utilisation and minimal exploitation of available natural resources, thus ensuring continued access to future generations.” (Lavasa 2009)

Environmental sustainability is a contested concept. The classic conceptualisation of sustainable development derived from Brundtland identifies sustainable development as seeking to meet the needs of current and future generations. In theory, it is a more holistic concept than environmental sustainability alone, aiming to address the three pillars of sustainability: economy, society and the environment.

The BRICs economies (Brazil, Russia, India, and China) face different challenges regarding sustainable development resulting in different emphasis placed on the relative importance of environmental, economic or social indicators. BRICs are emerging economies, facing rapid population growth and operating under different governance structures than the North. The

⁴⁷ Interview 1 Lavasa Corporation City Management, Lavasa, Pers. Comm. September 2010

most central challenge facing southern megacities is not the lack of environmental or economic resources, but distributional equity due to existing power structures, incapable administration, and poor public finances (Myllyla and Kuvaja 2005).

Through a focus on one site of consumption and production, the paper explores two linked issues: that of the global ‘branding’ of sustainable cities and the parallel development of sustainable product certification. This paper explores bamboo, one of two key natural resources Lavasa Corp. seeks to develop (the other resource being soil). Lavasa valley is home to six species of bamboos, which form an integral part of its sustainability vision to reduce its carbon footprint. The material is abundantly available and suitable as a building material.

Comparative studies have shown that bamboo can compete environmentally and financially with commonly used building materials in Western European countries (van der Lugt et al. 2005). At its optimum, bamboo has twice the compressive strength of concrete and almost the same strength to weight ratio of steel in tension (Kubba, 2010). Moreover, bamboo is considered a rapidly renewable resource under the US Leadership in Energy and Environmental Design (LEED) (Kubba 2010), which is a certification system Lavasa Corp. is actively seeking. To date, it has received LEED Certification for neighbourhood development and for one of its hotels (Lavasa 2012). Lavasa Corp. has plans to develop extensive bamboo plantations and source ‘sustainable’ bamboo to develop and supply a bamboo crafts factory, resources for construction, and landscaping. There is a view that bamboo is inherently sustainable but in order to validate this, Lavasa acted to certify their bamboo at the source and throughout the supply chain.

This study follows the Forest Stewardship Council (FSC) certification process. It highlights the performativity of standards, adding to increasing studies of the scope and limits of FSC.

Through undertaking a bamboo certification audit, the assessment of the area highlights the local controversies surrounding the area and the implications for the sustainable cities vision. The paper draws upon a certification mechanism used to verify responsible management of a natural resource and discusses broader issues within sustainable cities literature, highlighting the interplay between natural resources and the built environment regarding notions of sustainability.

Forest certification can be perceived as being performative, which implies it is active in co-producing outcomes (Hoogstra 2012). Put simply, performativity ‘does things’ rather than just describing an external reality that is not affected (Mackenzie 2006). Calling actors performative, or activities performances emphasises their ability to have effects and create realities (Law and Urry, 2004). A number of empirical applications of performativity have started to emerge regarding the processes of green markets and certification (Kortelainen 2008; Konefal and Hatanaka 2011; Hoogstra 2012). These show, for instance, that the greening of timber and pulp markets is not an isolated and self-sustaining economic process, but actively performed by a network of actors (Kortelainen 2008).

Through the lens of performativity, contemporary geography has exposed the dynamics of power and exploitation (Houston and Pulido 2002). Within performativity, materiality has a crucial role to play (Buizer and Turnhout 2011). Apart from certification instruments, places, such as Lavasa, are performative. Places are always emerging and in the process of becoming, therefore place making is relational, political and performative (Buizer and Turnhout 2011). For example, Buizer and Turnhout (2011) tell the story of how citizens organised themselves to promote an area they valued. The place was created through discursive and material practices by using their expertise, naming, mapping and creating ways to signify the different values of the area. This allowed for the creation of an area of

power and exclusion through articulating certain values and characteristics whilst ignoring others. Lavasa too utilises certain values in order to create a sense of place, which in turn establishes an area of power and exclusion.

5.2. The making of ‘world class’ gentrified landscapes

An awareness of cities as integral sites of production and consumption has led to an analysis of a new kind of capitalism in urbanism that seeks to create ‘people climates’ i.e. urban environments that are diverse and dynamic and attract the talented elite (Florida 2003). In this context, Peck (2005) highlights how:

“...strategic emphasis shifts from a narrow focus on the sphere of production to a deeper engagement with the marketizing and commodifying spheres of consumption and reproduction.”

In short, the way a city is framed or communicated is instrumental to its success. Thus, planning relies on the joint efforts of public sector agencies, as well as on political support, private investments, and citizen engagement to communicate shared social values (Dembski and Salet 2010).

To enter into the Liveable Cities Index would demonstrate a city’s harmonious relationship between economic growth, protecting the environment, and civil society (Portney 2003).

Whilst some scholars consider sustainability and liveability synonymous, others argue that liveability fundamentally pursues livelihood and ecological goals, whereas sustainable cities place less emphasis on ‘empowerment’ and community. Analysing liveability means transposing political ecology debates about sustainability and social justice onto the built

environment. This is more challenging in developing countries such as India. For instance, Evans (2002) notes:

“Urban elites and impoverished slum dwellers share a common interest in liveability but there is hardly overlap between the dreams of the poor and the elite when imagining global cities.”

As a result, the requirement for high living standards often translates into gentrified landscapes. The significance of neighbourhood reputations for the socio-economic status of residents makes neighbourhoods a contested domain (Vera-Sanso 2006). Moreover, the creation of differentiated social classes can be central to the economic success of new-build developments (Davidson 2010).

The ‘middle class’ in India is often associated with political agency rather than an income bracket, and is synonymous with those defining the ideal nation or setting urban agendas. The discursive boundaries of the new middle class are therefore constituted by a shift in aspirations and standards (Fernandes 2000). Whereas previously the middle class generally supported state programmes to improve the welfare of the urban poor, many recent studies in India highlight how the ‘new middle class’ is driving liberalised land development and anti-poor urban policy (Chaplin 2011).

Gentrification has become a global phenomenon over the past few decades, being an increasingly important strategy within neoliberal policy making. Although the gentrification of Mumbai is part of a larger global neoliberal movement, it is characterised by a powerful nexus of politicians, builders and developers exploiting poorly implemented and monitored land use policies and planning controls. The strong links between politicians and private capital has meant that gentrification has been characterised by financial irregularities and bribery. Moreover, the rights of the urban poor have been increasingly marginalised and

mediated through violence (Harris 2008). In 'Evil Paradises,' Davis and Monk (2007) explore the new geographies of exclusion and landscapes of wealth that have arisen during the globalisation boom since the 1990s. They draw upon Harvey's premise that the main achievement of neoliberalism has been redistributive rather than generative through highlighting 'dream worlds', which offer infinite consumption, social exclusion, physical security, and architectural monumentality, which are, to a large extent, incompatible with ecological sustainability.

In an increasingly urban world, almost half the global population and over three quarters of those in high-income countries live in urban areas (Cohen 2006). In 2001, the urban population of India had reached 285 million, including 75.26 million living in slums; it is now estimated to be around 360 million, and by 2011 the slum population is estimated to be around 93.06 million. Significantly, 14% of India's urban population lives in the three megacities of Delhi, Mumbai and Kolkata. This has brought about the rapid expansion of cities, particularly metropolitan cities (Chaplin 2011).

As India's population increases and puts greater pressure on its cities, India has aspirations of turning its current cities into world-class metropolises. For example, a report was commissioned in 2004 by the government of Maharashtra to investigate the feasibility of Mumbai becoming a world city by 2013 (GoM 2004). However, with population, sanitation, and poverty issues it is difficult to turn this aspiration into a reality. As India becomes more important on the global stage, the country seeks to assert itself as engaging at a 'world-class' level, with cities reaching the requirements of important global metropolises (Ghertner 2011).

The making of 'world-class' cities in India, such as Lavasa, is taking shape through the dissemination of a vision of the future which Ghertner (2011) describes as the 'world-class aesthetic', whereby residents expect a city to provide them with world class living standards

based on international norms. A new form of regulatory space has opened up through the use of private governance systems and certification schemes. Non-state market-driven (NSMD) governance systems have developed in order to embed environmental and socially responsible management practices within markets which eschew traditional state authority (Cashore 2002). However, both the new ‘creative class’ (Florida 2005) requiring dynamic new cities and the certified products they consume creates a relative neglect of an increasing economy of ‘under-laborers’ (Peck 2004a). Whilst Hines (2010) identifies a new expanding post industrial middleclass (PIMC) that is gentrifying rural landscapes, and thereby changing the power balance in the areas in which they migrate, certification can also be perceived as emphasising these inequalities. Klooster (2010) argues that:

“Certification might be a form of ‘green developmentalism’, posing an insufficient challenge to inequitable and unsustainable patterns of consumption; merely giving nature (and people) the right to earn their own way in a global market fosters the fantasy that we can reach sustainable development through slight modifications to business as usual.”

However, Bernstein (2001) suggests that these new norms of ‘liberal environmentalism’ are an attempt to reconcile global environmentalism with the promotion of liberal economic order. Certification therefore gains legitimacy through adapting to the institutional norms of political economy (Bloomfield 2012). Whilst neoliberalism is often presented as a hegemonic, coherent, ideological project, it is recognised that neoliberalism manifests itself in different forms, whilst nevertheless remaining part of ‘a single genus’ representing an assemblage of policies and governance arrangements which favour privatisation, the liberalisation of markets and competition (Barnett 2005). Guthman (2008a) highlights neoliberal techniques such as modelling/envisioning, audits, best practices, and stakeholder participation as key practices within the agro-food industry. The hollowing out of the state has allowed for private-public partnerships to have considerable power in carrying out social

change agendas. Furthermore, far from implementing a vision for change, Guthman (2008a) asserts that even modelling a vision is a way to instigate social change.

The paradox of creating ‘sustainable’ sites of production and consumption is that the monitoring schemes required place heavy costs on producers and disrupt the governance within producer organisations (Mutersbaugh 2002). Neoliberalism has therefore become a regulatory project which inhabits not only institutions, but also the spaces in between them (Peck and Tickell 2002). Fundamentally, some question whether strategies based on markets and consumption can effectively challenge global inequalities (Klooster 2010). Vandergeest and Unno (2012) argue that ‘certification territories’ have much in common with colonial-era extraterritorial empires. However, whilst Bloomfield (2012) asserts that market approaches have a limited capacity to challenge the core assumptions of the hegemonic neoliberal model, he argues that FSC has shown counter hegemonic qualities by challenging the rule-making authority of neoliberal state agencies and promoting the reregulation of the industry.

Although Neil and Pritchard’s (2009) research regarding the coffee industry largely supports the idea of certification being a neo-colonial mechanism, they also highlight that contemporary global market processes are site specific, with specific actors and networks within social structures. Therefore the performativity of standards within the site of production and consumption, in this case Lavasa, should be analysed regarding the place-bound actors and embedded structures of the particular setting.

Notions of social exclusion and gentrification are evoked in the history of hill stations.

Previously known as the villages Mulshi and Velke Taluka, before the Lavasa Corporation changed their names to its namesake, Lavasa is regarded as India’s first hill station after independence located at an altitude of 2,100 to 3,000ft above sea level. A master plan exists for an area spanning 25,000 acres, in the Sahyadri Mountains, on the banks of Warasgaon

Lake in Pune (Lavasa 2009). The major characteristics of colonial hill stations were the Anglicisation or Europeanisation of the landscape and the creation of a sense of physical and social distancing. The highest altitudes were reserved for the aristocracy, senior government officials, and top military officers (Chatterji 2003). Likewise, in Lavasa the hilltop villas offer the most expensive real estate, whereas the lower levels provide more affordable options (Lavasa 2009). Lavasa intends to offer leisure, spa, and tourism activities as a major selling point of the development, just as hill-stations of the colonial era functioned as a unique entity that operated as a seasonal site for recreation with a highly transient expatriate population (Barr and Desmond 1978). The tranquillity of nature, climate, health benefits, and beautiful environment were all part of the draw towards hill stations, and these are aspects that Lavasa hopes to reinvigorate through their new development. Apart from being areas to relax and rejuvenate, hill stations were considered a status symbol that signified the political, economic, and social power of the British or ‘landscapes of power’ (Kennedy 1996). The Lavasa project fosters powerful strategic networks with global brands and is positioned between Mumbai and Pune to target investment from the Indian elite.

5.3. Methodology

The research consisted of two main approaches. Firstly, qualitative interviews were conducted with key stakeholders to understand the opinions of local people regarding bamboo, sustainability, and certification. Interviews were conducted with bamboo harvesters, workers in the factories, craft workers, companies involved in the purchase of bamboo, certification auditors, members of Lavasa Corp. staff involved in the Environmental, CSR, and Management departments as well as a three key NGOs expressing opposition to the development. Two main bamboo sites were studied: Lavasa and Kudal. Currently a

partnership exists between Lavasa Corp. and KONBAC (Konkan Bamboo and Cane Development Center), based in Kudal. KONBAC is responsible for capacity building regarding the bamboo factories and plantations in Lavasa. In total, 41 interviews were conducted in February 2009, March, and September 2010. In February 2009, 7 interviews were conducted regarding bamboo certification in Delhi and Guwaharti. In March, 30 interviews were conducted in Mumbai, Lavasa, Kudal, Pune and Goa and in September 2010, 4 interviews were conducted in Mumbai and Pune. Due to sensitivities related to speaking to local people about Lavasa Corp. and administrative issues in Kudal, it was often impossible to speak with farmers. This study represents a sample of interviews conducted with bamboo related workers with the permission of the various companies involved. The NGOs that oppose the Lavasa development asked not to be recorded. Some members of these organisations claimed to have been intimidated through threats of violence. Lavasa Corp. allowed the recording of interviews with staff members, therefore verbatim quotes have been used within this article. The second phase of research involved shadowing an official FSC auditor conducting a pre-assessment of the area and providing basic training for reaching FSC standards in both Kudal and Lavasa,.

5.4. Lavasa's sustainability vision

Both certification and 'the city' reproduce neoliberal spaces of governance, playing performative roles in articulating realities. Lavasa's sustainability vision interplays with bamboo certification in a number of ways. To illustrate this, Lavasa's sustainability credentials will initially be explored, secondly the performativity of certification will be analysed in relation to the standard.

The development has a two pronged strategy for the environment through protecting the natural habitat and further ‘enhancing’ the habitat through utilising bio-mimicry, hydro-seeding, mass plantations, and beautification of ravines. A city nursery of 25 acres will provide the plant material to cater to the ‘greenification’ of the area. Lavasa has also developed a Corporate Social Responsibility (CSR) programme to assist the local residents through the creation of ‘the Gaothans’, an area to ‘rehabilitate’ and give them a better standard of living. This is being accomplished through providing locals with treated potable water, enhanced road connectivity, free health services, a new primary health centre, as well as a primary school.

The project is the first private endeavour of its kind in India. Under the ‘Hill Station Development Act 1996’, Lavasa Corp. was granted “special planning authority” status by the state government, which allowed the privately-appointed city services management to function in a similar way to a municipal authority (EPRW 2010). The project is estimated to cost Rs. 1,400 billion and was conceptualised to have a permanent population of 0.3 million with an estimated tourist inflow of 2 million (Lavasa 2010). The Lavasa management team envision creating a liveable city that can accommodate the unprecedented movement of people from rural villages to urban centres:

“[The rural migrants come] to what? To urban centres that have got infrastructure that they can’t get built, transportation that is unmanageable, 55% of the population living in the slums. They can’t handle them now, and more and more people are going to climb in on top of that... We don’t want to use the same model as India which hasn’t worked well...so we need to change the governance model and that requires rethinking the way that it’s done by using public-private partnerships.... We are trying to change the paradigm. We’re not saying change the rules for Maharashtra, change the rules for a state of a hundred million people...we’re doing this experiment of Lavasa...if we fail we’ll take the risk on that.”⁴⁸

⁴⁸ Interview 1 Lavasa Corporation City Management, Lavasa, Pers. Comm. September 2010

Although promoted as having considerable gains for the rural poor, the equity of Lavasa's vision has come under considerable scrutiny. Specifically, the city's sustainability credentials and handling of indigenous rights have been the focus of controversy. As a result, the development was temporarily suspended by the Ministry of Environment and Forests between November 2010 and November 2011 (NAPM 2011). At the time of writing, environmental clearance to continue the development had been re-granted (November 2011) and all construction activities resumed (Lavasa 2011). Recent clearance comes after a long process, leading to the conclusion by the Ministry that Lavasa violated the Environment Protection Act 1986 and numerous other environmental regulations (Appendix 8).

The National Alliance for People's Movements (NAPM) claims that present clearance is inconsistent with the Ministry's orders issued in November 2010, which accused the corporation of suppressing crucial facts and violating environmental norms. Lavasa Corp. has been found guilty of violating regulations regarding construction in the hills, hill slopes and river bed. Land meant for 'public purpose' was allegedly allotted to Lavasa, private dams were constructed in the reservoir which diverted water for private use, and felling of trees is affecting the ecology of the Moshe Khore valley. Numerous reports have also established that the company was guilty of illegal land transfers and usurpation of lands granted to the landless under the Land Ceiling Act. Although the Chief Minister accepted that the company has misused the 'Special Planning Authority' status under the 'Hill Station Development Act 1996', he recommended the project be given clearance for the first phase of its work (NAPM 2011). Considerable debate has centred around the way the development was fast-tracked by the Maharashtra government, allowing acquisition of land from 18 villages as well as environmental and infrastructural clearance (EPRW 2010). BBC 4 highlighted how the privatisation of previously public land, forests, and water resources has led to restrictions on former common pool resources (BBC 2009). There have been allegations of the company's

close relationship with politicians such as agriculture minister Sharad Pawar and implications of corruption. Moreover, there are accusations that the development might cause environmental hazards in the future (NAPM 2011).

Lavasa disputes such claims, insisting that their model of a sustainable city is legitimate. Lavasa Corp's vision couples the concepts of environmental sustainability with evocations of the traditional landscapes of hill stations through interpreting environmental protection as involving landscape greening. Members of the environment department expressed urgency in "making [Lavasa] green as fast as possible."⁴⁹ However, this environmental vision goes beyond 'greening' to 'enhancing' nature through mass plantations with approximately 4,500 acres allotted for indigenous plant species.⁵⁰ One representative noted: "The magnet is nature, so we will develop our magnetic power more and more by developing nature."⁵¹ Visiting the constructed nature trail in March identified how some plants and grasses were struggling to remain 'green'. Lavasa Corp. defended the potential water requirements needed for this endeavour by their utilisation of bio-mimicry, Control Counter Trenching (CCT), water recycling (whereby only treated water would be used for afforestation), and water harvesting.⁵²

One environmental organisation (referred to as Group A), responsible for the initial Environmental Impact Assessment (EIA), classified the area as unsustainable and refused to conduct any further investigations. They alleged that damming will affect Pune's water supply downstream; the water consumption in Lavasa is calculated at 450 litres per person per day, whilst Pune requires 135 litres per person per day. There was disagreement amongst environmental organisations about the ability of Lavasa to affect the water supply to Pune;

⁴⁹ Interview 2, Environment Department, Lavasa Corp., Lavasa, March 2010

⁵⁰ Interview 3, Environmental Department Landscaping and Plantations, Lavasa Corp., March 2010

⁵¹ Interview 2, Lavasa Corporation employee, Lavasa March 2010

⁵² Interview 4, Environment Department, Lavasa Corp., Lavasa, March 2010

however, two environmental organisations believe that the water consumption is considerable, involving the redirection of water, which has the potential to affect the population along the catchment area. Group A⁵³ claims that significant deforestation has occurred, resulting in the felling of approximately 70 Lakh trees (70,000,000 trees). Alternatively, Group B⁵⁴ states that this figure is exaggerated and inaccurate. Group B has a more pragmatic view of Lavasa's credentials, describing Lavasa as 'misguided'. They dispute Group A's claims, highlighting that the major issue is that Lavasa has been built within a water catchment area which was important for the ecology of the Western Ghats region and instrumental in the monsoon climate. Environmental organisations have suggested that the area is unsuitable for afforestation because it is dry scrubland. It is alleged that a biodiversity hotspot has been destroyed and many birds have changed their migratory patterns. Moreover, questions have been raised regarding the potential for landslides.

Lavasa Corp. refutes all allegations made by environmental groups. They claim that since World War II the indigenous inhabitants have practiced slash and burn techniques in the area. They cut down deciduous forests, sold timber to Pune, and grazed their cattle on pasture causing soil erosion. Furthermore, the reservoir in the area was built 30 years ago and has received no conservation management. Lavasa Corp. claims to be managing the water effectively, therefore reducing siltation and adding to the capacity and longevity of the system, even after net extraction. They claim the water treated from the sewerage plant is better quality than the water in the lake.

“Lavasa's environmental challenge was not to make sure we didn't disturb the environment that we'd found, it was to restore an environment that had been largely destroyed....Our challenge was to restore the deciduous forest that had been there a century ago...what [Lavasa's] team are doing is accelerating that....We are already restoring the water table, we're already reducing the

⁵³ Interview 5, Environmental Organisation, Pune, March 2010

⁵⁴ Interview 6, Environmental Organisation, Pune, March 2010

siltation in the lake....I am so, so tired of hearing this same mantra over and over again by people that don't know what they are talking about...25,000 acres is not going to change the regional climate by itself....We don't control the main body of the lake but we've got permission to put these check dams in. We would not have got permission from the state, who took a long time to review this, unless they were satisfied that we are not stealing Pune's water which is what you hear people on the street saying..⁵⁵

The CSR department at Lavasa are adamant that Lavasa has led to positive gains for the indigenous residents:

"Before Lavasa came here the life of these people was very miserable, there was no income source for these people...if people get sick here it used to take them 12km by walking...now because of Lavasa the transport facility is good...we are starting a very good school now, so the children will be educated..⁵⁶

Furthermore they dispute claims regarding land tenure:

"I don't think we have land problems, land is purchased...the Neri people, who were in need of money, sold their land to us and we paid them more than the market price....the land was of no use for them...economical crops were not there, these are the grasslands, the wastelands..⁵⁷

A recurring cause of contention amongst critics is the public-private partnership and emphasis on business and profit. Lavasa Corp. views this as an integral part of the sustainability and the liveable cities vision:

"...In the discussion of sustainability...it seems 80% of discussion is on the environmental side, 15% on the social side and 5% on the economic side. I subscribe to the triple bottom line...we are taking all three seriously...it's probably why people that are uninformed think it is just about making money. You have to be financially sustainable in the long-term and socially sustainable....Number one is make money, and nobody should be embarrassed because if the companies can't make money then they won't come. They shouldn't make a ghastly killing, they should make a reasonable profit, a reasonable return on investment.... there has to be a divorce eventually between the development company which is the Lavasa Corporation and the city. Right now that divorce hasn't happened yet..⁵⁸

⁵⁵ Interview 1 Lavasa Corporation City Management, Lavasa, Pers. Comm. September 2010

⁵⁶ Interview 7, CSR representative Lavasa Corp., Lavasa, March 2010

⁵⁷ Interview 8, CSR Representative, Lavasa Corp. Lavasa, March 2010

⁵⁸ Interview 1 Lavasa Corporation City Management, Lavasa, Pers. Comm. September 2010

5.5. Natural resource governance: A case study of bamboo

Governance of natural resources is an integral part of Lavasa Corps' environmental sustainability vision. By the year 2015, Lavasa Corp. aim to have a three pronged natural resources strategy, which establishes the city at the forefront in promoting the use of bamboo in all its uses, having established a fully operational soil product manufacturing unit and identified other natural resources such as fruits, and medicinal plants (Lavasa 2010). Lavasa Corp. intends to promote bamboo as an icon of sustainable development in two ways: firstly by establishing "Lavasa Bamboocrafts Ltd" as the foremost manufacturer of various bamboo products in India, and secondly by building capacity to use bamboo as a construction and structural material.

Lavasa Bamboocrafts Ltd, aims to house over 65 workers, with the products manufactured under the name "Bamboosa", under 2 categories: crafts and furniture. In order to supply the bamboo crafts factory, develop resources for construction and create landscaping, Lavasa Corp. is developing extensive bamboo plantations.⁵⁹ The company plans to certify about 500 acres of natural bamboo plantations, as well as plant bamboo and other native species. The area zoned for plantations constitutes of scrub, deciduous forest and agricultural land which previously belonged to farmers but has been purchased by Lavasa.⁶⁰

In India, bamboo management has been governed under the National Bamboo Mission (NBM) and the National Bamboo Mission for Applications (NBMA) since 2007, when the Ministry of Agriculture realised the need for a separate governing structure. In Maharashtra, the NBM is a subcommittee under social forestry. KONBAC acts as the capacity building agency to help create the Bamboosa factory and has been appointed to act as the bamboo sourcing intermediary. KONBAC was developed as an NGO based on a three pronged

⁵⁹ Interview 9, Special Initiatives Project Manager, Lavasa Corp., Lavasa, March 2010

⁶⁰ Interview 10, Lavasa Corporation Special Initiatives Project Manager, March 2010

strategy: to prevent the decline of bamboo workmanship, raise the profile of bamboo, and to develop bamboo products into an industrial standardised process (Rao et al. 2009).

KONBAC believe glamorisation is needed within the industry to provide prestige for the bamboo farmers (which is predominately viewed as ‘poor man’s timber’) to encourage the development of the bamboo industry. Although KONBAC maintain that bamboo is sustainably managed, they require a certification scheme which is recognised internationally, that will add value and give assurance to customers about their environmental and social credentials. The current trend for ‘sustainable living’ and environmental awareness provides opportunities for bamboo both as a building material and within the leisure and hotel industry.⁶¹ Although Lavasa Corp. and KONBAC have very different aims for their companies and operations, they both represent a sector which seeks to operate within high-end niche markets whilst providing sustainable local development. Lavasa aim to present a new model of urbanism based on a strategy for sustainable development through natural resource management, whereas KONBAC seeks to expand its potential as a sustainable enterprise driven by local community enterprise which aims to develop the scope of bamboo. In both cases, bamboo certification would add value and provide recognition for the consumer regarding its environmental and social credentials.⁶²

5.6. Forest and bamboo certification

Certification has become an institutionalised practice for verifying forest management, including Non Timber Forest Products (NTFP). The FSC label arose during a time when civil society highlighted the lack of government consensus regarding binding multilateral forestry agreements with global reach (Arts and Buizer 2009). Created in 1992, it is based on 10

⁶¹ Interview 11, KONBAC employee, Kudal, March 2010

⁶² Interviews 12 in Kudal and Lavasa March 2010

management principles: 1) Compliance with laws and FSC Principles; 2) Tenure and use rights and responsibilities; 3) Indigenous peoples' rights; 4) Community relations and worker's rights; 5) Benefits from the forest; 6) Environmental impact; 7) Management plan; 8) Monitoring and assessment; 9) Maintenance of high conservation value forests; and 10) Plantations (FSC 2010). Although there are currently a plethora of certification schemes for forestry, fair trade, organic, and various other environmental and social aspects, within mainstream, and predominantly Western focused markets, FSC enjoys the greatest recognition within timber markets.⁶³

Since bamboo in Lavasa and through KONBAC's production units seeks to compete directly within timber markets, assessing the viability of reaching the FSC mechanism is an important step in understanding the current approaches to 'sustainability'. Bamboo certification has a relatively limited history; research was conducted in India in the late 1990s, and trailed in Latin America in the early 2000s (Buckingham et al. 2009). At the time of the research, China was the only country that has been successful in maintaining FSC bamboo certification.⁶⁴ In recent times, FSC bamboo certification has proved controversial because of a lack of ecological stand-level management gains (Buckingham et al. 2011).⁶⁵ Although independent schemes are being created by bamboo organisations, currently FSC is the only bamboo certification scheme existing in the market.

⁶³ Buckingham (2007), K.C, Bamboo Certification; Master of Science thesis; University of Edinburgh, Interviews with B&Q and other timber retailers

⁶⁴ FSC bamboo certification has been initiated in Colombia (2011) and Nicaragua (2012)

⁶⁵ The controversy regarding the 'sustainability' of stand level management is beyond the scope of this article. See Buckingham et al. 2011

5.7. Performing the FSC pre-assessment

In order to understand whether bamboo management in Kudal and Lavasa adheres to universal certification standards of responsible management, as defined by the Forest Stewardship Council (FSC), an independent auditor conducted training and a 5 day audit. Visits to farmers' bamboo plantations, homesteads, and factories were conducted to identify areas of convergence and divergence with standards. As far as bamboo management was concerned, at the stand level, practice is simple with bamboo inter-planted with native tree species.

A number of preconditions were highlighted that are required to meet the standards for FSC certification. There were three significant areas identified that were clear violations of FSC P&C. They were illegal felling, wages below the national minimum wage, and banned chemicals in the landscape (these are detailed according to the P&C in table 5.1). Firstly, it is suspected that trees are being felled within the farm without permission from the forest department. Secondly, female workers in Kudal were paid Rs. 50 / (US\$1) day, which is considerably below the state minimum wage (Rs. 142/ US\$2.83). Currently a group of women are trying to negotiate an increase in wages. When the male farmers were interviewed, they admitted that they believed women worked half as much as men (but are currently paid 1/3); whereas the women believe they do 20% less work than the men. Finally, the pre-assessment highlighted that farmers in the Kudal region currently apply prohibited agro-chemicals (DDT) to paddy and mango fields that contain bamboo. Although no chemicals are directly applied to bamboo, FSC considers the integrated ecosystem. Therefore, if mangoes and cashews are grown on the land they would have to comply with FSC P&C. Moreover, the use of personal protection equipment is inadequate. The storage of chemicals and disposal of empty containers do not adhere to the requirements.

Table 5.1: The most significant areas of non-compliance with the P&C in Kudal (Kudal is the area from which Lavasa Corp. intend to source their bamboo)

1.5	Forest management areas should be protected from illegal harvesting, settlement and other unauthorised activities.
1.5.1	The applicant is able to identify and monitor possible illegal activities.
4.3	The rights of workers to organise and voluntarily negotiate with their employers shall be guaranteed as outlined in Conventions 87 and 98 of the International Labour Organisation (ILO).
4.3.6	National regulations concerning minimum wages for workers are available and implemented by the company. The rates and all social welfare benefits are fixed in the workers contracts.
6.6	Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organisation Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimise health and environmental risks.
6.6.1	The applicant proves to restrain from use of any harmful substances according to international treaties (World Health Organisation Type 1A and 1B and chlorinated hydrocarbon pesticides) and national legislation.

The survey conducted in Lavasa identified administrative issues regarding which land could be used. Land disputes between the local people and the corporation have created a significant lack of trust between the two sides. A member of the company noted that the branding of the Bamboosa factory is one way to encourage local people to be involved with Lavasa under a different name. In the plantation project, the company wants to work on their own land with hired workers rather than attempt to integrate the community. Lavasa Corp. does not have clear land rights regarding areas of land designated for bamboo plantations (the most significant areas of non-compliance according to the P&C are detailed in table 5.2). Currently there are 7 to 8 tribal families still living on the land, although they have no documentation to prove ownership. Lavasa Corp. intends to relocate them and provide them with seasonal work.⁶⁶ In the pre-assessment, the certification auditor reported:

⁶⁶ Interview 8, Manager of Special Initiatives Projects, Lavasa Corp., Lavasa, March 2010

“If the forests need to be certified in future, they need to look at issues related to rights of native people, tribals, land tenure.”⁶⁷

Moreover, the auditor was concerned about the safety of some areas and subsequent vulnerability to landslides. In order to avoid complications, he suggested certain areas be excluded from the scope of the certified area.

Table 5.2: The most significant areas of non-compliance with the P&C in Lavasa

2.	Tenure and use rights and responsibilities: Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented, and legally established.
2.1.	Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.
2.2	Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies.
2.2.5	There is proof of negotiations between the applicant and affected people or individuals regarding ongoing and planned forestry activities which could affect their rights.
2.3	Appropriate mechanisms shall be employed to resolve disputes over tenure claims and use rights. The circumstances and status of any outstanding disputes will be explicitly considered in the certification evaluation. Disputes of substantial magnitude involving a significant number of interests will normally disqualify a company from being certified.
2.3.1	Records describing any conflict, in the past or present, regarding property rights and user rights (use rights), are available.
2.3.3	There are no conflicts of large scale involving a big number of affected people or concerning large areas. In the case of existing conflicts on a small scale, a strong commitment towards a solution of the conflict is demonstrated.
3.	Indigenous People's Rights: The legal and customary rights of indigenous peoples to own, use, and manage their lands, territories, and resources shall be recognised and respected.
3.1	Forest management shall not threaten or diminish, either directly or indirectly, the resources or tenure rights of indigenous peoples.
3.1.5	The rights to control and manage their forest is granted for indigenous people. Delegation of the management of the forest to the applicant by indigenous people is documented in writing. There is proof that the indigenous people are not subject to any pressure of any kind.

At the end of the pre-assessment, it was clear Lavasa Corp. would have to address many land tenure issues before getting certification. Thus, the company intended to start with Chain of

⁶⁷ Interview 14, Certification Auditor, Lavasa, March 2010

Custody (COC) from KONBACs sourced areas. A few improvements such as safety guards for machinery, sufficient fire extinguishers, clear emergency exits etc. are required, but on the whole COC certification would easily be ascertained between Lavasa Corp. and KONBAC. After discussions and a quote provided by the auditing company (Table 5.3), it was concluded that the cost of certification would be prohibitive. The estimates were beyond the financial capabilities of KONBAC, without external support. Although economies of scale could be used to reduce the cost of certification, if a pilot study were to be conducted with fifteen farmers, it would cost US\$ 1,156.55 per hectare over the five year certification period. Due to the costs of certification resting with the producer, Lavasa as the buyer would not need to shoulder the costs. At present, both companies have no intentions to pursue FSC further, but do still require certification or verification of sustainable management in some form.

Table 5.3: Quote provided by the auditing company for Kudal bamboo certification (June 8th 2010)

Surveillance	Service	Total
Pre-assessment	Pre-assessment for bamboo certification and orientation on various certification schemes	EU 1,136.40 (Indian Rs 77,210)
Main audit year 1	Audit according to FSC principles and criteria forest area: 15 hectares, 20 farmers	EU 8,045.00
2-5 years	Audit according to FSC principles and criteria, forest area 15 hectares, 20 farmers	EU 2,477.50
Chain of Custody	COC for bamboo processing (including two production sites)	EU 1,152.80
Total	Bamboo FSC pre-assessment and certification and COC for 5 years	EUROS 12,811.70 US\$ 17,348.27 Per hectare: US\$ 1,156.55

Source: Author

5.8. Discussion

Lavasa was designed to be a ‘world-class’ development in India. In order to ascertain ‘world-class’ status, the city needs to reach benchmarked standards which are recognised globally. Lavasa Corp. intends to create sustainable city benchmarks in conjunction with other cities. In the meantime, the company is hoping to research existing standards of sustainability to ascertain their ‘world-class’ credentials. This case study highlights the importance of generating standards prior to development, rather than applying them post-hoc to improve existing practices. Regardless of Lavasa Corp’s intentions to fulfil environmental and social benchmarking criteria, the literature on liveable cities identifies the necessity to establish a harmonious relationship between economic growth, protecting the environment and the fabric of civil society.

The case study has shown how performativity can operate to create different realities. Whilst both ‘the city’ and certification reproduce neoliberal spaces, they create different realities regarding interpretations of sustainability. Bamboo was believed to be sustainably managed; however, the framework of certification encompassed far more than the ecological materiality of the plant and considered the surrounding social factors. A seemingly easy model of bamboo certification, used to verify sustainable practices, assisted in identifying and amplifying the underlying existing local tensions regarding land tenure, indigenous people’s rights, areas of potential danger due to landslides, and inequitable pay for women.

The performativity of the certification mechanism enforced a holistic institutionalised set of norms regarding human rights and environmental protection which, to a large extent, have been institutionalised through the United Nations system (e.g. WHO, ILO). Ultimately the Lavasa development may be able to renegotiate the lack of compliance with such norms by creating other benchmarks or sustainability systems which do not require such structures.

However, within the neoliberal model, CSR has become globalised so that global norms are being standardised. Although India and China may drive a new paradigm as their political weight increases globally, the framework of human rights and environmental protection is benchmarked to a large extent within UN forms of practice. Auditing these institutionalised norms highlighted the interplay between natural resources and the city. The elements of ‘nature’ and ‘society’ cannot be separated; both are integral to a ‘sustainable cities’ vision.

Scholarship has questioned whether certification can tackle contemporary sustainable development challenges under ‘liberal environmentalism’ (Bernstein 2001) by utilising the tools, mechanisms, and mentalities embedded within the system responsible for their production. Whilst some scholars have suggested certification within the coffee industry (Mutersbaugh 2002) and shrimp farming industry (Vandergeest and Unno 2012) can be interpreted as neo-colonial, Bloomfield (2012) raises the question whether FSC can be viewed as having anti-hegemonic characteristics through resisting the attempts by industry to drive down standards and instead challenge the rule making authority of state agencies. However, the FSC model can also be interpreted as advancing neoliberalism, with rights and responsibilities being shifted towards private firms, civil society and individuals, with the state providing the rules under which markets operate (Pellizzoni 2011). Whilst the ‘hegemony’ of neoliberalism is a contested issue (Barnett 2005), there are many avenues to explore the variability of neoliberalism (Bondi and Laurie 2005). The neoliberal project, in its unified form, can be interpreted as having ‘less government and more governance’ (Peck 2004b). By analysing the various neoliberal forms of governance, the efficacy of instruments such as FSC can be ascertained. Also by analysing the performativity involved in the construction of realities, the underlying sub-politics can be revealed. Although it is noted that FSC has attempted to make the mechanism more equitable for small holders and producers in developing countries, at present the third-party system has not achieved that aim (Bloomfield

2012). The Small and Low Intensively Managed Forests (SLIMF) initiative was created by FSC to streamline the certification procedure for smallholders, but recognises that finance for this effort remains a challenge (FSC 2009).

The FSC mechanism itself is considered a controversial tool to verify sustainable bamboo management. As a mechanism created for forest management, there is increasing pressure for FSC products in the timber, and alternative to timber markets to seek FSC certification. This is problematic for bamboo for at least two reasons: 1) bamboo management differs significantly from traditional forest management; the drive for certification has caused controversy amongst experts due to varying silvicultural and ‘*bambuseaecultural*’ requirements. Fundamentally, few ecological management gains have been accrued through the scheme; and, 2) the study has highlighted how prohibitive the cost of certification can be for smallholders. It would be impossible for KONBAC to recover the money within the five year trial period. This raises questions regarding where ultimate responsibility for certification costs should lie. In this case, Lavasa Corp. could potentially shoulder the financial cost. However, the onus is on the farmer to provide and bear the direct and indirect costs of certification; unfortunately, small-scale farmers are the least financially soluble actors within the bamboo value-chain. Although this has been recognised as an issue by FSC and a FSC-Fairtrade pilot scheme is underway (FSC 2012), the scheme has yet to be streamlined and would at present add another layer of bureaucracy and administrative burden to the process.

5.9. Conclusion

A return to the question, ‘whose sustainability counts?’ is pertinent. Lavasa has been surrounded by controversy since the outset of the development. Lavasa Corp. management

highlight the CSR gains for the local people, the new technology being developed and the improvements afforded to the lives of the local community. The equity of the Lavasa vision is yet to be proven; although polarised views exist regarding the sustainability of the development, it appears indicative of a trend within India where local planning law is fluid in a bid to assist ‘world-class’ developments that form part of a global move towards gentrification. As sustainability remains a contested issue, so too do claims to its pursuit. Regarding the efficacy of global forest certification standards, there is controversy over the efficacy of FSC for bamboo. However, the FSC audit did highlight many social and legal issues, thereby widening the potential scope of ‘sustainability’ to encompass a broader framework than ecological stand level management. Issues of land tenure and indigenous people’s rights inhibited the ability of Lavasa to move forward with certification, whereas in Kudal finance meant that changing practices would not be cost effective. At this stage, due to both administrative and financial constraints, bamboo certification will not be sought in the areas.

The post hoc application of standards of sustainability highlight the entrenched link between ‘nature’ and ‘society’. If buying into an idea of ‘world cities’ or the ‘liveable cities’ index, it is important to recognise these require adhering to a set of codified and institutionalised norms of practice which are entrenched in both environmental and human rights concerns. Although Lavasa has been given clearance to continue the development, it will be interesting to see how Lavasa Corp. seeks to verify their environmental credentials in future. The spaces of neoliberal governance utilised by the city and certification highlighted different realities. The financial constraints inherent in the FSC model have not allowed FSCs values to take precedence, yet the space created by neoliberalism for more stakeholder participation has allowed for cracks in the image of a hill station idyll. Guthman (2008b) highlights that neoliberalism makes citizens into consumers. However, the framework established for the

consumer to make ethical and sustainable choices is still often not enabling enough to facilitate change for smallholders in developing countries to overcome challenges within sites of power and exclusion.

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PLATES 14 A-D: CERTIFIED BAMBOO FORESTS IN CHINA

Certified bamboo forests or plantations are predominantly monocultures, which has caused considerable controversy amongst stakeholders. These issues will be explored further in Chapter 6.

Plate 14: Forest Stewardship Council (FSC) certified bamboo forests in Anji, Zhejiang, China (a, b, c, d)



(a)



(b)



(c)



(d)

Photos: Buckingham (2010)

CHAPTER 6: THE LEGITIMACY OF BAMBOO CERTIFICATION: UNPACKING THE CONTROVERSY AND THE IMPLICATIONS FOR A 'TREELIKE' GRASS

Kathleen Buckingham and Paul Jepson

Abstract

Bamboo is emerging as an important substitute for wood and fibre, but major purchasers of these products increasingly require some form of forest certification. Although bamboo can be assimilated within existing forest certification mechanisms, there is growing controversy amongst experts regarding the applicability and efficacy of adopting such instruments. A key reason why this controversy has arisen is that changes in the “technological zones” of forestry and growing resource scarcity has meant bamboo is now an input, and potentially an increasingly important input, into the global forest products market place. Through an accumulation of fieldwork, interviews, and discussions amongst experts between 2005 and 2012, this paper analyses the only existing global bamboo certification, Forest Stewardship Council (FSC), as well as proposals that are arising within the bamboo community. Through the lens of legitimacy, it analyses stakeholders’ views of the input legitimacy (processes) and output legitimacy (effectiveness) of FSC bamboo certification. It highlights the dissatisfaction with the third-party model for smallholders as well the lack of ecological management gains within the FSC system. However, currently the bamboo communities of practice are divided about ways to proceed with different organisations creating alternative approaches to FSC. The article highlights the power of the institution of forest certification through Global Production Networks (GPN) and identifies the need for unity within communities of practice if an attempt to overturn the institution is sought. At a macro level, it

highlights current challenges regarding the need to facilitate new resources into already existing institutions.

6.1. Introduction

Wood and fibre produced from trees are key natural resources. Over the last 20 years, a combination of factors, including the issue of tropical deforestation, the rise of Corporate Social Responsibility (CSR), and the roll back of the state have led to the formation of an influential Global Production Network (GPN) in the form of forest certification to govern the sustainability of forest resources in international markets. The scope of certification instruments is being extended to govern new natural resources; however, this practice creates tensions between standards produced for existing resources and the materialities and associated communities of new ones. One such resource that illustrates these tensions is bamboo.

Bamboo is emerging as an important substitute for wood and fibre. The world bamboo market in 2012 stands at around \$10bn (£6.24bn) and is estimated to double in five years (Woodridge 2012). This is a consequence of new technologies and industrial processing that are enabling bamboo products to compete effectively with wood products within Western markets. It is also due to bamboo's potential as a substitute material for a range of resources not produced from timber, such as viscose fibres, fibre-glass, construction materials, and food products. Bamboo's potential as a natural resource rests with its substitutability, with an estimated 1500 uses (Woodridge 2012). However, this also acts as a constraint. Because bamboo lacks a specific identity, bamboo products operate in markets with governance instruments designed for more established plant resources (such as timber or cotton). This situation is particularly pertinent when bamboo is traded as a commodity in 'sustainable' markets.

Major purchasers of wood and wood fibre products require forest certification. This has been demonstrated, for example, by the rise of FSC bamboo as a timber substitute (Mosobo 2010)

and for pulp and paper in toilet tissue (Baker 2012). The timber market is currently dominated by two certification schemes: Forest Stewardship Council (FSC) and PEFC (Formally the Pan-European Forest Certification scheme and currently the Programme for Endorsement of Forest Certification Schemes), for market, reputational, or policy led means (e.g. procurement policies). The FSC database contains data on companies registered in the Netherlands, United States, Canada, and Germany with a stake in FSC bamboo businesses (FSC 2012). Other non-timber markets for bamboo, such as fibre or shoots, tend to demand organic management, which has different certification schemes. This is problematic when applied to bamboo as a substitute resource, because bamboo has to adhere to a myriad of different systems. In addition, in terms of growth forms, cultivation, and scale, bamboo forests are distinct from silvicultural (tree) forestry. Thus, although bamboo can be assimilated within existing forest policy mechanisms, there is growing controversy amongst experts regarding the applicability and efficacy of adopting such instruments. This creates a strategic policy choice regarding whether bamboo should be assimilated within existing forest standards or whether to create a bamboo specific standard alongside FSC and PEFC in the marketplace.

This paper analyses the efficacy of FSC bamboo certification (the only scheme currently available) and proposals for alternative, bamboo specific schemes. It identifies the main actors and positions involved in the debate, and reports on the key arguments being proffered by each. It concludes with an assessment of the future directions as an aid to policy making. The implications of such decisions have the potential for wide ranging impact because bamboo is and has increasing potential to become an important part of livelihoods development in many tropical and subtropical regions. Moreover, it highlights current challenges regarding the need to facilitate new resources into already existing institutions.

6.2. Background

The creation of FSC coincided with, and was constitutive of, wider trends towards CSR within global capitalism. Many leading firms embraced the business case for CSR by operating beyond compliance underpinned by a combination of perceived benefits relating to brand management, more secure access to licences, and the prospect for market differentiation (Patteberg 2005). Because commodity networks are subject to trends within market globalisation, certification schemes have emerged as important elements of neoliberal governance (Klooster 2010).

Certification schemes are embedded within global value or commodity chains. Value Chain research by Gereffi (1994) highlights that different types of chains drive power relations. However, this conceptualisation only provides a partial analytical framework (Dicken et al. 2001), because recent research has pointed towards a more complex interplay through Global Production Networks (GPN). Unlike Value Chains that are often represented as primarily economic phenomena, GPNs are seen as social, cultural, and political systems. Although economic processes are still at the core of GPNs, the processes are not simply driven by firms; the operation and governance of GPNs involves various actors (Coe et al. 2008).

Due to its cultural embeddedness, the concept of Global Production *Networks* allows us to consider and question the institutions that exist within these networks and the associated structure and agency amongst actors (Coe et al. 2008). The connectivity of actors is not enough to guarantee global scope of a scheme, however. Since certification operates within and through networks, governance networks are not guaranteed power, but are precarious and must be continually reproduced, standardised, and normalised (Callon 1991). Market-based mechanisms, such as forest certification, therefore reflect the social influences and ideologies of those promoting them. These power dynamics are important; the most powerful actors,

such as those driving the schemes, skew commodity and value chains whereas the less powerful, such as local communities, may feel pressurised to conform to the standards imposed upon them (Elgert 2012).

Thus, the viability of certification frameworks rests on whether they can simultaneously gain legitimacy amongst ‘core audiences’ in domestic and international spheres (Cashore 2002).

Legitimacy is the perception of others that the existence and actions of an organisation are desirable, right and proper within some socially constructed systems of values, norms and beliefs (Suchman 1995). Within certification literature, Sharpf’s (1999) two-dimensional concept of legitimacy has been adapted to highlight the governance structure of input legitimacy (as a formulaic accepted process) and output legitimacy (on the ground effectiveness) (Elgert 2012; Schlyter et al. 2009; Auld and Bull 2003). Input (or procedural) legitimacy of certification has received more attention than output legitimacy (Schlyter et al. 2009; Auld and Bull 2003), because political scientists have tended to focus on transparency, accountability, deliberation, and participation in forest governance over (bamboo stand) forest level effectiveness (Schlyter et al. 2009). Either high input legitimacy or high output legitimacy can compensate for a lack of the other (Backstrand 2006). Whilst effectiveness may be seen as an important asset, Steffek (2009) identifies the United Nations legitimacy as resting with procedural (input) forms of legitimacy rather than its effectiveness (output legitimacy). Whilst institutions are only legitimate if they are perceived as such (Pierre and Peters 2005), institutions change when the parameters of legitimacy are challenged (Johansson 2012). It is therefore important to ascertain what elements may challenge an institution and what elements maintain an institutions’ legitimacy. Input and output legitimacy assist in deconstructing the parameters of legitimacy. They can compensate for one another if either element is particularly strong.

The practice of market driven, third-party audited governance supported by a network of non-state actors captures the procedural practice of certification. This has become the blueprint for receiving input (procedural) legitimacy for many certification schemes. Within this model, the audit has become a solution to a technical problem and also redesigned the practice of governance (Power 1997). In short, third-party auditing has become a legitimate form of governance by which to verify sustainability. Third-party certification is embedded in social, political, and economic networks (Hatanaka and Busch 2004). Auditing companies, therefore, need to be recognised as strategic actors that may seek to maximise their own profits or promote specific objectives. They are a socially mediated institution whereby their standards, accreditations, modes of operation, and auditing practices all affect whether or not clients choose them (Konefal and Hatanaka 2011).

Although new technologies that intersect with sustainability issues have changed drastically since the post-Brundtland world, when forest certification was first created, (Sneddon et al. 2006), the FSC adopted an institutional structure similar to the International Standardisation Organisation (ISO), which has become an institutionalised model for globalised standardisation and certification since its founding in 1947. Although FSC made significant adjustments to the ISO model regarding membership organisation (McDermott 2012), auditing as a form of accountability has not changed. Transnational institutional regulation of certification under ISO (ISO 65 and 68 for certification norms) limits the power of actors to alter certification practices as the guides identify the conditions under which qualities may be certified (Mutersbaugh 2005a). Mutersbaugh (2005a) identifies the ISO-based, NGO supported certification framework as a sophisticated, expensive, and robust system that has transformed ethical product governance. Therefore, certification is not just a discussion about standards; it involves a much broader discussion regarding modes of practice.

Organisational templates, such as forest certification, are composed of cultural elements, which are based on taken for granted beliefs and widely promulgated rules (DiMaggio and Powell 1991). The effectiveness of an institution is dependent on both its own performance and its interactions with other institutions with overlapping jurisdictions (Reischil 2012). Whilst the ideas behind the blueprint of certification are institutionalised, there is an institutional 'lifecycle', whereby rules and norms develop, become recognised and adhered to, and then fall into disuse, to be replaced by new arrangements (Lowndes 1996). Institutional change, therefore, involves at least three elements: the emergence of an alternative archetype, the delegitimising of the existing archetype, and the legitimising of the new one (Hinings et al. 2009). Legitimation occurs when innovations made by fringe players are adopted by established actors (Leblebici et al. 1991). It is therefore important to consider the perceived input and output legitimacy of the mechanism by the certification actor network, or more accurately, the communities of practice.

The key reason it is important to examine the legitimacy of bamboo certification is due to changes in the “technological zones” of forestry and growing resource scarcity, which means bamboo is now an input, and potentially an increasingly important input, into the global forest products market place. Much governance literature has attempted to conceptualise the importance of the cultural or institutional ‘space’ in which certification or standards operate. For instance, forest certification benefits from the conceptual frameworks of technological zones, organisational fields, and communities of practice. Barry (2006) articulates ‘technological zones’ as an assemblage that accelerates and intensifies agency in particular directions, with unpredictable and dynamic effects. In this instance, the forestry paradigm can be conceptualised as technological zones. Technological zones do not exist in isolation from other institutions or correspond to the territorial space of the nation-state. The spaces established through their development implies:

“...the need for analysis of the historical construction of particular political and economic spaces, and the specificities of the materials, practices and locations which they transform, connect, exclude and silence.” (Barry 2006).

Within technological zones are organisational fields and, connected to these, communities of practice. It is important to distinguish between organisational fields and communities of practice. An organisational field establishes new codes of conduct (Hoffman 2001), which in this case is forest certification. Dingwerth and Pattberg (2009) conceptualise organisational fields as a set of commonly accepted core norms.

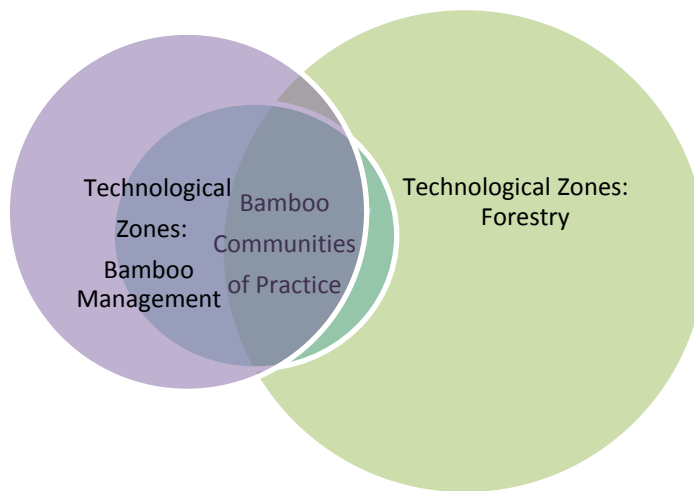
“The increasing density of interaction among the field’s members, and the success and legitimacy ascribed to the field’s key players by the outside world [helps] to solidify the organisational field until it eventually [develops] a ‘life of its own.’” (Dingwerth and Pattberg 2009)

Communities of practice (COPs) are the actors that shape organisational fields. COPs are viewed as the innovators, instigators, and collective entrepreneurs for new forms of transnational governance. For instance, COPs shaped the earliest experiments with forest certification leading to the rise of the FSC (Bartley and Smith 2010). A newly emerging sustainability governance field (such as bamboo certification) requires actors to access legitimacy and reputation resources beyond a single organisation, industry, or advocacy domain (Smith and Fischlein 2010). For example, FSC currently draws on a network of partners including Greenpeace and Wal-Mart which represent far reaching ideologies, but excludes government from standard setting.

Legitimacy is subjectively bestowed on a network; thus, efforts need to be made to pre-empt legitimacy threats from excluded actors and maintain ‘reputational assets’. Smith and Fischlein (2010) argue that as market mechanisms gain prominence in policy developments, there needs to be a greater understanding of the institutional architecture which is embedded

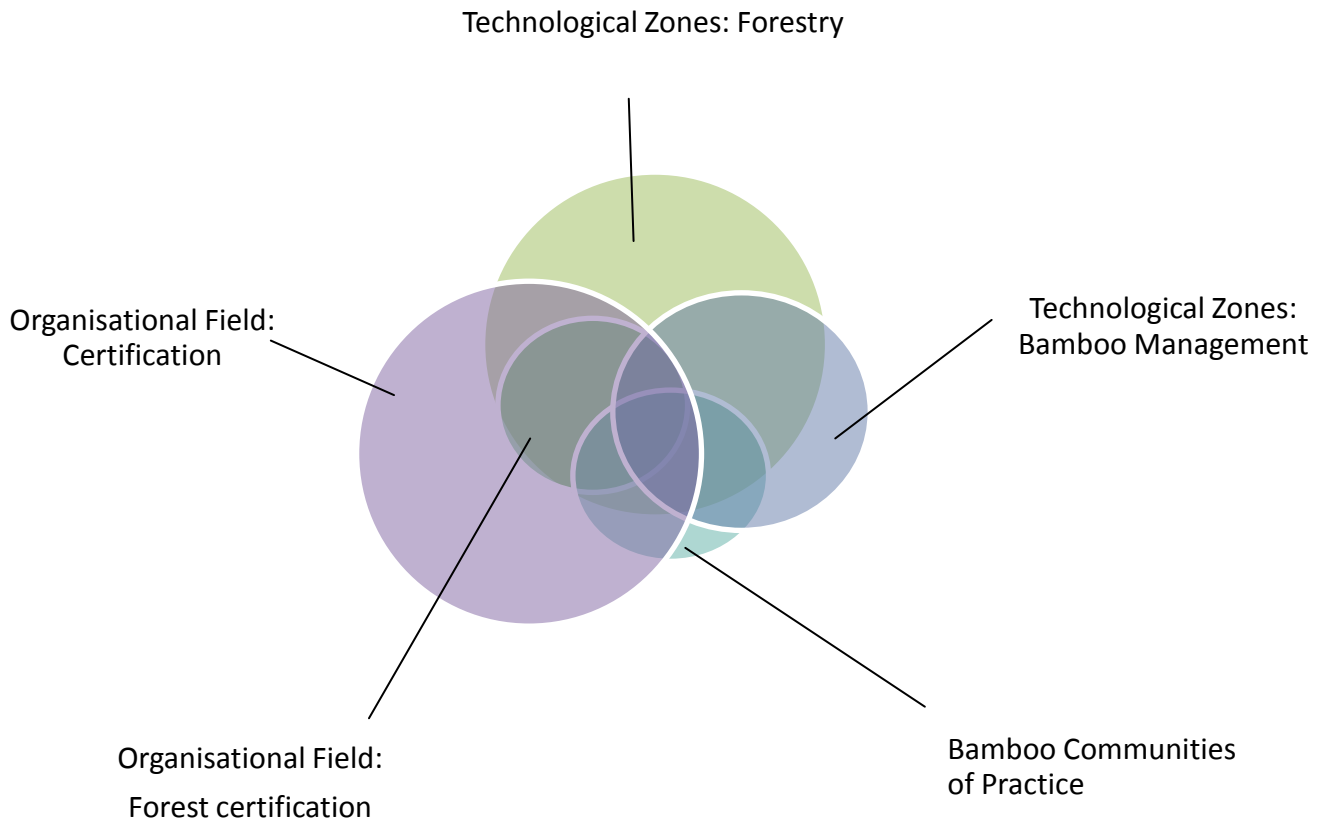
within private governance. Barley and Smith (2010) highlight that the communities of practice related to FSC were rooted in the collective convictions and knowledge base of participants. Furthermore, it is historically situated communities of practice that are responsible for the development of new forms of governance, not isolated calculating actors, hence the importance and strength of actor networks in instigating change.

Figure6.1: The technological zones of forestry and bamboo communities of practice



Source: Author

Figure 6.2: The shifting technological zones of forestry and its relationship with the organisational fields of certification and bamboo community of practice



Source: Author

A change has occurred in both the traditional technological zones of forestry and bamboo's role within the zones (from figure 6.1 to figure 6.2). In some societies such as China, bamboo has always been conceptualised as 'forestry', and therefore has long been included in the zones (figure 6.1). However, the technological zones of forestry have shifted to embrace political economy approaches to governance, such as market mechanisms. Within this new conceptualisation of the technological zones of forestry, bamboo has been embraced as a

‘timber’ product, leading to greater involvement of the bamboo communities of practice within the zones of forestry (figure 6.2.). This highlights not just the need to question the institutional frames and boundaries that bamboo has been placed within, but also the legitimacy of governance frameworks and mechanisms.

6.3. Mainstreaming certification

Global Production Networks are changing the way natural resources are governed. FSC certification was originally designed for treed lands, but has since broadened its scope to include Non Timber Forest Products (NTFPs) in order to allow for more commodities to adopt sustainable supply chains. NTFPs are defined as “All forest products except timber, including other materials obtained from trees such as resins and leaves, as well as any other plant and animal products” (FSC 2000). Since the creation of FSC, a new generation of certification, in the form of roundtables, has enabled the development of commodity specific standards. The production of many plantation crops, including palm oil, sugar, cotton, and cacao are increasingly governed under at least one sustainability or responsibility council, for example the Roundtable for Sustainable Palm Oil (RSPO) (Edwards and Laurance 2012). Instead of creating an additional niche market, as is often the case with private global governance initiatives, roundtables aim to make entire commodity chains more sustainable (Schouten and Glasbergen 2011).

Whether roundtables or certification schemes, there has been much controversy surrounding the top-down processes of the isomorphic standardisation models (Garcia-Lopez and Arizpe 2010). From the outset, FSC was challenged by a number of producer-backed forest certification initiatives. Forest producers objected to the institutional design of FSC, the key

role of NGOs in its creation, as well as the ability of environmental and social interests to outvote economic interests (Auld et al. 2008). This resulted in the creation of the PEFC in 1999, which was supported by European private forest owner associations (Gulbrandsen, 2005). The PEFC, as an umbrella scheme, provides producers with the opportunity to create their own standards (Auld et al 2008) under a globally recognised umbrella. This counteracts the risk of proliferation of schemes, which can cause the loss of credibility within the marketplace (van Dam et al. 2008). Although the standards have become increasingly similar in the scope of issues addressed, FSC standards are still more prescriptive than those endorsed by PEFC (Auld et al. 2008). The PEFC has therefore been criticised for not taking environmental concerns seriously enough and for having a stronger focus on economic gains for forest owners (Johansson and Lidestav 2011).

Such mainstreaming of the certification model has led critics to suggest the rigor of standards (and therefore the output legitimacy) is being eroded (Klooster 2010). Moreover, forest certification's current commitment to conventional market logics and practices currently favour powerful actors in conventional commodity chains, which tend to be Northern-based firms (Taylor 2005). Certification studies in the agricultural sector have shown that despite depending on the image of socially responsible production, certification still favours large producers (Gomez-Tovar et al. 2005), with no guarantee of increased income or trading conditions for Southern producers or smallholders (Mutersbaugh 2005b). Therefore, ethical labels can provide false assurance to consumers about the empowerment of smallholders, which is insufficient to challenge the inequitable and unsustainable practices through slight modifications to business as usual (Klooster 2010).

Whilst FSC recognises the linkages between conservation and poverty alleviation, the commitment has been to promote sustainable forest management rather than modify existing

trade relations (Taylor 2005). This had led to a power imbalance between the large retailers demanding certification and the community forest managers who must absorb increased costs (Klooster 2005). Currently, there are significant challenges to NTFPs receiving certification. These include inaccessibility of certification for small producers, uncertain tenure and access, lack of market knowledge and expertise, lack of ecological knowledge for many species, capacity building within the forestry sector, chain of custody and narrow and unpredictable markets (Shanley et al. 2002). To date, the most successful NTFP certifications have been subsidised either by donors or from sales of certified timber (Shanley et al 2008).

In recent years the ‘inherent’ sustainability of bamboo has come under increasing scrutiny in the media, resulting in calls for safeguards within GPNs.⁶⁸ In addition, many building and construction standards now require FSC certified materials, leading to pressure from the construction industry operating in the alternative timber markets for bamboo to be incorporated within FSC certification (Mosobo 2010).

Bamboo certification has a relatively short history. The first attempts at certifying bamboo under FSC were for certification for *Bambusa affinis* in India in the late 1990s. However, they did not come to fruition because a number of issues were identified as limiting the achievement of certification standards, including finance, land ownership, and a lack of motivation. The community bamboo plantation did not receive government funding as originally anticipated, and disputes over land ownership affected the ability of farmers to apply for certification. In India, 94% of the forests are owned by the government. Therefore, farmers cannot apply for FSC certification without government support. Currently, the

⁶⁸ The ‘greenwash’ of bamboo has become the topic of many blog posts, e.g:
<http://michellegabrielsblog.blogspot.co.uk/2009/11/is-bamboo-flooring-greenwashing.html>
<http://kmswoodworks.wordpress.com/2010/04/18/the-great-green-washing-of-bamboo-flooring/>

national emphasis is on environmental and social sustainability and not commercialisation, and so FSC was not perceived as a priority (Buckingham et al. 2009).

The first bamboo certification scheme was established in Colombia, in 2006, and funded by GTZ for the species *Guadua angustifolia*. Thirty-four producers were funded to adopt an FSC Small and Low Intensively Managed Forest (SLIMF) programme. However, this scheme was not sustainable due to a lack of capacity building. Major challenges were identified as: 1) a lack of understanding regarding the motivation behind certification; 2) the predominance of European and American based certification bodies and associated high costs of technical assistance; 3) financial dependence on the funding organisation, and 4) challenges associated with compliance and competition in comparison with big businesses (Buckingham et al. 2009).

Whilst certification schemes were initially attempted in Latin America and India, it is in China where the most rigorous and far-reaching assessment of bamboo certification has occurred. This is because commercialisation and intensity in management led Chinese bamboo experts to consider the need for sustainable bamboo management practices. China's bamboo sector is estimated at around US\$ 5.4 billion (Smith and Marsh 2007), whilst China boasts over 500 species and the richest bamboo resources in the world (Lei 2001), *Phyllostachys heterocycla* var. *Pubescens* (known as Moso) now accounts for approximately 72% of the total bamboo area in China and over 90% of the bamboo economy (Dou and Yu 2008). The current challenges facing sustainable bamboo management are monocultures, intensive harvesting, soil loosening and tending, as well as fertiliser, insecticide, pesticide and chemical residues (Fu and Lou 2001).

However, the Chinese management experience represents only one species out of the estimated 1,200 species of bamboos, distributed mainly in tropical and sub-tropical regions

(Lei 2001). This has caused controversy amongst stakeholders involved in bamboo management globally. There are different species, varying rooting structures, and particular management and economic capacities of different bamboo nations, which the intensive Chinese monocultures do not represent.

There are three major bamboo organisations that could be considered the key stakeholders regarding bamboo certification. These are: 1) the International Network for Bamboo and Rattan (INBAR), 2) Ecoplanet Bamboo, and 3) the World Bamboo Organisation (WBO). INBAR is an intergovernmental organisation dedicated to improving the social, economic, and environmental benefits of bamboo and rattan. The organisation connects a global network of partners from the government, private, and not-for-profit sectors in over 50 countries. INBAR was set up in 1984 by the International Development Research Centre (IDRC) of Canada and became an independent organisation in 1997, with its headquarters established in Beijing, China (INBAR 2012). EcoPlanet Bamboo is a bamboo plantation and associated manufacturing company with operations currently in Latin America and Africa. The company converts low-yielding, degraded grassland and deforested areas into bamboo plantations. Ecoplanet Bamboo's goal is to provide a sustainable replacement for rapidly depleting tropical hardwoods and become the leading producer of bamboo products and building-materials from Central America and Africa for export to the US, Europe, and the Middle East. They recently obtained FSC certification and verified carbon offsets for Nicaraguan plantations (Ecoplanet Bamboo 2012).

The World Bamboo Organisation is a United States tax-exempt trade association, originally founded as the International Bamboo Association (IBA), from discussions in 1991. The founding members of the WBO are from the USA, India, Philippines, Ghana, Chile, and Belgium (WBO 2012). The WBO plays a networking role by connecting people every three

to four years through the World Bamboo Congress, (WBC). It is the WBC that creates the avenue for the bamboo communities of practice, and WBO has played an intrinsic role in creating online and dynamic networks with LinkedIn groups to facilitate discussion amongst bamboo communities of practice (COPs).

6.4. Methodology

This paper draws upon a body of knowledge accumulated since 2005 by the lead author. This includes a period of (2005-2006) as an International Network for Bamboo and Rattan (INBAR) volunteer, and research for a Masters Degree research project, conducted in 2007 at the University of Edinburgh. This knowledge was extended through field research conducted during time spent at the University of Oxford whilst conducting doctoral research (2008 - 2012). In China, fieldwork was conducted between April and September 2010. Key informant interviews were conducted in China and an FSC audit was shadowed in Chishui in Guizhou. Conferences in Korea, Malaysia, Thailand, Belgium, and China also informed the research. The snowballing approach was utilised to identify key informants from a range of NGOs, forestry experts, certification bodies, academics, bamboo experts, government forestry departments, and those involved with bamboo management at the local level. The research was conducted with assistance from the British Inter-university China Centre (BICC), Economic and Social Research Centre (ESRC), and INBAR.

6.5. Assessment of Forest Stewardship Council (FSC) for bamboo

China is the first country to successfully create large FSC management units (FMU) and Chain of Custody (COC), value chain certificates for bamboo. In 2012, 19 Forest Management (FM) and 351 Chain of Custody (COC) bamboo certificates exist, of which 13 FM are in China⁶⁹ and 6 in Colombia⁷⁰ (FSC 2012).⁷¹

Under the FSC scheme, bamboos can either be certified as an NTFP within the matrix of a forest, or as ‘treelike’ within plantations or natural forests (FSC 2010). A motion was passed to improve and expand FSCs guidelines on bamboo and rattan forest certification in 2005 (FSC 2005); however, FSC’s approach has not fundamentally changed. Subsequently, because Chinese bamboo plantations are considered ‘treelike’, they operate under the Principles and Criteria of trees. Although this has caused controversy, many stakeholders view the current generic forest Principles and Criteria (P&C) as being suitable for bamboo.

Core to the controversy of FSC certification is the fact that many bamboo experts fundamentally object to it being classed and treated as a tree.⁷² Opponents of FSC certification believe bamboo is grown sustainably anyway; therefore, adhering to a mechanism often used by monoculture timber plantations is very straightforward.⁷³ Table 6.1, although a simplification, details some of the key differences between bamboos and trees, identifying the different growth patterns, rooting structure, flowering patterns, competitiveness characteristics, fertility, and longevity aspects and so highlights the need for different management techniques. Although social and environmental gains have been demonstrated through Chinese and Indian examples, the FSC standard currently holds very

⁶⁹ The first certificate dates from 2008

⁷⁰ The first certificate dates from 2011

⁷¹ EcoPlanet Bamboo has FSC certified plantations in Nicaragua however these are currently not listed on the database

⁷² Interviews 13, 34, 45, 58,59

⁷³ Interviews 13, 34, 45, 58,59

little output legitimacy amongst bamboo communities of practice. Some argue that if there are no significant gains or differentiation between the ‘sustainable’ and ‘unsustainable’ bamboo management, the instrument acts primarily as a trade barrier for producers that are not in a position to certify.⁷⁴

Table 6.1: Some key differences between bamboos and trees

Variable	Bamboo	Many timber producing species
Growth	Reaches its final height in 2-4 months Growth occurs in one year with a single cylinder	Tend to keep growing throughout their whole lifetime Grow wood rings
Rooting structure	Rhizomes serve as the trunk; the culms are the branches off the trunk. Bamboos have three distinct rooting structures: monopodial (diffuse), sympodial (clumping) and amphodial (mixed)	Have roots, trunks and branches
Flowering patterns	The majority of bamboos are monocarpic, flowering once in cycles. Depending on the species, bamboos flower once in 3 to 120 years	Mature trees often flower and set seed on an annual cycles
Competitiveness characteristics	Can outcompete trees or other plants for access to sunlight, nutrients, and water through rhizomes and ‘invasive’ characteristics	Competes through height in the canopy
Fertility	Many bamboo species are infertile (or have infrequent flowering and therefore seeds are in short supply) and require vegetative propagation techniques	Many tree species are fertile
Longevity	Culms can decay after 5-8 years without harvesting. The mother plant tends to die after flowering	Can last centuries

Based on WBO 2011

Furthermore, there are various different management challenges across species. Currently *Phyllostachys pubescens* (Moso) is the predominant bamboo species grown and utilised in China, which is ‘treelike’ (monopodial), but in sub-tropical Yunnan there is a need for bamboo that grows in a clump (a sympodial species) to receive FSC certification for pulp and paper. Likewise, the main commercial varieties being developed across India, Africa and Latin America are all sympodial. Opponents of FSC perceive the instrument as being far

⁷⁴ Interviews 2, 13, 34, 45, 58, 59,61

more suitable to the monopodial landscapes, which are much closer to the concept of treed lands. Three significant differences between timber and (particularly sympodial) bamboos can be identified as affecting management across tropical and subtropical countries: a) the requirements of ‘clumping’ or sympodial harvesting, b) the challenges of propagation with seed or vegetative propagation techniques, and c) the challenges faced by flowering. Whilst the majority of FSC certified bamboo forests are in China, this model of cultivation is largely absent in other countries. In India and elsewhere, bamboo grows as a small-scale horticultural crop on homesteads (Buckingham 2011).

Flowering is a challenge particularly for the management of sympodial bamboos as a natural resource. Bamboo experts in the northeast of India believe that certification could be a useful instrument if it could be adapted to accommodate natural flowering cycles. The Cane and Bamboo Technology Centre (CBTC) in Assam has created an independent national certification system for nurseries, which was accepted nationwide in 2007. The certification system aims to document propagation dates in a bid to aid the prediction of flowering cycles and enable the propagation of mixed age ranges on plantations and homesteads.⁷⁵ Many bamboo species have infertile seed and therefore need to be propagated through cuttings. The quality of stock can cause concern for farmers because the age of the mother-plant affects the time at which the bamboo will flower. The availability and quality of seed can also be in short supply.

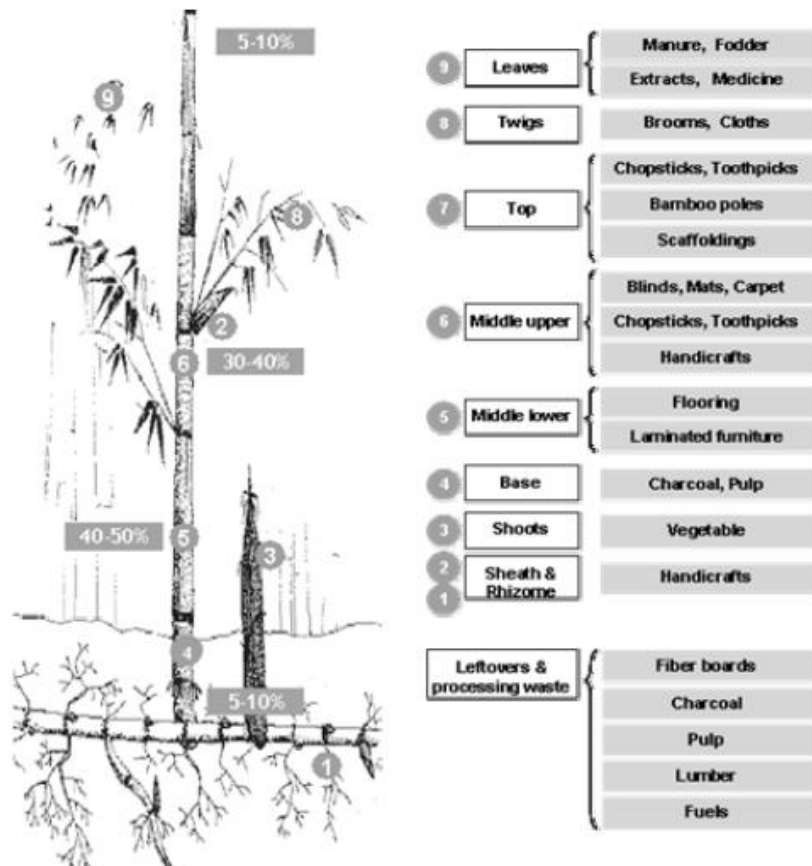
Whilst bamboo certification has limitations in terms of output legitimacy, the market itself is currently limiting bamboo certification. One of the key benefits of bamboo as a material is the fact that the whole culm can be utilised for various different materials (Figure 6.3).

However, there is a limited market for certified bamboo products outside the scope of high-end timber alternatives, such as bamboo flooring; it is therefore costly for the factories to

⁷⁵ Interview in Guwharti, February 2009

adhere to certification for a limited scope of their products. Efficient bamboo factories have very little waste, even being powered by bamboo. They demonstrate a high level of sustainability in natural resource utilisation but are disadvantaged by the limited FSC market many of their products attract.⁷⁶

Figure 6.3: The different utilities of bamboo



Source: INBAR (2006)

Advocates of FSC certification highlight that many of the P&C refer to generic forestry resources, such as laws, tenure, and indigenous peoples and workers rights. An FSC audit in India (Chapter 5) highlighted issues with land tenure, indigenous people's rights, and women receiving wages below the national minimum wage. These examples are significant because

⁷⁶ Interviews 45, 60

these issues had already been raised within the local communities; the FSC mechanism acted to support existing simmering, yet unresolved, issues within the communities rather than impose a Western value system (Buckingham forthcoming; Chapter 5). Such failure to recognise FSC's function as primarily a social standard, leads FSC advocates to consider opponents as being ignorant of the applicability of FSC to bamboo⁷⁷ (Table 6.2). Although many criteria require adaptation, all the criteria *can* be applied in some way to bamboo forestry. Advocates therefore argue for a working group to adapt the ecological requirements to suit bamboo,⁷⁸ regarding the 'scale and intensity of operations' (FSC 1996: Appendix 5).

A bamboo specific FSC standard currently exists in Ecuador, but one has not yet been created for China. One Chinese bamboo expert noted:

“As far as I'm concerned, in China bamboo is a type of tree. It is part of the forest. Bamboo has its particular characteristics as tree species do. It is a challenge of fine tuning; the whole system doesn't need to be overturned (own translation from Chinese).”⁷⁹

Whilst many forestry and bamboo experts support certification, some are cautious about overstating what certification is capable of achieving. This is because they see sustainable bamboo management and certification as different. This sentiment was captured by one expert who noted:

“Bamboo certification adheres to principles and criteria; the scope of sustainable management is much broader. Bamboo certification is a mode of national development. It is a good thing: it can improve the level of bamboo forestry within China, increase the farmers' income and international exchange, which will enable China to develop production and other positive

⁷⁷ Interviews 55,56,57

⁷⁸ Interviews 4,5,14, 15, 47, 57

⁷⁹对我来说在中国竹子在中国是一个树种。是森林的一个部分。他们的特性，其他的树种这是一个挑战是以个微调，不是说把所有的东西推翻。

elements. The change has been quite significant (own translation from Chinese).⁸⁰

Chinese experts were the first to highlight the need to consider biodiversity conservation within bamboo forests. It was the very same forests at the heart of this controversy that became the first FSC certified forests. Large-scale areas of bamboo monocultures received certification in 2008. Since then, the government has assisted bamboo foresters in the area to reach standards. Those involved in certifying their forests claim they are making headway to ensure their forests are sustainable, with intent to increase biodiversity within monocultures. Those that were advocates of mixed forestry management and so called ‘sustainable’ practices are exasperated by the result. By the potentially ‘least sustainable’ bamboo forests gaining international recognition as ‘sustainable’, the market mechanism appears to marginalise other bamboo foresters that have less capacity to access the system. This has led to what can be interpreted as an output legitimacy crisis; many experts question the efficacy of FSC to promote sustainable bamboo management.⁸¹

In China, Anji in Zhejiang province has received funding through the government for the entire area to receive FSC forest certification. As the most commercially valuable bamboo resource in the country, and film set for bamboo forest scenes in Chinese films, the government sees the investment potential in verifying sustainability credentials. The development of bamboo certification is helping to develop pilot management areas and informing government regulation standards.⁸²

⁸⁰不是一模一样的.竹林认证按照原则的标准,人们的经营行为的话可特续经营是范围比较大一点的话竹林认证是数量可特续经营是国家发展方线.是很好的话可以提高中国竹林的水平,增加老百姓的收入颇大国际的交流,为我们国家产品的发展其他比较好的事情...变化一概说是比较大的话

⁸¹ Interviews 8, 10, 57, 58

⁸² High yield management techniques for moso bamboo stands GB

Outside of the province of Zhejiang, there is increasing demand for FSC; independent pulp and paper factories are keen to receive certification for fear that they will lose international business.⁸³ Although recognising many challenges financially, administratively, and from the plant's ecology, many businesses and experts believe it to be more pragmatic and beneficial to work with FSC to facilitate a bamboo specific mechanism than create a new scheme. Table 6.3 highlights the recognised strengths of adopting FSC for bamboo: it is already institutionalised globally, established and recognised in the marketplace, as well as having the backing of a range of powerful actors from NGOs and businesses alike. Many stakeholders feel it would be difficult to replicate, ascertain, or maintain the legitimacy afforded to FSC with a new label. The concern is that a new certification scheme would be expensive to create, take years to develop, promote, and build credibility from the buying public. Moreover, some advocates believe similar administrative and financial problems would arise with any new scheme akin to the FSC model, which pertain to the institutional framework rather than the standards themselves.⁸⁴ Furthermore, the FSC's stringency regarding land conversion (which must have been done prior to 1994) prevents the 'greenwashing' that other standards have been accused of, such as PEFC. Whilst stakeholders in China often question what constitutes a 'natural' bamboo forest, the standard creates safeguards against the commercialisation of newly created bamboo monocultures.⁸⁵ In short, the power afforded by consumers and industries in GPNs gives FSC input legitimacy.

Areas of controversy surrounding FSC are recorded in table 6.2. It identifies that monitoring and assessment are major causes of controversy. Some even believe bamboo certification controversy is not really a discussion about standards, but monitoring and evaluation. Apart from adherence to standards being open to interpretation by auditors, there is also the

⁸³ Interviews 15,16,17,18,19,45,53, 61

⁸⁴ Interviews 7, 14, 46, 57

⁸⁵ Interviews 26, 47

potential for bribery and corruption within the system. This has arisen as a significant issue for FSC within China. In 2010, the Chinese government halted FSC auditing due to corruption regarding a lack of connectivity between Chain of Custody (COC) and forest management units (Buckingham and Jepson forthcoming: Chapter 4). Furthermore, research conducted in India found that the cost of auditing would prevent certification from being pursued (Table 6.4). Although it is recognised that the amount of US\$1,156 per hectare could be reduced over the course of certification by using economies of scale, the project in India intended to pilot an area of 15 hectares with 20 farmers in order to build capacity and learn more about certification in a manageable way. Although the factories wished to operate in high-end markets, which adhere to global standards of sustainability, the financial burden was perceived as too great (Buckingham forthcoming: Chapter 5). This demonstrates that the input legitimacy based on third-party auditing is the major cause for concern.

By mid 2010, about 56% of the world's 355 million hectares of certified forests were in North America, 24% in Western Europe, and only 8% in Latin America, Asia and Africa combined (Bieri and Nygren 2010). The Northern drive for certification has helped institutionalise the instrument. Bamboo is native to all continents except Europe and Antarctica (McClure 1966; Liese 2001), thereby underlining the need for frameworks suited to tropical and sub-tropical regions. Figure 6.4 illustrates bamboos natural geographic range.

Another root of the controversy for certification (Table 6.2) lies in the perceived applicability of Principle 2 regarding the lack of customary rights over land, as well as questions over whether 'indigenous people' exist, particularly in China. As previously mentioned, the ecological management regarding environmental impact and management plan has also caused controversy.

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Table 6.2: Relevance of FSC principles and criteria to bamboo

Principle	Applicability	Criteria applicable to bamboo	Level of Controversy
1.Compliance with laws and FSC principles	Highly applicable	<i>Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory</i>	Low- Case study in India revealed wages below legal level.
2.Tenure and use rights and responsibilities	Applicable but problematic in some countries	<i>Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.</i>	Medium- Farmers in India were unable apply for certification without permission from the government (land owners). . Lack of formal documentation and customary rights can be difficult to legitimate (Bieri and Nygren 2011).
3.Indigenous peoples' rights	Principle applicable/ Terminology problematic	<i>The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognized and respected.</i>	Medium- China does not recognise indigenous peoples therefore says principle 3 is not applicable.
4.Community relations and worker's rights	Highly applicable	<i>Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.</i>	Low- Many social gains have been highlighted from forests in China.
5.Benefits from the forest	Applicable	<i>Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.</i>	Low- No issues were raised by stakeholders.
6.Environmental impact	Needs adaptation	<i>Assessment of environmental impacts shall be completed -- appropriate to the scale, intensity of forest management and the uniqueness of the affected resources.</i>	Medium- Opponents highlight that forests are still able to use insecticides and pesticides and have not fundamentally changed their management approaches. Proponents note that they are reducing the use of chemicals and working towards more sustainable practices.
7.Management plan	Needs adaptation	<i>A management plan -- appropriate to the scale and intensity of the operations – shall be written, implemented, and kept up to date.</i>	Medium- Those utilising the system are content with the management plan. Others feel that FSC does not have adequate management techniques to guarantee sustainable bamboo management.
8.Monitoring and assessment	Needs adaptation	Monitoring shall be conducted -- appropriate to the scale and intensity of forest management -- to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.	High- Many stakeholders disagree with third-party auditing which creates an unnecessary paper trail is created for certification. Moreover the auditors' requirements are open to interpretation. Some require extensive paper work whereas others consider the 'appropriate scale' of operations. In China many stakeholders worry about bribery and corruption within the system.
9.Maintenance of high conservation value forests	Applicable in some cases	<i>Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.</i>	Low- No issues were raised by stakeholders.
10.Plantations	Applicable in some cases	<i>The management objectives of the plantation, including natural forest conservation and restoration objectives, shall be explicitly stated in the management plan, and clearly demonstrated in the implementation of the plan.</i>	Medium- Stakeholders raised the issue that certification was suitable for 'treelike' monopodial stands but not sympodial homesteads in India.

Table 6.3: Analysis of the Strengths, Weaknesses, Opportunities and Threats (SWOT) of adopting different bamboo certification standards

Scheme for bamboo	Strengths	Weaknesses	Opportunities	Threats
Forest Stewardship Council (FSC)	-Established in the marketplace -Recognised by consumers as a legitimate mechanism -Backed by a range of powerful actors from the NGO and business sectors e.g. WWF, Greenpeace, IKEA, B&Q etc. -Institutionalised globally -Certified bamboo forests exist	-Expensive for smallholders primarily due to requiring third-party auditing -Although all the criteria can be applied, often bamboo specific requirements are not included or developed -Perceived primarily as a mechanism for trees by experts, although it covers NTFPs -Ambiguous policy for bamboo	-Already an existing system to develop a more bamboo specific system -More cost effective to adopt an existing system and not have to create a new system and visibility within the marketplace -If there is a proliferation of schemes it may result in confusion in the market place resulting in consumers opting for FSC as a recognised brand	-Growing discontent with FSC for bamboo amongst experts -If the controversy escalates it risks devaluing the FSC label -Expensive and time consuming project to adapt FSC for bamboo which could lead to few changes
Programme for the Endorsement of Forest Certification Schemes (PEFC)	-Established in the marketplace -Recognised by consumers as a legitimate mechanism -Known flexibility for governments to create their own standards -The most widespread certification system globally -Institutionalised globally	-Expensive for smallholders primarily due to requiring third-party auditing -Perceived primarily as a mechanism for trees, although it covers NTFPs	-Already an existing system to develop a more bamboo specific system -More cost effective to adopt an existing system and not have to create a new system and visibility within the marketplace	-Growing discontent with forest certification amongst experts -Expensive and time consuming project to adapt FSC for bamboo which could lead to few changes
World Bamboo Congress (WBO)	- Bamboo specific standards -Potentially endorsed by bamboo experts and major bamboo stakeholders -Purports to 'guarantee' sustainable bamboo management and opportunities for smallholders to participate	- Would need to create a brand and establish legitimacy within the marketplace -Not supported by all the bamboo community who are creating other parallel schemes -Verification system currently lacks legitimacy -Currently a lack of major stakeholders/NGOs/businesses supporting or backing the scheme	- Developing bamboo specific management requirements which enhance the sustainability of bamboo globally -Lower cost of adherence to certification for smallholders -Develops new methodologies of monitoring and verification which could replace third-party auditing	- Potentially very expensive exercise for stakeholders involved in the creation of the certification -No guarantee of visibility and acceptance within the marketplace and amongst consumers -The absence of third-parties could undermine the credibility of the system -The close connection with WBO may be seen as lacking independence

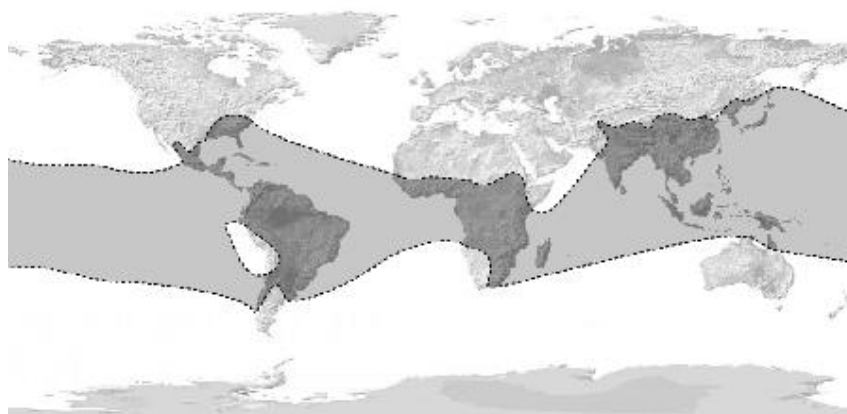
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Scheme for bamboo	Strengths	Weaknesses	Opportunities	Threats
INBAR	-Is based upon the FSC system which is trusted -More in tune with the needs and capacity of smallholders -Potentially endorsed by bamboo experts and major bamboo stakeholders	-Would need to create a brand and establish legitimacy within the marketplace -Not supported by all the bamboo community who are creating other parallel schemes -Verification system currently lacks legitimacy -Currently a lack of major stakeholders/NGOs/businesses supporting or backing the scheme	-Lower cost of adherence to certification for smallholders -A stepwise approach which allows smallholders to build their capacity -Develops new methodologies of monitoring and verification which could replace third-party auditing	- Potentially very expensive exercise for stakeholders involved in the creation of the certification -No guarantee of visibility and acceptance within the marketplace and amongst consumers -The absence of third-parties could undermine the credibility of the system -The close connection with INBAR may be seen as lacking independence
Roundtable	-Bamboo specific standards -Potentially endorsed by bamboo experts and major bamboo stakeholders -Purports to 'guarantee' sustainable bamboo management and opportunities for smallholders to participate -Roundtables are increasingly seen as legitimate forms of governance for commodities	-Would need to create a brand and establish legitimacy within the marketplace -Not supported by all the bamboo community who are creating other parallel schemes	-There currently is 'space' for a bamboo roundtable as one does not exist - Developing bamboo specific management requirements which enhance the sustainability of bamboo globally	-Potentially very expensive exercise for stakeholders involved in the creation of the certification -No guarantee of visibility and acceptance within the marketplace and amongst consumers

Table 6.4: Quote from auditing company for bamboo certification in India

Surveillance	Service	Total
Pre-assessment	Pre-assessment for bamboo certification and orientation on various certification schemes	EU 1,136.40 (Indian Rs 77,210)
Main audit year 1	Audit according to FSC principles and criteria forest area: 15 hectares, 20 farmers	EU 8,045.00
2-5 years	Audit according to FSC principles and criteria, forest area 15 hectares, 20 farmers	EU 2,477.50
Chain of Custody	COC for bamboo processing (including two production sites)	EU 1,152.80
Total	Bamboo FSC pre-assessment and certification and COC for 5 years	EUROS 12,811.70 US\$ 17,348.27 Per hectare: US\$ 1,156.55

Source: Author

Figure 6.4: Global bamboo distributionSource: <http://igendesign.wordpress.com>

6.6. The international response: Creating new schemes

Initially, global bamboo experts suggested that certification was unnecessary. Increasingly, bamboo communities of practice are realising that engaging with certification is essential if bamboo is going to become an increasingly viable material, globally. The current availability of FSC bamboo certification on the global market has created pressure for bamboo industries

to follow suit. Some stakeholders are critical of China's decision to adopt a mechanism, which has limited effectiveness for bamboo.⁸⁶ Chinese stakeholders however highlight that they are merely responding to a market demand;⁸⁷ attaining bamboo certification is recognising the mechanism's pragmatic legitimacy within the market

Moreover, China is witnessing a move away from FSC towards PEFC certification (Chen et al. 2011). In the Chinese case, PEFC is being utilised as a nationwide strategy throughout forestry to provide greater ownership of the direction of sustainable management and is considered more conducive to developing emerging economies' forestry resources (Tian and Liu 2002). The government intends to create a bamboo standard under PEFC. However support for the FSC and PEFC approach is still limited.

Many international experts believe that a new framework needs to be created which separates sympodial and monopodial bamboos to reflect contrasting management needs. Proposals for new schemes are being developed which would focus on sympodial species and exclude the main commercial 'treelike' bamboo species in China. For instance, EcoPlanet Bamboo investigated the feasibility of creating a roundtable for sympodial bamboo species. However, major challenges were envisioned regarding finance and capacity to initiate a global system (See Table 6.3). As a result, the company intends to certify forests under FSC, working with supportive bamboo actors to initiate change within the system. However, the potential increase of FSC bamboo has prompted varying responses amongst the bamboo community.

Experts working for INBAR are divided over certification. Some believe that certification is not needed, whilst others, who initially advocated FSC bamboo, have become disillusioned with the lack of changes at the management level. Although bamboo certification was originally researched in the environment department at INBAR, the project was taken up by

⁸⁶ Interview 8, 58,59

⁸⁷ Interview 14, 15, 16,1718,1920,21,60

the livelihoods team due to the cost of auditing being a major prohibitive barrier to compliance. This has supported the desire to use alternative methods of verification rather than the institutionalised third-party system.

In order to rectify perceived challenges for smallholders, INBAR has devised a scheme which allows smallholders to achieve certification in stages. It intends to use the FSC Principles and Criteria as the framework. Within a grading system, targets would be reached to achieve modular adherence to all the legal and social criteria of the FSC. As highlighted in Table 6.3, the certification would benefit from the legitimacy of the FSC model, whilst tackling perceived developmental issues, such as third-party auditing. INBAR's scheme intends to utilise smart phones and GPS technology to record bamboo resources within a globally accessible database. The scheme will be piloted in India, as the model is more smallholder/homestead based.

In a similar move, the World Bamboo Organisation has proposed 'Bamboo Sustainability Certification', which aims to certify sympodial bamboo species. Because it is perceived that the future of bamboo is in the tropics, monopodial species in China would be excluded. The certification proposal focuses on the key differences afforded to trees and bamboo, highlighting the growth and management divergences. The scheme calls for documented records that indicate a stable or steadily growing amount of biomass, with data regarding the size and number of culms. Like the INBAR system, it intends to adopt a global internet database which utilises local smart phones. The local audit will require a management plan and global audit of production, sales, and audited figures that link production and sales. It is envisioned that the national level agriculture organisation of each country will be enlisted to provide a local audit trail through the use of techniques that they currently use for verifying farmers' records of inputs and production of organic farms.

Whilst creating a new system for auditing could be viewed as an opportunity (see Table 6.3), it is simultaneously a threat because the third-party system is institutionalised. Whilst both schemes have similarities, such as the utilisation of GPS technology for auditing and aiming to target sympodial species, currently WBO and INBAR have no intention to cooperate on proposals. As previously discussed, the institutionalisation of certification within Global Production Networks relies on the connectivity of actors and communities of practice. One of the major strengths of both FSC and PEFC is stakeholder support. With two conflicting systems within the marketplace, consumers may become confused about the legitimacy of the mechanisms. This could lead to consumers choosing the scheme they do recognise: FSC.

6.7. Concluding remarks

Corporate Social Responsibility has created the framework for forest certification institutions. Although forest certification as an institution has gained input or procedural legitimacy through a network of actors within Global Production Networks, the output legitimacy of the predominant certification scheme, the Forest Stewardship Council (FSC), has come under increasing scrutiny in terms of its efficacy to achieve sustainable bamboo management. In addition, the current procedural (input) legitimacy afforded to third-party auditing has come under question on account of its suitability for smallholders due to the high financial burden and administrative associated challenges.

The existence of a bamboo certification mechanism under the FSC has prompted three organisations (WBO, INBAR and EcoPlanet Bamboo) and the Chinese government to propose alternative, large-scale certification schemes for bamboo. Stakeholders appear to view certification with scepticism, but understand its pragmatic legitimacy within GPNs and

its inherent need to ascertain sustainable practices. As a result, EcoPlanet Bamboo considered the feasibility of a roundtable, but opted for FSC certification for their bamboo plantations, whilst the Chinese government is creating PEFC standards.

The question of whether to bring bamboo within existing schemes or create a bamboo specific scheme is currently a contested issue with no clear sign of resolution. FSC proponents are firm in the view that FSC is a suitable mechanism for bamboo because very few Principles and Criteria are directly related to silvicultural management. Proponents of a bamboo-specific standard argue that management is a key issue if sustainability is to be achieved, and therefore bamboo specific measures need to be designed. Lessons learned from attempting to establish FSC bamboo certification with smallholders and the challenges within the wider NTFP community have led to the design of certification schemes not based on a third-party model, which has an associated financial and administrative burden.

At present, this lack of agreement amongst bamboo communities of practice could lead to a proliferation of schemes in the market place. In the late 1990s, a plethora of certification schemes arose in response to different actors' visions of sustainable forestry, all which were competing for legitimacy and support (McDermott et al. 2008). This could be detrimental to the cause, thereby causing greater confusion about the legitimacy of schemes. As previously seen with the PEFC umbrella scheme, a fragmented alliance and proliferation of schemes may not prove to offer consumers choice, but lead them to resort to familiarity: in this case most likely the FSC label. Moreover, Bartley and Smith (2010) highlight that the forestry communities of practice related to FSC were rooted in the collective convictions and knowledge base of participants. They highlighted that historically situated communities of practice have been responsible for the development of new forms of governance, not isolated

calculating actors. This indicates that the coherence and alliance of communities of practice is essential in order to instigate change.

This study found that within bamboo nations there is a credible drive to move towards long-term, sustainable solutions to commercial bamboo plantation management. However, many countries feel that China cannot act as a model because of the unique nature of its predominant monopodial species, Moso, which currently dominates the Chinese and global market. In emerging tropical and sub-tropical bamboo nations, solutions towards finding sympodial bamboo management techniques are needed; however, within this market China still has the potential to play a key role. With pulp and paper making species in southwest China requiring international standardisation, it is important to assess in what ways the Chinese government can facilitate the move to a more conducive mechanism at home and abroad. This may occur within the PEFC scheme or other arising alternatives.

This contribution has highlighted the power of the institution of forest certification, which is based on a powerful network of actors and institutionalised practices of resource governance. Within the paradigm of sustainable forest management, bamboo has not asserted a strong position because it is considered an ‘alternative’ crop to timber. Moreover, the classic vision of a monopodial bamboo forest has led to the marginalisation of sympodial species; such species have received inadequate attention regarding how to move forward to achieve indicators for commercial management. Because bamboos represent 1,200 species, the challenges for creating one scheme are vast. With so many competing visions of sustainability and an industry desperate to compete with China, it is important to ascertain in which ways the global market can move forward. The classic vision of a treelike bamboo forest in China may be problematic regarding its perceived alliance with forestry mechanisms designed for timber, but plans to exclude China from mechanisms, when certain areas are

developing symodial resources, appears counterproductive. If bamboo organisations and experts cannot agree on a framework for certification, a global umbrella scheme similar to the PEFC may be one solution. When creating new schemes it is important to note that consumers pay little attention to the different species, origin, and rooting structures of bamboo or relative scale and capacity of operations. As Klooster (2010) notes, a successful certification system must be: a) rigorous; the standards for certified products must be substantially higher than those for non-certified ones, but b) not too rigorous so that there is acceptability amongst forest managers. Moreover the certification system must be c) perceived as legitimate.

Despite its various weaknesses regarding finance and small holders, the FSC is perceived as a success on the whole; the multi-stakeholder process is credited with having positive policy outcomes in countries with otherwise weak forestry governance. However, the legitimacy of certification is locked up in a much larger debate regarding the responsibility and accountability of business actors in world politics (Pattberg 2005). Forest certification is seen as embedded within the global political economy (Bieri and Nygren 2010; Bloomfield 2012) and certification as a technique of neoliberal governance (Guthman 2008; Klooster 2010). In short, the creation of alternative schemes not based on the ISO standard, third-party, NGO backed blueprint could be problematic.

Input and output legitimacy attempt to distinguish between legitimacy associated with procedure and effectiveness. Whilst output legitimacy is essential for COPs and prominent stakeholders in any bamboo related scheme, it is essential to consider how previous schemes have become institutionalised within the marketplace. Education forms one part of advocacy for a new scheme; however, if diversifying from the current isomorphic blueprint, considering ways in which to guarantee the accountability, transparency, and legitimacy

required to satisfy major stakeholders is a significant challenge to overcome. As the introduction highlighted, institutional change is brought about through providing an alternative model, delegitimising an existing archetype, and legitimising a new one (Hinings et al. 2009), if these elements are not taken into account in a unified manner, a more development focused model may fail to gain legitimacy and be unable to resolve the challenges it set out to address.

At a micro level, this article has highlighted the contested space of forest governance, particularly as the ‘technological zones’ of forestry expand to encompass bamboo within its governance structures. At a macro level, it highlights current challenges regarding the need to facilitate new resources into already existing institutions, due to challenges regarding growing pressure on resources. It aims to highlight the need to question the foundations of ‘legitimate’ institutions of natural resource management and the importance of unity amongst communities of practice in order to develop feasible alternatives.

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CHAPTER 7: CONCLUSION: FINDING A NEW FRAME FOR SUSTAINABLE BAMBOO MANAGEMENT

7.1. Introduction

The thesis presented an analysis of the interplay of forestry resource governance institutions with bamboo, an increasingly important plant within the context of natural resource governance. Since the onset of the project in 2008, bamboo has gained increasing utility as a substitute resource. This is demonstrated through the discussions within the chapters, but also through recent developments within the bamboo industry. Some significant developments include: a) the redevelopment of FSC bamboo in Colombia at the end of 2011; b) the certification of the first FSC sympodial bamboo within China in late 2011; c) the launch of bamboo toilet paper by a major brand (Andrex) in June 2012; d) the certification of FSC bamboo plantations and carbon verification by EcoPlanet Bamboo in Nicaragua in November 2012, and, e) the development of the Centre for African Agriculture and Forestry Research (CAFOR) by the International Network for Bamboo and Rattan (INBAR) and Zhejiang Agriculture and Forestry University (China), with the aim to develop bamboo resources across Kenya, Ethiopia, and Ghana starting in December 2012.

These developments act to support the timeliness of the thesis, but also highlight the need for further research and development regarding bamboo resource management and institutions. All these developments will have impacts on bamboo governance and institutionalisation. For instance, the launch in June 2012 by Andrex, a major toilet tissue brand with a line in bamboo toilet paper, could have wide ranging impacts on the perception of bamboo as a pulp

and paper resource. Andrex is preparing a £4m marketing campaign to support the launch of its 'Eco brand', made from 100% FSC certified bamboo (and recycled paper) sourced from plantations in China (Baker 2012). The market for pulp and paper has mainstreamed FSC; it is now commonplace for toilet paper to come from sustainable sources which require labelling and certification. The decision by a major brand to use FSC certified bamboo fibre and market it as an eco-brand is significant because, as a market leader, it will reinforce associations, such as eco (green) products, FSC, and bamboo in the market. This is expected to strengthen the case for bamboo being treated as a 'tree' under the FSC criteria. However, it will also provide a catalyst for bamboo communities of practice to further question the efficacy of the framework of certification for bamboo.

Incidentally, I believe the FSC bamboo pulp and paper for Andrex originates from the site in Guizhou, China, where I shadowed an FSC audit during my fieldwork. Guizhou has the most advanced and large-scale bamboo pulp and paper factories within the country and was in advanced stages of adherence to FSC requirements during my fieldwork. This has a number of implications. It would signify not only the first FSC bamboo outside of the major bamboo 'timber' production area (Anji, Zhejiang, China), but also represent the first sympodial bamboo species to be successfully certified (outside of the failed project in Latin America). This example dispels the belief by bamboo communities of practice that China has nothing to contribute to the ongoing discussions regarding shaping new schemes for sympodial bamboo.

As I complete my thesis, a range of new questions have emerged regarding new challenges within the bamboo industry. These will be explored in the final section, regarding directions for future research. Preceding this, the thesis questions will be revisited and overall conclusions discussed.

7.2. Thesis Questions

- 1) How does bamboo fit within international institutions of forest governance and what are the implications for its management and development?

Considering the evolution of the technological zones of forestry, this thesis has explored bamboo's fit within forest governance mechanisms. Chapter 3 identified that although it is often considered a Non Timber Forest Product (NTFP), bamboo is unique as it 'becomes timber' within the global political economy through having to adhere to timber regulations and norms. In short, conceptualisation of forestry as treed lands, or bamboo being perceived as 'treelike', has affected policy choices for bamboo. In sum, the chapters identify that it is not necessarily a case of considering 'bamboo' as a unit per se, but of 'bamboos' and their different intensity and management requirements. The question arises as to whether the diversity of management requirements, rooting structures, and challenges of flowering or invasiveness can be effectively governed under mechanisms designed for trees.

Three international institutions of forest governance for: a) sustainable forestry, b) legality verification, and c) carbon sequestration have been examined, these are: forest certification, timber legality verification, and Reduction in Emissions from Degradation and Deforestation (REDD+). Fundamentally, these instruments have been designed for trees, which have different ecological requirements than bamboos and by actors without a cultural history of that resource. Bamboo's inclusion within the forestry frame has affected the governance of the resource, as it 'becomes timber'; however, this identifies the need to consider the fundamental 'fit' of bamboo within the institutional frame. Whilst the research has shown that bamboo *can* fit within mechanisms designed for trees, whether bamboo *can* fit within the arbitrary criteria of 'trees' as defined by the UN or FSC is beside the point. What is important is whether the mechanism enables the plant to be effectively developed and managed as a

natural resource within the context in which it is housed. Bamboo's fit within these mechanisms is subject to controversy. Some believe bamboos can be effectively governed within institutions designed for trees, whereas others believe new institutions should be created to reflect the materiality of the plant as a grass.

Currently, the institution of forest certification interplays with bamboo management in a number of ways. Principally, bamboo is associated with trees and therefore operates in the GPNs of timber and wood fibre. This places expectations on producers to adhere to certification requirements. To focus purely on the large-scale, intensively managed, monopodial 'treelike' stands in China would be to ignore the vast areas of small-scale, sympodial bamboo homesteads with issues regarding flowering and propagation of sterile species. Bamboo plantations in Africa, Latin America and India are being developed which require enabling policy and management mechanisms. Whilst there are arguments that all smallholders face challenges adhering to certification requirements, bamboo differs from other plant species as it 'becomes timber' and is traded directly within timber markets and is subject to the same requirements as timber resources. Since bamboo is developing in timber markets, it is important to develop a unique institutional space for the resource. It is clear that there are similarities and lessons to be learned from tree based forestry. However, there needs to be a fundamental recognition that bamboo is not a tree and that it grows in tropical and subtropical regions, mainly in developing economies. Enabling mechanisms need to be created to consider forests as more than treed landscapes as well as recognise the challenges inherent in developing nations.

2) How is China responding to forest certification (Non State Market Driven NSMD governance) and how is legitimacy being negotiated?

This is an important question because it analyses the interpretation of governance instruments in local settings. In turn, forest governance practices will have implications for the management of bamboo. The research showed that China responds to the inclusion of forest certification within their governance structure by assimilating it within current modes of legitimate governance. Chapter 4 identified that legitimacy for forest certification was required by the Chinese government on three fronts. The government needed to appeal to the differing needs of both international and domestic markets simultaneously, whilst ultimately assuming a legitimate form of (institutionalised) domestic governance which allows the government to maintain their authority over the mechanism and its operations. By adopting ‘strategic balance’ between conforming and differentiation to achieve legitimacy (Deephouse 1999), China can maintain the institutional ‘rules of the game’ (North 1990) both domestically and abroad.

Chapter 4 focused on the principles of NSMD governance through an analysis of the legitimate authority afforded to the state, third-parties, and NGOs within China. Through tracing the creation of a new forest certification scheme, which aims to be adopted under the Programme for Endorsement of Forest Certification Schemes (PEFC), the paper identified how an authoritarian regime, such as China, facilitated a mode of governance that was conducive with its current political order. As Beetham (1991) argues, non-liberal democracies are more concerned than liberal-democracies about the erosion of the societal basic belief system and the threat of being superseded by a further legitimate political order. In such cases, it is particularly necessary for states to maintain and reproduce legitimacy, through the maintenance of rules and the reproduction of beliefs.

Fundamental to the legitimacy of power is the need for an authoritative source of rules (Beetham 1991). In the case of forest certification, although the certification ‘threat’ has been perceived as a challenge to many countries sovereignty (Cashore et al. 2006), in China a ‘Non-State Market Driven’ governance instrument could conflict with ideas of an ‘authoritative source of rules’. Therefore, the system needs to be adapted to fit within the legitimate political order.

Recently, forest governance literature has drawn attention to the fact that forest certification systems are more intertwined with states than previously recognised (Bernstein 2001; Bartley 2007; Gale and Haward 2009; Cadman 2011). Whilst recent scholarship has considered the ‘cross fertilisation’ (McDermott et al. 2008) and hybrid nature of the state and non-state in creating sustainable forest governance, in practice the state establishes the institutional infrastructure that underpins markets and remains the preeminent legitimiser, public monitor, and buyer of timber products (Overdevest 2010). Forestry governance is therefore witnessing a new mode of collective responsibility beyond the public/private dichotomy (Gale and Haward 2009; Cadman 2011), whereby globalisation is providing the context for global arenas and global processes to be ‘constructed from below’ within local contexts (Fourcade and Savelsberg 2006). In recognition of this, Cadman (2011) suggests that governance is moving to new hybrid forms of state/market/civil society governance, which are better adapted to the complex reality of the twenty-first century.

By adopting ‘strategic balance’ between conforming and differentiation to achieve legitimacy (Deephouse 1999), China can maintain the institutional ‘rules of the game’ (North 1990) both domestically and abroad. This could lead to more ‘hybrid’ types of governance, whereby the drivers for certification cease to be primarily market based, but are a combination of market forces and domestic governance, integrating a growing need to deal with procurement

policies and timber legality verification. This move would reassert sovereignty (Cashore et al. 2006; Vandergeest and Unno 2012) and represent a space for heterogeneity in global governance whilst being aligned with domestic governance practices.

3) What is the performative role of forest certification for sustainable bamboo management?

Forest certification played a performative role in articulating a vision of sustainable bamboo management. Through a focus on one site of consumption and production, Chapter 5 explored two linked issues: the global ‘branding’ of sustainable cities and sustainable product certification. Whilst both the city and certification reproduced neoliberal spaces of governance, a performativity lens highlighted the political outcomes of envisioning different ‘realities’. In order to ascertain ‘world-class’ status, the city requires globally recognised standards. Because bamboo competes with timber in the forestry assemblage, the economic actors responded to bamboo’s inclusion within forestry by adhering to demands from the sustainable products market, in this case Forest Stewardship Council (FSC) certification. This seemingly easy model of bamboo certification, assisted in identifying underlying existing local tensions regarding land tenure, indigenous people’s rights, potential landslide areas, and inequitable pay for women.

Focusing on the performative role of forest certification highlighted the ‘agency’ the governance instrument has to create realities or support existing conflicts. Whilst Bloomfield (2012) asserts that market approaches have a limited capacity to challenge the core assumptions of the hegemonic neoliberal model, he argues that FSC has shown counter hegemonic qualities by challenging the rule-making authority of neoliberal state agencies and promoting the reregulation of the industry. Although Neil and Pritchard’s (2009) research

regarding the coffee industry largely supports the idea of certification being a neo-colonial mechanism, they also highlight that contemporary global market processes are site specific, with specific actors and networks within social structures. In this sense, an alternative model could assist in creating different ‘realities’, therefore emphasising different priorities and requirements. In the case of bamboo, there is a need for an inclusive institution of stand level bamboo management, within the broader issue of sustainability (rights and tenure). This research highlights the need for practitioners to be mindful of the performative role governance instruments play in constructing or maintaining realities. By considering the socio-historical values on which governance instruments are constructed allows for more appropriate and legitimate modes of governance to operate within local contexts.

- 4) How are bamboo ‘communities of practice’ responding to the inclusion of bamboo within the ‘technological zones’ of forestry and what are the implications for the legitimacy of forest governance mechanisms?

As the thesis has shown, bamboo is emerging as an important substitute for wood and fibre, but major purchasers of these products increasingly require some form of forest certification. Although bamboo can be assimilated within existing forest certification mechanisms, there has been conflicting responses regarding the inclusion of bamboo within the technological zones of forestry. This has meant that there is growing controversy amongst experts regarding the applicability and efficacy of adopting such instruments.

Chapter 6 examined the controversy surrounding the bamboo communities of practice through the lens of legitimacy. It analysed stakeholders’ views of the input legitimacy (processes) and output legitimacy (effectiveness) of FSC bamboo certification. On the one

hand, it highlighted the dissatisfaction with the third-party model for smallholders as well as the lack of ecological management gains within the FSC system. On the other hand, advocates highlight that many of the P&C refer to generic forestry resources such as laws, tenure, and indigenous peoples and workers' rights (as highlighted in Chapter 5). Such failure to recognise FSC's function as primarily a social standard leads FSC advocates to consider opponents as being ignorant of the applicability of FSC to bamboo.

Currently the bamboo communities of practice are divided about ways to proceed with different organisations creating alternative approaches to FSC. However, a SWOT analysis identified that the input legitimacy of the FSC is a powerful and institutionalised instrument throughout GPNs. Forest certification is based on a powerful network of actors and institutionalised practices of resource governance. Moreover, forest certification is seen as embedded within the global political economy (Bieri and Nygren 2010; Bloomfield 2012) and certification as a technique of neoliberal governance (Guthman 2008; Klooster 2010). In short, the creation of alternative schemes not based on the ISO standard, third-party, NGO backed blueprint could be problematic.

The existence of FSC bamboo certification has had a performative effect on the bamboo community and communities of practice, in terms of their response to bamboo's fit within international forestry policy. As Bartley (2007) has identified, markets are institution building projects that have arisen out of conflict. The creation of institutional frames makes exchange more stable and predictable, but also creates power struggles and therefore becomes the subject of conflict (King and Pearce 2010). Institutions and organisations are representative of temporal and spatial conditions (Orr 2004), which give rules communicable meaning that can be diffused across generations, enforced through repetition, persistence and predictability rather than political change, flexibility and agency (March and Olsen 1996:253).

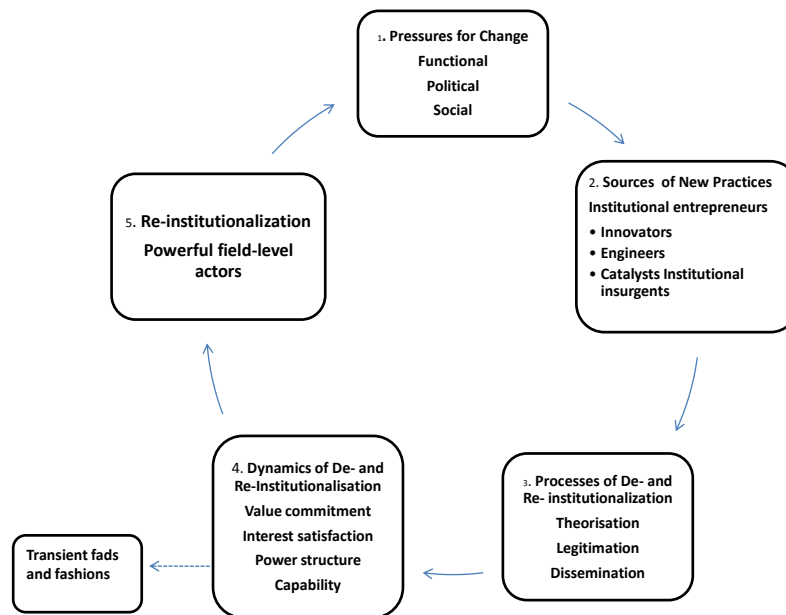
However, constructing a new institutional space will be challenging. Bamboos are becoming embedded within place-bound GPNs, in terms of territorial arrangements, networks and societal structures. As Neilson and Pritchard (2009) noted in their analysis of tea and coffee value chains, there are a series of struggles which emerge as institutions negotiate the ability of governance structures to determine social, economic, and environmental outcomes. That these governance structures produce ‘geographies of access and denial (2009:235)’ is pertinent. Although much forestry and NTFP literature has focused on the industrial vs. small-holder dichotomy, this thesis aims to go further by looking at the complexity of a plant which represents over 1,200 species, was historically absent for conceptualisations of Western forestry, and has only recently begun to be utilised; the unique history and qualities of bamboo lead to questions about the legitimacy of the institutions that govern the plant. Without the existence of a framework for the standardisation of sustainable forest management entering the market, it is unlikely that there would be a drive to create bamboo specific or sympodial/monopodial specific certification. This performativity of certification has led to communities of practice to question the organisational field (certification) in which bamboo operates, within the broader field of the technological zones (forest management). However, without unity amongst the COP it is unlikely that the current institutional model (FSC) will be overturned.

This research has shown that by analysing input and output legitimacy of governance, it allows practitioners to pinpoint the opportunities and challenges of adopting governance instruments. It also highlighted the importance of examining the strength of institutionalised processes of governance when considering creating new mechanisms based on different approaches.

7.3. Overall Conclusions: The path of institutional change

Institutions provide ‘rationalised building blocks’ (Meyer and Rowan 1977), with institutional elements such as recognised structures, policies and practices (Hoffman and Ventresca 1999). In ‘Clio and the Economics of QWERTY’, David (1985) explained how the peculiar organisation of letters on a typewriter became standardised and have persisted in the face of more efficient alternatives. Such ‘technological anomalies’ are not hard to find. Institutions have provided the basic structure by which human society has created order and attempted to reduce uncertainty in exchange (North 1990).

Environmental history has shown how paradigms often remain robust until crisis motivates countries to seek ways to solve shared problems (Figure 7.1). The increasing amount of FSC bamboo within the market place could provide impetus for ‘pressure for change’, as outlined in Delmas and Young’s (2009) cycle of institutional change. However, this could either lead to the deinstitutionalisation or alternatively the institutionalisation of FSC and bamboo. As discussed in the thesis, institutional change, involves at least three elements: the emergence of an alternative archetype, the delegitimising of the existing archetype, and the legitimising of the new one (Hinings et al. 2009). As Klooster (2010) notes, a successful certification system must be: a) rigorous; the standards for certified products must be substantially higher than those for non-certified ones, but, b) not too rigorous so that there is acceptability amongst forest managers. Moreover, the certification system must be: c) perceived as legitimate. The input legitimacy of a scheme within GPNs, in many respects, can be perceived as more important to consumers than output legitimacy. Whilst output legitimacy is essential for communities of practice and prominent stakeholders in any bamboo related scheme, it is essential to consider how previous schemes have become institutionalised within the marketplace.

Figure 7.1: The cycle of institutional change

Source: Delmas and Young (2009)

This thesis has attempted to address the informal constraints on bamboo by examining bamboo institutions, the legitimacy of governance and the performative role governance instruments hold. As identified in the title, the thesis aimed to answer the question: to what extent is bamboo marginalised within international forestry policy? The answer is relatively simple, to quite a large extent. It has been embraced and framed as a part of forestry, but only in its relationship with ‘trees’ and treed lands. However, the processes of unravelling the institutional norms that have contributed to the marginalisation are far more complex. Previously, bamboo forestry was not a significantly abundant resource and because of its absence from European floras, was not a significant consideration within colonial landscapes. Its substitutability meant it was not a useful resource in its own right. However, contemporary visions of sustainable development are changing the importance of substitutability as a utility value. Sustainable development presents three simultaneous challenges: economic and social

development with environmental sustainability. If we are not fundamentally changing our consumption habits, we need to reconsider the natural resources we consume.

Even considering the use of such ‘natural’ resources is a contentious issue, because to refer to them as ‘natural’ obscures the way all resources are ‘cultural appraisals about utility and value’ (Bridge 2011). For example, as much as timber is valued as a ‘natural’ resource today, the utilisation of timber was not fully realised within early forestry practices. Before the development of forestry under Henry the VI, in England a forest was largely considered to be an area or district reserved by the king for hunting; this was because of its value as a habitat for game animals, rather than the value of timber resources. During the demise of forests in medieval times, the idea of growing trees for timber production gradually took root, hastened to a large extent by rapidly expanding naval requirements (James 1990). The timber crisis within 16th and 17th century Europe, when timber was the key energy resource, led to the development of coal as a fuel, which in turn made the technologies of the Industrial Revolution (Nef 1977). It is argued that the Industrial Revolution occurred in the UK 50 to 100 years earlier than any other country because of the innovative response to scarcity of resources (Hobhouse 2003).

That is not to say that bamboo can replace timber. Bamboo, as previously stated, is not a panacea. However, until existing cultural preconceptions about the ‘value’ and ‘usefulness’ of certain plants are explicitly challenged and overcome, social knowledge encompassing plants and their utilisation will remain entrenched within institutional and colonial foundations, thereby limiting opportunities to develop inventive, sustainable plant resources to meet contemporary challenges. As Schema (1995) notes:

“Landscapes are culture before they are nature; constructs of the imagination projected onto wood and water and rock.”

Bamboo is not alone in its marginalisation or cultural constraints on development. For instance, commercial cultivation of hemp in industrialised countries more or less halted in the early 20th century when hemp became intrinsically linked with marijuana, the species' other phenotype, which contains larger quantities of a psychoactive compound. Recently, a renewed interest in hemp for industrial purposes has occurred due to environmental concerns, the over production of food crops, coupled with a need for new sources of fibre (Young 2005). However, political constraints ensue. For example, Halsey (1997) researched the production processes and legislation relating to the clear felling of old-growth forest and harvesting of hemp fibre for paper products. The article raised questions regarding the ecological utility of legislation that permits the destruction of a unique resource but prohibits the harvesting of a sustainable alternative.

We can no longer afford the luxury of abundance. Previously bamboo was not valued as a resource; however, we need to consider potentially less 'desirable'—from a management point of view—resources, their biology and ecology, and to develop frameworks for their effective management in order that their utility is realised. By exploring the historical roots of bamboo's marginalisation, this research hopes to start a dialogue that aims to highlight the importance of this topic and the need to question the use and value of many other inadequately utilised 'natural resources'. With the rise of China, India, and other developing economies, pressure on natural resources will be further exacerbated. The impending natural resource crisis calls for a fundamental reassessment of available resources and their cultural, ideological, and historical embeddedness in order to see past social constructions, to their potential utility value in the modern world.

Interdependence through globalisation created the foundations for governance of natural resources. However, governance has largely been centred on Western priorities, strategies, institutions, and cultural norms. As we move forward to greater interdependencies in the forthcoming century, this is coupled by new economic and cultural powers, namely China and India. This shift in power should enable a broadening of natural resource institutions and the diversity of actors that reinforce or contest the legitimacy of institutions. It is therefore important to consider both the input and output legitimacy of governance systems to make them inclusive. This is particularly the case for bamboo, a plant native to tropical and sub-tropical areas and outside of the scope of European and northern management. Whilst non-state governance was innovative for the late 90s, with increasing technologies, interconnectedness, and social paradigms, resource governance could be set to move towards more hybrid forms utilising different technologies such as GPS instead of third-party auditing. Sustainable development will probably remain a contested issue. Whose sustainability counts will invariably be decided by increasingly powerful networks of actors, which become increasingly complex through GPNs. As Beetham (1991) highlights, power relations are an ongoing process. However, how power relations originate is not as important as how they are maintained and reproduced. As power shifts globally with international development, it will be interesting to examine how legitimacy within institutions also changes.

In a world of globalisation, where political economy turns plants into commodities, we need to consider the socio-historical embeddedness of 'natural' resources and their relationship to practice. Moreover, we need to examine how natural resources and their social construction interacts or conflicts with other constructions in different societies. Since institutions are a construct of society, society is much more engaged in reproducing existing institutions than producing new ones (Vatn 2005); institutions are therefore isomorphic in that they resemble

others (DiMaggio and Powell 1983). However, this isomorphic process can be viewed as ‘ceremoniously’ reflecting the institutional environment with its procedures and practices, whereby it is not necessarily efficient or effective (Meyer and Rowan 1977). In short, plants, which become valued as natural resources, can become institutionalised within isomorphic frames without adequate attention to the efficacy of the framework.

Instigating change within the cognitive field is challenging because the political and cultural nature of cognitive institutional models means the framing and boundaries of the institution are not always perceptible. In order to initiate change, efforts must incorporate strategies that address all aspects of institutions—regulative, normative, and cognitive (Hoffman and Ventresca 1999)—particularly with regard to developing new ‘natural’ resources to substitute existing ones in light of increasing pressures for sustainable development.

With a global industry estimated at US\$10bn, the implications of an inclusive and enabling frame for bamboo management could have wide ranging impacts for both natural resource management and livelihood development. Policy makers should take this opportunity to encourage a policy process that will accord bamboo equal status to silviculture in future international forest regimes. Therefore, the perception and scope of bamboo resources needs to be extended, not just as a forestry crop, but also developed within agriculture or horticulture. Bamboo needs a new institutional space which separates it from trees as the default parameter for forests. For example, if bamboo had been classified as more akin to wheat (a grass), than a tree, different institutions would have governed it. It would have been viewed as a rapidly growing crop housed within agricultural institutions and subject to agricultural commodity governance. However, although a grass, the natural ecosystem of bamboo land would have been seen as more like a treed forest than a field of wheat and housed within forestry institutions. To clarify, bamboos are neither a tree nor wheat, but

could gain from advances within agro-forestry institutions. To enable adequate development of the natural resource institutions, areas of similarity and difference should be identified. A new space needs to be created for bamboo amongst its overlapping current institutional frames in forestry, agriculture, and horticulture. Many lessons can be learned from the timber and agricultural sectors, but difference needs to be recognised in order to provide enabling governance. In short, modern institutions should be created and adapted to facilitate the development of natural resources which reflect the reality and challenges of the 21st century.

7.4. Directions for future research

7.4.1. Theme 1: The establishment of FSC sympodial bamboo plantations

As the thesis is completed in 2012, it is done so at a time of change for bamboo globally, but particularly across South America and Africa. At the end of 2011, China certified the first sympodial bamboo, Colombia managed to reinstate their previously failed attempt at bamboo certification (FSC 2012), and in November 2012, Ecoplanet Bamboo achieved FSC bamboo certification and Verified Carbon Credits in their Nicaraguan plantations (EcoPlanet Bamboo 2012). Since all of these developments involve sympodial, large-scale plantations, it would be interesting to ascertain what costs and benefits have been accrued from FSC certification, what challenges were faced, and what challenges are anticipated in the future. More fundamentally, to return to the thesis question: *How does the management of (sympodial) bamboo fit within forest governance mechanisms?*

7.4.2. Theme 2: The establishment of the Sino-African Centre for Agriculture and Forestry Research

In December 2012, the Centre for African Agriculture and Forestry Research and Development is being established, with the aim of developing a strategy between the International Network for Bamboo and Rattan (INBAR) and Zhejiang Agriculture and Forestry University (China) to promote South-South cooperation between China and Africa through the development of forestry and agriculture technology. The project intends to develop bamboo as a key resource across Kenya, Ethiopia, and Ghana. This would signify the first move to actively define and develop forestry institutions inclusive of bamboo since the early 1800s. Since Africa has not traditionally utilised bamboo it will be interesting to examine: *To what extent are Chinese forestry institutions reconceptualising forestry resources in Africa and what are the broader implications for the 'technological zone' of forestry?*

China's rapid economic growth has created a series of pressures which has forced the country to engage more closely with a number of low and middle income countries (LMICs). China's growth has depleted scarce domestic resources and so part of its 'Going Out Strategy' encourages overseas investment to access natural resources (Mohan & Power 2009). As a controversial topic, it is important to ascertain the power dynamics invested in the relationships. This could draw upon an increasingly important topic within global governance, articulated by Nye (2004) as 'soft power'. The soft power of a country rests heavily on three basic resources: its culture, its political values, and its foreign policies (Nye 2011). In this sense, it would be interesting to examine: *How do Chinese forestry institutions within Africa contribute to Chinese soft power?* Both in terms of the impact it may have on the technological zones of forestry (being more inclusive of bamboo) and regarding the dynamics of the Chinese utilisation of resources and subsequent trade deals.

7.4.3. Theme 3: Chinese certification as a potential replay of Western concerns

Whilst China is presented as a unique case due to its authoritarian regime, it would be interesting to examine whether China shares the same fears in the 2000s as were being voiced in the 1990s, throughout the English speaking world, to uncover the commonalities and differences regarding the initial rejection of non-state market driven governance. By utilising an extensive Chinese forest certification literature review (scarcely utilised in English language academic journals), research could identify whether institutionalisation of the instrument is preceded by initial rejection or whether China has started on a different trajectory to Europe and the USA. It would be interesting to examine: *To what extent is current opposition to forest certification in China a replay of concerns voiced in the initial stages of its development in Europe and the US?*

7.4.4. Theme 4: The practical application of alternative bamboo certification schemes

The final paper of this thesis examined the controversy regarding bamboo communities of practice. As the various proposed mechanisms are developed and established, it would be interesting to examine whether new instruments can become institutionalised, or whether FSC will become a dominant form of governance within bamboo management. Again, it would be interesting to examine: *How does the management of bamboo fit within forest governance mechanisms? Moreover: How do the bamboo communities of practice and actors within the supply chain respond to different governing instruments within the market place?*

7.4.5. Theme 5: The interplay between Timber Legality Verification and forest certification

Chapter 4 identified that the Chinese government views potential synergy between forest certification and Timber Legality Verification. This is supported by Cashore and Stone

(2012) and Carlsen et al. (2012). This will have implications for the potential institutionalisation of certification for bamboo, as well as for certifications role within forestry as a whole. It would be interesting to examine: *How does Timber Legality Verification interplay with the institutionalisation of forest certification?*

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APPENDIX 1: NOTES ON PAPERS AND CONTRIBUTIONS OF COLLABORATING AUTHORS

Introduction

This appendix summarises the contributions of co-authors and provides relevant additional background information to the papers.

Chapter details

Chapter 3: Can't see the bamboo forest for the trees: Bamboo's unrealised potential for sustainable resource solutions; Kathleen Buckingham. Liangru Wu and Yiping Lou;

This paper was based on extended conversations with Wu Liangru and Dr Lou Yiping. As bamboo experts working in the field, both facilitated access to bamboo sites in China, provided vital bamboo specialist knowledge and verified the current situation within the industry, which they could do as professionals within the industry.

An earlier version of the paper was peer reviewed by three anonymous reviewers. This paper also was initially submitted for my Confirmation of Status report therefore an earlier draft received comments from two internal examiners.

Chapter 4: Forest Certification with Chinese Characteristics: State Engagement with Non-State Market Driven Governance; Kathleen Buckingham and Paul Jepson;

Dr Paul Jepson articulated the legitimacy framework to a large extent and provided input on the structure of various drafts.

An earlier version of the paper was peer reviewed by three anonymous reviewers. This paper also was initially submitted for my Confirmation of Status report therefore an earlier draft received comments from two internal examiners.

Chapter 6: The legitimacy of bamboo certification: Unpacking the controversy and the implications for a ‘treelike’ grass; Kathleen Buckingham and Paul Jepson;

Dr Paul Jepson advised me on how to present the data in tabular format and identified a more structured framework for my argument.

Statement from Dr Paul Jepson

I confirm that the above details are correct to the best of my knowledge and that the leading role of Kathleen Buckingham in each of these articles is beyond dispute.

..... 14th June 2012

APPENDIX 2: DETAILS OF PEOPLE INTERVIEWED

Note: For the sake of interviewee anonymity no interviewees have been named.

India

Organisation	Location	Language	Date	Recorded
WWF	New Delhi, India	English	08/02/2009	N
SCS	New Delhi, India	English	08/02/2009	N
New Delhi University	New Delhi, India	English	09/02/2009	N
Organic Certification	New Delhi, India	English	10/02/2009	N
Indian Institute of Forest Management	Phone call (Delhi to Bhopal)	English	11/02/2009	N
Cane and Bamboo Technology Centre (CBTC)	Guhawarti, Assam, India	English	12/02/2009	Y
Cane and Bamboo Technology Centre (CBTC)	Guwaharti, Assam, India	English	12/02/2009	Y
Lavasa Corp.	Lavasa, Maharashtra, India	English	03/03/2010	Y
Lavasa Corp.	Lavasa Maharashtra, India	English	04/03/2010	Y
Lavasa Corp.	Lavasa, Maharashtra, India	English	04/03/2010	Y
Lavasa Corp.	Lavasa, Maharashtra, India	English	04/03/2010	Y
Lavasa Corp.	Lavasa, Maharashtra, India	English	05/03/2010	Y
Lavasa Corp.	Lavasa, Maharashtra, India	English	05/03/2010	Y
Lavasa Corp.	Lavasa, Maharashtra, India	English	05/03/2010	N
Bamboo farmer	Lavasa Maharashtra, India	Marathi	06/03/2010	N
Bamboo farmer	Lavasa Maharashtra, India	Marathi	06/03/2010	N
Bamboo farmer	Lavasa Maharashtra, India	Marathi	06/03/2010	N
KONBAC	Kudal, Maharashtra, India	English	09/03/2010	Y
KONBAC	Kudal, Maharashtra, India	English	09/03/2010	Y
KONBAC	Kudal, Maharashtra, India	English	09/03/2010	Y
KONBAC	Kudal, Maharashtra, India	English	09/03/2010	Y
Engineer	Kudal, Maharashtra, India	English	10/03/2010	Y
Bamboo farmer	Kudal, Maharashtra, India	Marathi	10/03/2010	N
Bamboo farmer	Kudal, Maharashtra, India	Marathi	11/03/2010	N
KONBAC	Kudal, Maharashtra, India	English	11/03/2010	N
KONBAC	Kudal, Maharashtra, India	English	11/03/2010	N
Legislative Assembly	Savantwadi, Maharashtra, India	Marathi	12/03/2010	N
Legislative Assembly	Savantwadi, Maharashtra, India	Marathi	12/03/2010	N
National Bamboo Mission, Savantwadi	Savantwadi, Maharashtra, India	Marathi	12/03/2010	N
Bamboo farmer	Savantwadi, Maharashtra, India	Marathi	12/03/2010	N

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Organisation	Location	Language	Date	Recorded
Mining Services	Goa, Maharashtra, India	English	15/03/2010	N
National Bamboo Mission	Goa, Maharashtra, India	English	16/03/2010	N
Lemontree Hotel	Goa, Maharashtra, India	English	16/03/2010	N
Lavasa Corp.	Lavasa, Maharashtra, India	English	20/03/2010	N
IMO	Lavasa, Maharashtra, India	English	21/03/2010	Y
Lavasa	Lavasa, Maharashtra, India	English	21/03/2010	Y
Oasis Environmental Foundation	Pune, Maharashtra, India	English	25/03/2010	N
Peoples Alliance	Pune, Maharashtra, India	English	16/10/2010	N
Lavasa	Pune, Maharashtra, India	English	16/10/2010	Y
Oasis Environmental Foundation	Pune, Maharashtra, India	English	16/10/2010	N
Environmental NGO	Pune, Maharashtra, India	English	16/10/2010	N

China

Organisation	Location	Date	Language	Recorded
Rain Forest Alliance	Beijing, China	12/04/2010	English	N
The International Network for Bamboo and Rattan (INBAR)	Beijing, China	20/04/2010	English	N
GFA	Beijing, China	23/04/2010	English	N
Chinese Academy of Forestry (CAF)	Beijing, China	26/04/2010	Chinese	Y
CAF	Beijing, China	26/04/2010	Chinese	Y
CAF	Beijing, China	26/04/2010	Chinese	Y
Forest Stewardship Council (FSC)	Beijing, China	28/04/2010	English	N
INBAR	Beijing, China	06/05/2010	English	Y
SGS	Beijing, China	10/05/2010	English	Y
State Forestry Administration	Beijing, China	11/05/2010	Chinese	Y
Beijing University	Beijing, China	11/05/2010	Chinese	Y
WWF	Beijing, China	12/05/2010	Chinese	Y
CBRC	Hangzhou, Zhejiang, China	17/05/2010	Chinese	Y
CAF	Fuyang, Zhejiang, China	18/05/2010	Chinese	Y
Anji Bamboo Industry Association	Anji, Zhejiang, China	27/05/2010	Chinese	Y
Anji Bamboo Industry Association	Anji, Zhejiang, China	28/05/2010	Chinese	Y
Yongyu Bamboo Factory	Anji, Zhejiang, China	28/05/2010	Chinese	Y
Yunnan Mengxiang Bamboo Industry Co.	Xishuangbanna, Yunnan, China	07/06/2010	Chinese	Y
Yunnan Mengxiang Bamboo Industry Co.	Xishuangbanna, Yunnan, China	07/06/2010	Chinese	Y
Yunnan Mengxiang Bamboo Industry Co.	Xishuangbanna, Yunnan, China	07/06/2010	Chinese	Y
SFA	Kuala Lumpur, Malaysia	16/06/2010	Chinese	N

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Organisation	Location	Date	Language	Recorded
Soil Association	Beijing, China	21/06/2010	Chinese	Y
SCS	Beijing, China	21/06/2010	English	Y
SFA	Beijing, China	29/06/2010	Chinese	N
TFT	Beijing, China	02/07/2010	Chinese	Y
International Centre for Bamboo Research (ICBR)	Beijing, China	30/06/2010	Chinese	Y
Rainforest Alliance	Beijing, China	04/07/2010	English	N
Uganda Forestry Department	Beijing, China	05/07/2010	English	N
China Forest Certification Council	Beijing, China	06/07/2010	Chinese	N
PEFC	Beijing, China	08/07/2010	Chinese	Y
INBAR	Beijing, China	09/07/2010	Chinese	Y
Zhejiang Forestry University	Linan, Zhejiang, China	12/07/2010	Chinese	Y
Zhejiang Forestry University	Linan, Zhejiang, China	12/07/2010	Chinese	Y
The Chinese People's Political Consultative Conference	Anji, Zhejiang, China	13/07/2010	Chinese	N
Zhejiang Forestry Academy	Hangzhou, Zhejiang, China	13/07/2010	Chinese	N
Zhejiang Forestry Academy	Hangzhou, Zhejiang, China	13/07/2010	Chinese	Y
Zhejiang Forestry Academy	Hangzhou, Zhejiang, China	13/07/2010	Chinese	Y
Zhejiang Forestry University	Linan, Zhejiang, China	14/07/2010	Chinese	Y
Zhejiang Forestry University	Linan, Zhejiang, China	14/07/2010	Chinese	Y
Chinese Academy of Subtropical Forestry	Fuyang, Zhejiang, China	14/07/2010	Chinese	Y
Chinese Academy of Subtropical Forestry	Fuyang, Zhejiang, China	14/07/2010	Chinese	Y
Ningbo Shilin Arts and Crafts Co. Ltd	Ningbo, China	15/07/2010	Chinese	Y
FSC China	Seoul, South Korea	28/08/2010	English	Y
SFA	Beijing, China	01/09/2010	Chinese	N
CAF	Beijing, China	02/09/2010	English	N
ICRAF	Beijing, China	03/09/2010	Chinese	Y
IKEA	Beijing, China	08/09/2010	Chinese	N
Greenpeace	Beijing, China	10/09/2010	Chinese	Y
Renmin University of China	Beijing, China	10/09/2010	Chinese	N
Renmin University of China	Beijing, China	10/09/2010	Chinese	N
Factory owner	(telephone) Beijing, China	11/09/2010	Chinese	N

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International Discussions

Topic	Venue	Date	Language
FSC bamboo certification	Ecoplanet Bamboo office, Oxford	5/10/2011	English
The creation of a sustainable roundtable for bamboo	Oxford University	11/10/2011	English
Presentation on an alternative certification scheme for bamboo (INBAR)	Oxford University	10/02/2012	English
The World Bamboo Organisation certification scheme	Skype discussion, Online forum	20/10/2012	English

APPENDIX 3: CONFERENCES ATTENDED THAT INFORMED THE RESEARCH

Conference /Workshop	Location	Date	Language	Funding source
The World Bamboo Congress (WBC)	Antwerp, Belgium	10-15/04/2012	English	INBAR
The Association for American Geographers (AAG)	New York, USA	24-28/02/2012	English	ESRC/St Cross College
China Postgraduate Research Conference	Hong Kong	3-8/01/2012	Chinese/English	Hong Kong University
The institute for Australian Geographers (AAG)	Wollongong, Australia	3-6/07/2011	English	Wollongong University
The Association of American Geographers (AAG)	Seattle, USA	12-16/04/2011	English	ESRC/St Cross College/ SoGE
Forests, Markets, Policy & Practice 2010 in China Annual Conference	Beijing, China	7-8/ 10/ 2010	Chinese/English	ESRC
The International Union for Forestry Research Organisations (IUFRO)	Seoul, South Korea	23-28/08/2010	English	ESRC
INBAR African Bamboo Development Workshop	Beijing, China	22-25/06/2010	English	INBAR
PEFC Stakeholders Dialogue	Kuala Lumpur, Malaysia	16-18/06/2010	English	ESRC
INBAR Bamboo World Expo Workshop	Shanghai, China	19-22/05/2010	Chinese/English	INBAR
INBAR Training of Trainers Biodiversity Conservation	Changsha, Henan, China	25/05/2010	Chinese	INBAR
Sustainable Management, Biodiversity and Climate Change Bamboo Forum	Linan, Zhejiang China	25-26/10/2009	Chinese	INBAR
The World Bamboo Congress	Bangkok, Thailand	16-19/10/2009	English	INBAR
The international Association of Agricultural Economists (IAAE)	Beijing, China	16-22/09/2009	English	UCCL
The European Conference on Agriculture and Rural Development in China	Leeds, UK	3-5/04/2009	English	ESRC
Certification for Commodities: Opportunities and Challenges for the Rural Poor; INBAR and Common Fund for Commodities	Beijing, China	02/04/2009	English	INBAR
The International Conservation Agriculture Congress	India	4-7/02/ 2009	English	ESRC

APPENDIX 4: PRO-FORMA FOR KEY-INFORMANT INTERVIEWS

These pro-forma questionnaires show some of the templates for interview questions with different stakeholders. The questions were used as cues and were guides to help identify topic areas of discussion. Because the research was an iterative process, and conducted largely in Chinese, all the English templates and Chinese translations have not been included in the appendix,

Interview with FSC

FSC and China

1. What is your role?
2. What major changes have you seen in FSC since it started in China?
3. What have been the benefits?
4. What have been the major challenges?
5. Working group

Bamboo certification

6. How suitable is FSC as a mechanism for bamboo?
7. Do you think FSC bamboo equates to sustainable bamboo management?
8. In what ways do you think certification needs to change to accommodate bamboo more effectively?

CBs

9. Why do organisations such as RA need to have collaboration with CAF?
10. What other CB partnerships exist?
11. Do you feel the government is supportive of FSC?
12. Does the Chinese government support forest certification in general?

COC issues

13. I understand that there have been problems with COC certificates, how is that manifesting itself?
14. In what ways does the 3rd party system differ from other countries?
15. I have heard that there are some certification bodies that are less attentive than others and this may be a result of the ISO system. What are your thoughts about this?
16. How does FSC intend to resolve this issue?
17. I have heard that there are issues with companies offering bribes, how is this being dealt with?
18. Have you audited in China?
19. What differences have you found with the auditing process?

FSC changes

20. How is FSC as a mechanism changing?
21. Are there any plans for the inclusion of carbon sequestration or REDD?
22. Do you have any opinion about the potential for carbon sequestration in forestry and bamboo?
23. How do you envision FSC developing in China?
24. How do you envision China's own certification developing?

Others

Would like to contact CBs and ISO- do you have any contacts

- FSC rep
- Field sites
- Forestry bureau contacts

Interview with SCS (certification body)

Market trends

1. How long has SCS been operating in China?
2. How have you noticed change in environmental auditing since SCS first entered into China?
3. What are the main certifications that SCS are involved with in China?

CNCA

4. In what ways does CNCA influence the way SCS operates?
5. Do you have a partner in China in order to satisfy CNCA requirements?
6. How has CNCA influenced forest certification?

ISO

7. Do you audit ISO in China?
8. What do you think about ISO?
9. Auditors I have spoken to suggest that due to some unscrupulous certification bodies, people lack trust in ISO certificates from China. What are your thoughts about this?

Forest certification

10. What does SCS have to offer environmental auditing as a generalist, rather than a specialist for example in forest certification?
11. How do you feel about forest certification?
12. Do you have any thoughts regarding the differences between FSC and PEFC?
13. Some stakeholders suggest that forest certification is an expensive mechanism which puts a large burden on smallholders, what are your thoughts about this?

COC

14. Do you audit COC?

APPENDIX 4

15. Recently there have been problems regarding COC FSC certification in China, what are your thoughts about this?
16. Has SCS been asked to stop audits?

Certification Bodies

17. How do SCS reassure clients about their trustworthiness and transparency?
18. How does SCS perceive competition with other certification bodies?
19. What are the greatest challenges for SCS operating in China?
20. Have you been involved with the development of the Zhonglin tianhe cb?

Other

Any other comments?

Interview with auditors after the audit

China and certification

1. Do you believe the Chinese government is supportive of certification?
2. In what ways is the government showing its support?
3. In your opinion what are the specific challenges for forest certification in China?
4. In what ways does the Chinese system facilitate forest certification?

Auditing

5. What was your impression of the way the audit was executed in Chishui, Guizhou?
6. In what ways did the pre-assessment differ from other countries you have witnessed?
7. What do you think of the suitability of third party auditing in China?

APPENDIX 4

8. In what ways does third party auditing differ in China from other countries?
9. I understand that there have been problems with COC certificates, how is that manifesting itself?
10. I have heard that there are some certification bodies that are less attentive than others and this may be a result of the ISO system. What are your thoughts about this?
11. How does FSC intend to resolve this issue?

Bamboo

12. What do you think about the suitability of FSC for bamboo?
13. What specific challenges are faced regarding FSC bamboo?
14. What do you think about the ambiguity in the way a plantation is defined and how this relates to bamboo?

Changing certification

15. What is your opinion about PEFC?
16. How is FSC as a mechanism changing?
17. Are there any plans for the inclusion of carbon sequestration or REDD?
18. Do you have any opinion about the potential for carbon sequestration in forestry and bamboo?
19. How do you envision FSC developing in China?
20. How do you envision China's own certification developing?

Others

21. Do you have any contacts within forestry/certification bodies/certification in China?

Interview with Lavasa

Lavasa

1. What does your role involve?
2. In your opinion what has been the greatest achievement for Lavasa?

Sustainability & bamboo

3. What is sustainability according to Lavasa?
4. How does bamboo fit in?
5. How has bamboo governance changed since Lavasa was created?
6. Do you think bamboo is sustainably managed in Lavasa? Y/N
7. In your opinion, what is sustainable bamboo management?
8. What are the major opportunities for bamboo management?
9. What are the challenges facing bamboo management?
10. How do you feel about climate change?
11. What is conservation?

Certification & Sustainability

12. What certifications does bamboo currently have at Lavasa?
13. What process did this involve?
14. Why is Lavasa thinking about bamboo certification?
15. What are your thoughts about bamboo certification?
16. Do you think your idea of 'sustainability' is reflected in any certification schemes?
17. What do you think about the potential for bamboo to contribute to carbon markets and REDD/REDD+?
18. What do you think about the potential of using GIS systems and handheld computers for bamboo management?

Historical, political and cultural context

19. How do cultural beliefs influence bamboo management?
20. How does caste influence bamboo management?
21. How have attitudes in India changed towards the importance of bamboo as a natural resource?

APPENDIX 4

22. How do you see the bamboo industry in 10 years time?

Lavasa in the future

- 23. What environmental standards does Lavasa adhere to?
- 24. Are there any standards that Lavasa will seek in the future?
- 25. What benefits have been acquired by the local people since the creation of the project?
- 26. How have local conflicts been resolved?
- 27. How have land rights been acquired?
- 28. How does Lavasa limit water consumption?

Governance

- 29. What local laws must the bamboo farmers adhere to?
- 30. Are there annual allowable cuts?
- 31. What support with trade and development has been provided?
- 32. How is the National Bamboo Mission involved in the local governance?

China

- 33. How do you feel about the competition between bamboo nations?
- 34. China currently has 3 FSC certified bamboo forests and 15 COC, do you have any feelings about this?
- 35. How do you feel about monopodial Chinese bamboo and Indian sympodial bamboo being certified as 'FSC bamboo'?

Categorization

- 36. How do you define bamboo?
 - a) Horticulture
 - b) Forestry
 - c) Non-timber Forest Product
 - d) Other
- 37. Do you think this category affects the way bamboo is managed?
- 38. Do you think this category affects certification?

Closing

39. Are there any other issues that you would like to cover?

Interview with the Land revenue/Forestry department

Background and regulations

1. What does your role involve?
2. How does your role involve bamboo?
3. How do you monitor and regulate bamboo?
4. How efficient is the land revenue/transport permit at regulating bamboo?
5. How many bamboo farmers are there in the area?
6. How much bamboo is harvested annually?

Historical, political and cultural context

7. How have attitudes in India changed towards the importance of bamboo as a natural resource?
8. What are the major opportunities for bamboo management?
9. What are the challenges facing bamboo management?
10. How do cultural beliefs influence bamboo management?
11. How does caste influence bamboo management?
12. How do you define bamboo?
 - e) Horticulture
 - f) Forestry
 - g) Non-timber Forest Product
 - h) Other

13. Do you think this category affects the way bamboo is managed?

Climate change

14. Have you noticed any climate change since being in your role?

APPENDIX 4

15. How has this affected forestry/agriculture?
16. Has this affected bamboo?
17. Are there any strategies or plans to deal with climate change?

Certification & Sustainability

18. Do you think bamboo is sustainably managed in India? Y/N
19. In your opinion, what is sustainable bamboo management?
20. Are there any certification schemes operating for bamboo?
21. Do you think your idea of 'sustainability' is reflected in any certification schemes?
22. How do you feel about the FSC certification scheme?
23. Does the NBM have any methods of accrediting sustainable management? Y/N
24. What do you think about the potential for bamboo to contribute to carbon markets and REDD/REDD+?
25. What do you feel about the potential of using GIS systems and handheld computers for forestry management?

China

26. How do you feel about the competition between bamboo nations?
27. China currently has 3 FSC certified bamboo forests and 15 COC, do you have any feelings about this?
28. How do you feel about monopodial Chinese bamboo and Indian sympodial bamboo being certified as 'FSC bamboo'?

Closing

29. Are there any questions you would like to ask me?

APPENDIX 5: FOREST STEWARDSHIP COUNCIL (FSC) PRINCIPLES AND CRITERIA

The FSC Principles and Criteria were first published in 1994. They were amended in 1996, 1999 and 2001. A comprehensive review commenced in 2009, which resulted in major revisions to the wording – although not the substance – of the Principles and Criteria being proposed in 2011. Voting on the new version closed in January 2012, with the new version of the FSC Principles and Criteria (FSC-STD-01-001 V5-0 D5-0 EN) being approved by 75% of the membership vote.

The **Revised P&C** (FSC-STD-01-001 V5-0) were approved in February 2012. Nevertheless, they shall not be used for audit until completion of the FSC International Generic Indicators and the transfer process of the National Standards is complete. Meanwhile, the previous version of the P&C (FSC-STD-01-001 V4-0) is to be used (FSC 2012).

<http://www.fsc.org/the-revised-pc.191.htm>

FSC-STD-01-001 (version 4-0) EN

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INTRODUCTION

It is widely accepted that forest resources and associated lands should be managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. Furthermore, growing public awareness of forest destruction and degradation has led consumers to demand that their purchases of wood and other forest products will not contribute to this destruction but rather help to secure forest resources for the future. In response to these demands, certification and self-certification programs of wood products have proliferated in the marketplace.

The Forest Stewardship Council (FSC) is an international body which accredits certification organizations in order to guarantee the authenticity of their claims. In all cases the process of certification will be initiated voluntarily by forest owners and managers who request the services of a certification organization. The goal of FSC is to promote environmentally responsible, socially beneficial and economically viable management of the world's forests, by establishing a worldwide standard of recognized and respected Principles of Forest Stewardship.

The FSC's Principles and Criteria (P&C) apply to all tropical, temperate and boreal forests, as addressed in Principle #9 and the accompanying glossary. Many of these P&C apply also to plantations and partially replanted forests. More detailed standards for these and other vegetation types may be prepared at national and local levels. The P&C are to be incorporated into the evaluation systems and standards of all certification organizations seeking accreditation by FSC. While the P&C are mainly designed for forests managed for the production of wood products, they are also relevant, to varying degrees, to forests managed for non-timber products and other services. The P&C are a complete package to be considered as a whole, and their sequence does not represent an ordering of priority. This document shall be used in conjunction with the FSC's Statutes, Procedures for Accreditation and Guidelines for Certifiers.

FSC and FSC-accredited certification organizations will not insist on perfection in satisfying the P&C. However, major failures in any individual Principles will normally disqualify a candidate from certification, or will lead to decertification. These decisions will be taken by individual certifiers, and guided by the extent to which each Criterion is satisfied, and by the importance and consequences of failures. Some flexibility will be allowed to cope with local circumstances.

The scale and intensity of forest management operations, the uniqueness of the affected resources, and the relative ecological fragility of the forest will be considered in all certification assessments. Differences and difficulties of interpretation of the P&C will be addressed in national and local forest stewardship standards. These standards are to be developed in each country or region involved, and will be evaluated for purposes of certification, by certifiers and other involved and affected parties on a case by case basis. More information and guidance about the certification and accreditation process is included in the FSC Statutes, Accreditation Procedures, and Guidelines for Certifiers.

The FSC P&C should be used in conjunction with national and international laws and regulations. FSC intends to complement, not supplant, other initiatives that support responsible forest management worldwide. The FSC will conduct educational activities to increase public awareness of the importance of the following:

- *improving forest management;
- *incorporating the full costs of management and production into the price of forest products;
- * promoting the highest and best use of forest resources;
- *reducing damage and waste; and
- *avoiding over-consumption and over-harvesting.

FSC will also provide guidance to policy makers on these issues, including improving forest management legislation and policies.

1 Principle #1: Compliance with laws and FSC Principles

Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.

- 1.1 Forest management shall respect all national and local laws and administrative requirements.
- 1.2 All applicable and legally prescribed fees, royalties, taxes and other charges shall be paid.
- 1.3 In signatory countries, the provisions of all binding international agreements such as CITES, ILO Conventions, ITTA, and Convention on Biological Diversity, shall be respected.
- 1.4 Conflicts between laws, regulations and the FSC Principles and Criteria shall be evaluated for the purposes of certification, on a case by case basis, by the certifiers and the involved or affected parties.
- 1.5 Forest management areas should be protected from illegal harvesting, settlement and other unauthorized activities.
- 1.6 Forest managers shall demonstrate a long-term commitment to adhere to the FSC Principles and Criteria.

2 Principle #2: Tenure and use rights and responsibilities

Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.

- 2.1 Clear evidence of long-term forest use rights to the land (e.g. land title, customary rights, or lease agreements) shall be demonstrated.
- 2.2 Local communities with legal or customary tenure or use rights shall maintain control, to the extent necessary to protect their rights or resources, over forest operations unless they delegate control with free and informed consent to other agencies.
- 2.3 Appropriate mechanisms shall be employed to resolve disputes over tenure claims and use rights. The circumstances and status of any outstanding disputes will be explicitly considered in the certification evaluation. Disputes of substantial magnitude involving a significant number of interests will normally disqualify an operation from being certified.

3 Principle #3: Indigenous peoples' rights

The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognized and respected.

- 3.1 Indigenous peoples shall control forest management on their lands and territories unless they delegate control with free and informed consent to other agencies.
- 3.2 Forest management shall not threaten or diminish, either directly or indirectly, the resources or tenure rights of indigenous peoples.
- 3.3 Sites of special cultural, ecological, economic or religious significance to indigenous peoples shall be clearly identified in cooperation with such peoples, and recognized and protected by forest managers.

3.4 Indigenous peoples shall be compensated for the application of their traditional knowledge regarding the use of forest species or management systems in forest operations. This compensation shall be formally agreed upon with their free and informed consent before forest operations commence.

4 Principle #4: Community relations and worker's rights

Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.

4.1 The communities within, or adjacent to, the forest management area should be given opportunities for employment, training, and other services.

4.2 Forest management should meet or exceed all applicable laws and/or regulations covering health and safety of employees and their families.

4.3 The rights of workers to organise and voluntarily negotiate with their employers shall be guaranteed as outlined in Conventions 87 and 98 of the International Labour Organisation (ILO).

4.4 Management planning and operations shall incorporate the results of evaluations of social impact. Consultations shall be maintained with people and groups (both men and women) directly affected by management operations.

4.5 Appropriate mechanisms shall be employed for resolving grievances and for providing fair compensation in the case of loss or damage affecting the legal or customary rights, property, resources, or livelihoods of local peoples. Measures shall be taken to avoid such loss or damage.

5 Principle #5: Benefits from the forest

Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.

5.1 Forest management should strive toward economic viability, while taking into account the full environmental, social, and operational costs of production, and ensuring the investments necessary to maintain the ecological productivity of the forest.

5.2 Forest management and marketing operations should encourage the optimal use and local processing of the forest's diversity of products.

5.3 Forest management should minimize waste associated with harvesting and on-site processing operations and avoid damage to other forest resources.

5.4 Forest management should strive to strengthen and diversify the local economy, avoiding dependence on a single forest product.

5.5 Forest management operations shall recognize, maintain, and, where appropriate, enhance the value of forest services and resources such as watersheds and fisheries.

5.6 The rate of harvest of forest products shall not exceed levels which can be permanently sustained.

6 Principle #6: Environmental impact

Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.

6.1 Assessment of environmental impacts shall be completed -- appropriate to the scale, intensity of forest management and the uniqueness of the affected resources -- and adequately integrated into management systems. Assessments shall include landscape level considerations as well as the impacts of on-site processing facilities. Environmental impacts shall be assessed prior to commencement of site-disturbing operations.

6.2 Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g., nesting and feeding areas). Conservation zones and protection areas shall be established, appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Inappropriate hunting, fishing, trapping and collecting shall be controlled.

6.3 Ecological functions and values shall be maintained intact, enhanced, or restored, including:

- a) Forest regeneration and succession.
- b) Genetic, species, and ecosystem diversity.
- c) Natural cycles that affect the productivity of the forest ecosystem.

6.4 Representative samples of existing ecosystems within the landscape shall be protected in their natural state and recorded on maps, appropriate to the scale and intensity of operations and the uniqueness of the affected resources.

6.5 Written guidelines shall be prepared and implemented to: control erosion; minimize forest damage during harvesting, road construction, and all other mechanical disturbances; and protect water resources.

6.6 Management systems shall promote the development and adoption of environmentally friendly non-chemical methods of pest management and strive to avoid the use of chemical pesticides. World Health Organization Type 1A and 1B and chlorinated hydrocarbon pesticides; pesticides that are persistent, toxic or whose derivatives remain biologically active and accumulate in the food chain beyond their intended use; as well as any pesticides banned by international agreement, shall be prohibited. If chemicals are used, proper equipment and training shall be provided to minimize health and environmental risks.

6.7 Chemicals, containers, liquid and solid non-organic wastes including fuel and oil shall be disposed of in an environmentally appropriate manner at off-site locations.

6.8 Use of biological control agents shall be documented, minimized, monitored and strictly controlled in accordance with national laws and internationally accepted scientific protocols. Use of genetically modified organisms shall be prohibited.

6.9 The use of exotic species shall be carefully controlled and actively monitored to avoid adverse ecological impacts.

6.10 Forest conversion to plantations or non-forest land uses shall not occur, except in circumstances where conversion:

- a) entails a very limited portion of the forest management unit; and
- b) does not occur on high conservation value forest areas; and
- c) will enable clear, substantial, additional, secure, long term conservation benefits across the forest management unit.

7 Principle #7: Management plan

A management plan -- appropriate to the scale and intensity of the operations -- shall be written, implemented, and kept up to date. The long term objectives of management, and the means of achieving them, shall be clearly stated.

7.1 The management plan and supporting documents shall provide:

- a) Management objectives.
- b) Description of the forest resources to be managed, environmental limitations, land use and ownership status, socio-economic conditions, and a profile of adjacent lands.
- c) Description of silvicultural and/or other management system, based on the ecology of the forest in question and information gathered through resource inventories.
- d) Rationale for rate of annual harvest and species selection.
- e) Provisions for monitoring of forest growth and dynamics.
- f) Environmental safeguards based on environmental assessments.
- g) Plans for the identification and protection of rare, threatened and endangered species.
- h) Maps describing the forest resource base including protected areas, planned management activities and land ownership.
- i) Description and justification of harvesting techniques and equipment to be used.

7.2 The management plan shall be periodically revised to incorporate the results of monitoring or new scientific and technical information, as well as to respond to changing environmental, social and economic circumstances.

7.3 Forest workers shall receive adequate training and supervision to ensure proper implementation of the management plan.

7.4 While respecting the confidentiality of information, forest managers shall make publicly available a summary of the primary elements of the management plan, including those listed in Criterion 7.1.

8 Principle #8: Monitoring and assessment

Monitoring shall be conducted -- appropriate to the scale and intensity of forest management -- to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.

8.1 The frequency and intensity of monitoring should be determined by the scale and intensity of forest management operations as well as the relative complexity and fragility of the affected environment. Monitoring procedures should be consistent and replicable over time to allow comparison of results and assessment of change.

8.2 Forest management should include the research and data collection needed to monitor, at a minimum, the following indicators:

- a) Yield of all forest products harvested.
- b) Growth rates, regeneration and condition of the forest.
- c) Composition and observed changes in the flora and fauna.
- d) Environmental and social impacts of harvesting and other operations.
- e) Costs, productivity, and efficiency of forest management.

8.3 Documentation shall be provided by the forest manager to enable monitoring and certifying organizations to trace each forest product from its origin, a process known as the "chain of custody."

8.4 The results of monitoring shall be incorporated into the implementation and revision of the management plan.

8.5 While respecting the confidentiality of information, forest managers shall make publicly available a summary of the results of monitoring indicators, including those listed in Criterion 8.2.

9 Principle #9: Maintenance of high conservation value forests

Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.

9.1 Assessment to determine the presence of the attributes consistent with High Conservation Value Forests will be completed, appropriate to scale and intensity of forest management.

9.2 The consultative portion of the certification process must place emphasis on the identified conservation attributes, and options for the maintenance thereof.

9.3 The management plan shall include and implement specific measures that ensure the maintenance and/or enhancement of the applicable conservation attributes consistent with the precautionary approach. These measures shall be specifically included in the publicly available management plan summary.

9.4 Annual monitoring shall be conducted to assess the effectiveness of the measures employed to maintain or enhance the applicable conservation attributes.

10 Principle #10: Plantations

Plantations shall be planned and managed in accordance with Principles and Criteria 1 - 9, and Principle 10 and its Criteria. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

10.1 The management objectives of the plantation, including natural forest conservation and restoration objectives, shall be explicitly stated in the management plan, and clearly demonstrated in the implementation of the plan.

10.2 The design and layout of plantations should promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests. Wildlife corridors, streamside zones and a mosaic of stands of different ages and rotation periods, shall be used in the layout of the plantation, consistent with the scale of the operation. The scale and layout of plantation blocks shall be consistent with the patterns of forest stands found within the natural landscape.

10.3 Diversity in the composition of plantations is preferred, so as to enhance economic, ecological and social stability. Such diversity may include the size and spatial distribution of management units within the landscape, number and genetic composition of species, age classes and structures.

10.4 The selection of species for planting shall be based on their overall suitability for the site and their appropriateness to the management objectives. In order to enhance the conservation of biological diversity, native species are preferred over exotic species in the establishment of plantations and the restoration of degraded ecosystems. Exotic species, which shall be used only when their performance is greater than that of native species, shall be carefully monitored to detect unusual mortality, disease, or insect outbreaks and adverse ecological impacts.

10.5 A proportion of the overall forest management area, appropriate to the scale of the plantation and to be determined in regional standards, shall be managed so as to restore the site to a natural forest cover.

10.6 Measures shall be taken to maintain or improve soil structure, fertility, and biological activity. The techniques and rate of harvesting, road and trail construction and maintenance, and the choice of species shall not result in long term soil degradation or adverse impacts on water quality, quantity or substantial deviation from stream course drainage patterns.

10.7 Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and invasive plant introductions. Integrated pest management shall form an essential part of the management plan, with primary reliance on prevention and biological control methods rather than chemical pesticides and fertilizers. Plantation management should make every effort to move away from chemical pesticides and fertilizers, including their use in nurseries. The use of chemicals is also covered in Criteria 6.6 and 6.7.

10.8 Appropriate to the scale and diversity of the operation, monitoring of plantations shall include regular assessment of potential on-site and off-site ecological and social impacts, (e.g. natural regeneration, effects on water resources and soil fertility, and impacts on local welfare and social well-being), in addition to those elements addressed in principles 8, 6 and 4. No species should be planted on a large scale until local trials and/or experience have shown that they are ecologically well-adapted to the site, are not invasive, and do not have significant negative ecological impacts on other ecosystems. Special attention will be paid to social issues of land acquisition for plantations, especially the protection of local rights of ownership, use or access.

10.9 Plantations established in areas converted from natural forests after November 1994 normally shall not qualify for certification. Certification may be allowed in circumstances where sufficient evidence is submitted to the certification body that the manager/owner is not responsible directly or indirectly of such conversion.

GLOSSARY

Words in this document are used as defined in most standard English language dictionaries. The precise meaning and local interpretation of certain phrases (such as local communities) should be decided in the local context by forest managers and certifiers. In this document, the words below are understood as follows:

Biological diversity: The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems. (see Convention on Biological Diversity, 1992)

Biological diversity values: The intrinsic, ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components. (see Convention on Biological Diversity, 1992)

Biological control agents: Living organisms used to eliminate or regulate the population of other living organisms.

Chain of custody: The channel through which products are distributed from their origin in the forest to their end-use.

Chemicals: The range of fertilizers, insecticides, fungicides, and hormones which are used in forest management.

Criterion (pl. Criteria): A means of judging whether or not a Principle (of forest stewardship) has been fulfilled.

Customary rights: Rights which result from a long series of habitual or customary actions, constantly repeated, which have, by such repetition and by uninterrupted acquiescence, acquired the force of a law within a geographical or sociological unit.

Ecosystem: A community of all plants and animals and their physical environment, functioning together as an interdependent unit.

Endangered species: Any species which is in danger of extinction throughout all or a significant portion of its range.

Exotic species: An introduced species not native or endemic to the area in question.

Forest integrity: The composition, dynamics, functions and structural attributes of a natural forest.

Forest management/manager: The people responsible for the operational management of the forest resource and of the enterprise, as well as the management system and structure, and the planning and field operations.

Genetically modified organisms: Biological organisms which have been induced by various means to consist of genetic structural changes.

Indigenous lands and territories: The total environment of the lands, air, water, sea, seaice, flora and fauna, and other resources which indigenous peoples have traditionally owned or otherwise occupied or used. (Draft Declaration of the Rights of Indigenous Peoples: Part VI)

Indigenous peoples: "The existing descendants of the peoples who inhabited the present territory of a country wholly or partially at the time when persons of a different culture or ethnic origin arrived there from other parts of the world, overcame them and, by conquest, settlement, or other means reduced them to a non-dominant or colonial situation; who today live more in conformity with their particular social, economic and cultural customs and traditions than with the institutions of the country of which they now form a part, under State structure which incorporates mainly the national, social and cultural characteristics of other segments of the population which are predominant." (Working definition adopted by the UN Working Group on Indigenous Peoples).

High Conservation Value Forests: High Conservation Value Forests are those that possess one or more of the following attributes:

- a) forest areas containing globally, regionally or nationally significant : concentrations of biodiversity values (e.g. endemism, endangered species, refugia); and/or large landscape level forests, contained within, or containing the management unit, where distribution and abundance
- b) forest areas that are in or contain rare, threatened or endangered ecosystems
- c) forest areas that provide basic services of nature in critical situations (e.g. watershed protection, erosion control)
- d) forest areas fundamental to meeting basic needs of local communities (e.g. subsistence, health) and/or critical to local communities' traditional cultural identity (areas of cultural, ecological, economic or religious significance identified in cooperation with such local communities).

Landscape: A geographical mosaic composed of interacting ecosystems resulting from the influence of geological, topographical, soil, climatic, biotic and human interactions in a given area.

Local laws: Includes all legal norms given by organisms of government whose jurisdiction is less than the national level, such as departmental, municipal and customary norms.

Long term: The time-scale of the forest owner or manager as manifested by the objectives of the management plan, the rate of harvesting, and the commitment to maintain permanent forest cover. The length of time involved will vary according to the context and ecological

conditions, and will be a function of how long it takes a given ecosystem to recover its natural structure and composition following harvesting or disturbance, or to produce mature or primary conditions.

Native species: A species that occurs naturally in the region; endemic to the area.

Natural cycles: Nutrient and mineral cycling as a result of interactions between soils, water, plants, and animals in forest environments that affect the ecological productivity of a given site.

Natural Forest: Forest areas where many of the principal characteristics and key elements of native ecosystems such as complexity, structure and diversity are present, as defined by FSC approved national and regional standards of forest management.

Non-timber forest products: All forest products except timber, including other materials obtained from trees such as resins and leaves, as well as any other plant and animal products.

Other forest types: Forest areas that do not fit the criteria for plantation or natural forests and which are defined more specifically by FSC-approved national and regional standards of forest stewardship.

Plantation: Forest areas lacking most of the principal characteristics and key elements of native ecosystems as defined by FSC-approved national and regional standards of forest stewardship, which result from the human activities of either planting, sowing or intensive silvicultural treatments.

Precautionary approach: Tool for the implementation of the precautionary principle

Principle: An essential rule or element; in FSC's case, of forest stewardship.

Silviculture: The art of producing and tending a forest by manipulating its establishment, composition and growth to best fulfil the objectives of the owner. This may, or may not, include timber production.

Succession: Progressive changes in species composition and forest community structure caused by natural processes (nonhuman) over time.

Tenure: Socially defined agreements held by individuals or groups, recognized by legal statutes or customary practice, regarding the "bundle of rights and duties" of ownership, holding, access and/or usage of a particular land unit or the associated resources there within (such as individual trees, plant species, water, minerals, etc).

Threatened species: Any species which is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Use rights: Rights for the use of forest resources that can be defined by local custom, mutual agreements, or prescribed by other entities holding access rights. These rights may restrict the use of particular resources to specific levels of consumption or particular harvesting techniques.

APPENDIX 6: FOREST STEWARDSHIP COUNCIL (FSC) GUIDELINES FOR BAMBOO

ADVICE-20-007-06	FSC certification of bamboo
Normative reference	FSC-STD-20-007 V3-0 EN Clause 1.1
Effective date	13 May 2004
Terms & definitions	
Background	Can certification bodies certify/ label bamboo?
Advice	1. Where bamboo occurs within the matrix of an FSC-certified natural forest or plantation it may be certified/ labeled as a Non-Timber Forest Product (NTFP) following FSC's general guidance for NTFPs. 2. If bamboo is itself grown as a plantation crop, or is itself the principal component of a 'natural forest' it may or may not be possible to certify under the FSC system, depending on the specific situation. The key question is whether the area of bamboo is within FSC's definition of a 'natural forest' or 'plantation', and then whether the management of the area meets the requirements of the FSC Principles and Criteria for Forest Stewardship. Potential applicants for certification are advised to request a 'scoping visit' from an FSC accredited certification body to seek advice on this before proceeding to a full evaluation. 3. Within the FSC system a forest or a tree plantation may be considered for certification if it meets either the definition of 'natural forest' or a 'plantation' (see glossary to FSC-STD-01-001 FSC Principles and Criteria for Forest Stewardship). If an area of bamboo can be considered natural forest or part thereof, or a plantation, can be managed in compliance with the FSC P&C, and maintain the ecological functions and values required by the FSC P&C, then it may be evaluated and certified within the FSC system. Satisfaction of these requirements depends on the particular production system in question rather than on the product type, or the tree/bamboo species as such. 4. There are many species of bamboo, the larger of which may be considered treelike. Larger areas of such bamboo are often referred to as 'bamboo forests'. Such areas may be considered as 'natural forests' within FSC's definition, and may be evaluated for certification based on the FSC Principles and Criteria for Forest Stewardship. 5. Bamboo of any size may also occur naturally as patches within a natural forest or plantation matrix. In this case the bamboo may be considered as a non-timber forest product, and be certified as such within the FSC system. 6. In the case of plantation grown bamboo a decision would need to be made by the certification body as to whether it comes within the FSC definition of 'plantation', and whether the management system can meet the FSC Principles and Criteria. This decision may be based on such factors as the size of the bamboo stems, the length of the rotation, the

APPENDIX 7: FOREST STEWARDSHIP COUNCIL (FSC) MOTION FOR BAMBOO AND RATTAN

Margret Stern, Environmental Chamber, South

FSC General Assembly, Manaus, Brazil- Dec 2005

Motion 31 Policy

Motion on the certification of bamboo and rattan forest

Motion to urge the FSC to improve and expand its guidelines on bamboo and rattan forest certification, building on recent efforts made by the Colombian National Initiative and the FSC Secretariat with respect to the management and certification of bamboo.

JUSTIFICATION

Bamboo has a broad geographic distribution and people from many developing countries around the world could benefit from certification of these forest resources.

This motion, therefore, is a call to pick up the momentum regarding the certification of bamboo forests.

Two steps have been made to date:

1. As a response to certifiers' requests, in 2004 the FSC produced an advice note on bamboo certification where bamboo forests may be certified if and when the area of bamboo is within the definition of a natural forest or plantation, and then, whether the management of the area meets the requirements of the P&Cs.
 2. Recently, the Colombian National Initiative developed national forest management standards for bamboo forests, but these have yet to be accredited by FSC. Once they are, then the certifying bodies are required to use these standards in Colombia and they may be used as well as a template for bamboo certification in other countries. It is hoped that this motion will speed up this process to formally recognise the Colombian national standards.
- This motion will help unite the South-South coalition within the FSC and build bridges between countries with important bamboo resources and where new regional offices of FSC and certifiers are in the process of being established.
 - It is precisely the production and sale of products made from natural materials such as bamboo and rattan, which allow forest dwelling communities and small producers' greater opportunity to generate income and compete successfully with larger commercial enterprises.
 - High-end bamboo products- such as flooring- have become extremely popular in the United States and Europe, creating a market for certified products. This is an opportunity to expose FSC certification label on the shelves of a popular product. Certification of bamboo and rattan would emphasise forest management and increase market recognition and value for bamboo products.

- With reference to the potential certification of bamboo, confusion reigns regarding whether large woody bamboos- that are clearly grasses and not trees- should be considered as timber species due to their substantial biomass, their frequent dominance in the forest, the use of raw bamboo material for construction, and its products as wood alternatives; or if products derived from the timber bamboos should be considered as non-timber forest products.

Relevant FSC documents:

1. FSC-ADV-30-026 (previously FSC-ADV-30-502) Certification of bamboo, May 2004
2. FSC-DSC-01-001 The scope of application of the FSC Principles and Criteria for Forest Stewardship, May 2005
3. FSC-POL-10-004 The scope of the FSC Principles and Criteria

APPENDIX 8: GOVERNMENT OF INDIA MINISTRY OF ENVIRONMENT AND FORESTS CLEARANCE FOR LAVASA

**F.No. 21-9/2011-IA.III
Government of India
Ministry of Environment & Forests**

**Paryavaran Bhawan,
CGO Complex, Lodhi Road,
New Delhi - 110 003.**

Dated: 9th November, 2011.

**To
M/s Lavasa Corporation Limited,
Hincon House, 247 Park, LBS Marg,
Vikhroli (West), Mumbai - 400 083.**

**Subject- Environmental Clearance for the Development of Hill Station
Township at Village Mulshi and Velhe Talukas, District Pune,
Maharashtra by M/s. Lavasa Corporation Ltd. -regarding.**

Sir,

This has reference to your application No: TPD/LCL/2011 dated 1st February 2011 and subsequent letters dated 07.02.2011, 21.05.2011, 11.06.2011, 08.07.2011, 12.07.2011, 27.07.2011, 27.09.2011 and 11.10.2011 submitted to the Ministry for seeking environmental clearance for the above project under the EIA Notification, 2006. This proposal has been appraised in light of final directions issued by the Ministry on 17th January, 2011 and the EIA Notification, 2006 and its subsequent amendments, as also on the basis of the mandatory documents enclosed with the application viz., the Form 1, Form 1A, Concept plan, EIA, EMP and the additional clarifications furnished in response to the observations of the Expert Appraisal Committee constituted by the Competent authority in its meetings held on 14th - 15th February 2011, 3rd - 4th March 2011, 5th - 6th April 2011, 11th - 12th May 2011 and 31st May 2011.

2. It is interalia noted that the project involves the development /construction of 1st phase of a hill station township on a plot area of 2,000 ha. It is proposed to develop residential area - 618.24 ha., commercial area - 33.74 ha., hotels area - 72.77 ha., institutional area - 207 ha., open space - 908 ha. and for other activities - 209 ha. The total built-up area proposed is 52,19,917 sq.m. Out of above 2,000 ha. Development/ Constructions have been carried out on approximately 681.27 ha. It is proposed to construct 3,068 buildings. The total water requirement will 12.256 MLD (fresh water requirement will 11.643 MLD). The total capacity of STP's proposed are 14.70 MLD. Treated waste water to be used for flushing of toilets 3.676 MLD, horticulture & cooling requirement 7.353 MLD. Total solid waste generation will be 70.03 MT/day. The power requirement will 240 MW. The total cost of the project proposed is Rs. 2,824 Crores.



3. The Expert Appraisal Committee, after due consideration of the relevant documents submitted by the project proponent and additional clarifications furnished in response to its observations, have recommended in minutes of its meeting held on 31st May, 2011 for the grant of Environmental Clearance for the project mentioned above with certain conditions. The Ministry had accepted the recommendations of the Expert Appraisal Committee.

4. In light of the acceptance of the recommendations of the Expert Appraisal Committee, Ministry issued a letter to M/s Lavasa Corporation Ltd. to comply with the pre-conditions stipulated by the Ministry and also a letter to Government of Maharashtra to initiate credible action against the violation under the Environment (Protection) Act, 1986.

5. M/s Lavasa Corporation Ltd. submitted a letter dated 12th July, 2011, another letter on 27th July, 2011 and also submitted written undertakings during the hearing requested by it and provided on 5th August, 2011. The competent authority had accepted the report of the panel which concluded that these signify the willingness of M/s LCL to comply with stipulations. These documents are available on the website of the Ministry (www.envfor.nic.in).

6. Further the Expert Committee constituted by the competent authority under the chairmanship of Prof. K.T. Ravindran, has also examined the details of the project and visited the project area on 14th – 15th April, 2011 to assess the (i) Quantum of penalty and (ii) Creation of Environmental Restoration Fund for Lavasa City Project. The Ministry had accepted the recommendations of Prof. K.T. Ravindran Committee, a copy of the report of Prof. K.T. Ravindran committee is available on the website of the Ministry (www.envfor.nic.in).

7. The Ministry noted that there are various Writ Petitions and PIL in the Hon'ble High Court of Bombay at Mumbai regarding M/s LCL. On 20th October, 2011, Hon'ble High Court has directed the Ministry to pass final order on the application of M/s LCL for environmental clearance within three weeks.

8. Lastly, the Ministry has also noted the credible action taken by Govt. of Maharashtra namely that they filed a complaint in the Court of Chief Judicial Magistrate against the constructions/development carried out in Dasve sector (681.27 ha.) without obtaining prior Environmental Clearance under EIA Notification 1994 as amended in 2004 and also EIA Notification 2006 under Environment (Protection) act 1986, a copy of the application filed in the Court by Govt. of Maharashtra is also available on the website of the Ministry (www.envfor.nic.in).

9. Therefore, the Ministry hereby accords Environmental Clearance for the above project as per the provisions of Environmental Impact Assessment



Notification - 2006 and its subsequent amendments, subject to strict compliance of the terms and conditions as follows:

PART A- SPECIFIC CONDITIONS

I. Construction Phase

- i) "Consent for Establishment" shall be obtained from Maharashtra State Pollution Control Board under Air and Water Act and a copy shall be submitted to the Ministry before start of any construction work at the site.
- ii) Further development/constructions shall be undertaken after examining the environment issues e.g. Slope analysis, Soil investigation, physiography, geological, hydrological and geographical details and other vital parameters.
- iii) LCL shall submit its environment related policy/ plan of action to the Ministry within 3 months and shall abide with the written undertakings submitted to the Ministry on 27th July, 2011 and 5th August, 2011 as approved by Board of Directors.
- iv) The scale and intensity of development of the hill town shall be in accordance with the Hill Station Regulations of Maharashtra and shall be revised based on developable/ buildable area. A clear demarcation of "no development/ construction zone/ area" shall be identified comprising of (a) all water bodies (b) forest lands/forest like lands and (c) areas steeper than 1:3. The developable/buildable areas shall be verified through State Government/Director Town Planning and the calculation of FSI shall be made accordingly. No development shall be taken up in areas steeper than or equal to 1:3.
- v) The FSI calculation shall be worked out separately based on land uses and shall not be averaged for the calculation of FSI.
- vi) As far as possible, no hill cutting, digging, excavation, or any other activity involving generation of soil or its use or its transportation/ disposal shall be carried out.
- vii) The water conserved through bandharas shall be used for potable purposes only, putting lesser burden on the main Warasgoan reservoir. For all other secondary purposes, the treated waste water shall be used with dual plumbing system. Decentralised treatment (and reuse) of waste water shall be built into overall water/ waste water planning.
- viii) There shall be a provision for discharge of water from these bandharas as and when required by the Irrigation dept. other than natural over



flow in the monsoon season to meet the water requirement of down stream areas including Pune city.

- ix) Sediment and organic loading through runoff to the bandharas during monsoon shall be checked and computed more conservatively to assess the water quality.
- x) Continuous ecological monitoring of all the water bodies including bandharas within the project area shall be carried out and suitable mitigation measures shall be adopted. Appropriate measures shall be taken to restore the aquatic flora and fauna in the water bodies. Suitable fish species shall also be stocked based on the soil and water quality and in consultation with fisheries experts.
- xi) There shall be no discharge of any kind of effluents from any facilities, including the treated waste water, from the STP / ETP. The entire treated waste water from STP/ETP shall be recycled.
- xii) The surface water qualities shall be monitored at all the locations shown in the EIA Report, for pH, BOD, COD, Lead, Cadmium, Mercury, Chromium (VI), Arsenic, Nickel, Cobalt and Iron on six monthly basis and the reports shall be sent to MoEF and MPCB.
- xiii) Effluent Treatment Plant (ETP) shall be installed for treatment of the liquid effluents generated from the Hospital. All the other biomedical wastes generated from the hospital shall be sent, within 48 hours, to the Common Biomedical Waste Treatment Facility indicated by the MPCB in the authorization issued under the Biomedical Waste (Management and Handling) Rules, 1998.
- xiv) The cleaning of all the open/covered facilities, including pavements, walkways, etc. which are not connected to sewers, shall be restricted to only sweeping and there shall be no water washing of such facilities.
- xv) The sludge generated in S.T.P's shall be suitable managed. Suitable sanitation measures shall be adopted while pumping raw sewage.
- xvi) Construction spoils, including bituminous material and other hazardous materials, shall not be allowed to contaminate watercourses and the dump sites for such material shall be secured so that they shall not leach into the ground water.
- xvii) The Hazardous Wastes, namely used oil and electronic waste shall be stored in close containers under a covered shade/room and sold to the recyclers registered with the CPCB / SPCB as per the Hazardous Waste (Management and Handling) Rules, 2008 after taking



authorization required under these Rules from the Maharashtra Pollution Control Board (MPCB).

- xviii) The soil quality shall be monitored at all playgrounds (Including those of schools, colleges, etc), gardens, parks and lawns and for Lead, Cadmium and Mercury on six monthly basis and the reports shall be sent to MoEF and MPCB.
- xix) A detailed management plan related to prevention of soil erosion and loss of road side plantation shall be delineated.
- xx) The ambient air quality shall be monitored at all the locations shown in the EIA Report for the relevant parameters on six monthly basis and the reports shall be sent to MoEF and MPCB.
- xxi) Regular air pollution monitoring shall be done around the hot mix plants/stone crushers to know their adverse impacts (if any) due to these activities. The locations shall be decided only after the consultation with the Maharashtra Pollution Control Board.
- xxii) The energy consumption shall aim to target minimum saving of at least 28-32% by adopting energy conservation methods including non-conventional energy. All the commercial buildings shall adhere to the mandatory ECBC code.
- xxiii) The intensity of educational/ health facilities shall be developed keeping in view the requirements of locals/ tourists and without much stress on environmental resources in the fragile ecosystem.
- xxiv) All the construction of roads and related infrastructure shall be carried out following the relevant IRC guidelines/protocols.
- xxv) Road Safety auditing of the various roads/road section shall be carried out. Further, based on the safety auditing report, various safety measures (improvement in the geometric design, display of sign Boards, speed limits etc.) shall be implemented. Further, contingency plans to deal with road traffic mishaps/accidents etc. shall also be clearly delineated with the budgetary allocation.
- xxvi) Use of the (appropriate) less polluting road construction techniques (e.g. Cold Mix technology for bituminous roads etc.) shall be used. Further, use of locally available road construction materials (including marginal materials) shall be used after detailed technical studies in consultation with local authorities.
- xxvii) A well worked out disaster management plan (fire, accidents, land slides, earthquakes etc.) for the entire township shall be prepared with



provision for emergency evacuation routes, space for assembly and other measures.

xxviii) LCL shall submit within 3 months their policy towards Corporate Environment Responsibility (CER) as approved by Board of Directors which shall inter-alia address (i) Standard operating process/ procedure to bring into focus any infringement/ deviation/ violation of environmental or forest norms/conditions, (ii) Hierarchical system or administrative order of the Company to deal with environmental issues and ensuring compliance EC conditions and (iii) System of reporting of non compliance/ violation environmental norms to the Board of Directors of the company and/or stakeholders or shareholders.

xxix) As part of CSR programme, LCL shall conduct need based assessment for the nearby villages to study economic measures with action plan which can help in upliftment of poor section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. LCL shall provide separate budget for community development activities and income generating programmes. This shall be in addition to vocational training for individuals imparted to take up self employment and jobs.

xxx) At least 5% of the total cost of the project shall be earmarked towards the Corporate Social Responsibility (CSR) as approved by the Board of Directors and item-wise details along with time bound action plan shall be prepared and submitted to the Ministry's Regional Office at Bhopal. Implementation of such program shall be ensured accordingly in a time bound manner.

xxxi) A high level Verification and Monitoring Committee shall be constituted by Govt. of Maharashtra in consultation with MoEF. The Committee will comprise of eminent experts, representatives of MoEF, State Government, District Administration and other Stake holders etc. The Committee shall inter alia (i) examine, verify and monitor at various stages of planning, construction and operation etc.) of the project for compliance with the Conditions of the clearance. (ii) examine and verify the restoration work, (iii) undertake assessment of water balance in the reservoir, downstream requirements and the steps taken by M/s Lavasa for minimizing the use of fresh water, and (iv) ensure the compliance with the recommendations of the Prof. K.T.Ravindran Committee Report. The Committee shall

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periodically submit reports to Government of Maharashtra and MoEF, GOI.

xxxii) LCL shall submit an undertaking/commitment to:

- a) Restore the environment by specifically responding, but not limited to, the environmental damage caused to the Lavasa project and the related areas as a result of its activities, at its own cost;
- b) An amount equal to 5% of the expenditure incurred as on the date, the L.C.L. activities ceased, may be kept with the Government of Maharashtra, which may be used in case the L.C.L. fails to carry out the necessary restoration works within a specific time frame,
- c) The High Level Verification and Monitoring committee as indicated above at para (xxxi) shall ensure the follow up action on the recommendations of the Prof. K.T.Ravindran committee report.
- d) L.C.L. shall prepare a time bound environmental restoration plan identifying the activities as indicated in the report of the Prof. K.T.Ravindran Committee and shall carry out the works under the supervision of the High Level Monitoring Committee.

xxxiii) All required sanitary and hygienic measures shall be in place before starting construction activities and to be maintained throughout the construction phase.

xxxiv) A First Aid Room shall be provided in the project both during construction and operation of the project.

xxxv) Adequate drinking water and sanitary facilities shall be provided for construction workers at the site. The safe disposal of wastewater and solid wastes generated during the construction phase shall be ensured.

xxxvi) The diesel generator sets to be used during construction phase shall be low sulphur diesel type and shall conform to E(P) Rules prescribed for air and noise emission standards.

xxxvii) Vehicles hired for bringing construction material to the site shall be in good condition and shall conform to applicable air and noise emission standards and shall be operated only during non-peak hours.

xxxviii) Ambient noise levels shall conform to residential standards both during day and night. Incremental pollution loads on the ambient air and noise quality shall be closely monitored during construction phase.



- xxxix) Storm water control and its re-use as per CGWB and BIS standards for various applications shall be under taken.
- xl) Water demand during construction shall be reduced by use of pre-mixed concrete, curing agents and other best practices referred.
- xli) Separation of grey and black water shall be done by the use of dual plumbing line for separation of grey and black water. Treatment of 100% grey water by decentralised treatment shall be done.
- xlaii) Fixtures for showers, toilet flushing and drinking shall be of low flow either by use of aerators or pressure reducing devices or sensor based control.
- xliii) Use of glass shall be reduced by upto 40% to reduce the electricity consumption and load on airconditioning. If necessary, use high quality double glass with special reflective coating in windows.
- xliv) Roofs of the buildings shall meet prescriptive requirement as per Energy Conservation Building Code by using appropriate thermal insulation material to fulfill requirement.
- xlvi) Adequate measures shall be under taken to reduce air and noise pollution during construction phase keeping in mind CPCB norms on noise limits.
- xlvi) Opaque wall shall meet prescriptive requirement as per Energy Conservation Building Code which is proposed to be mandatory for all airconditioned spaces while it is aspirational for non-airconditioned spaces by use of appropriate thermal insulation material to fulfill requirement.
- xlvi) Other conditions as stipulated by MoEF/ other State agencies of State Government shall also be complied with

II. Operation Phase

- i) The installation of the 14.70 MLD Sewage Treatment Plant (STP) shall be certified by an independent expert and a report in this regard shall be submitted to the Ministry before the project is commissioned for operation. Discharge of treated sewage shall conform to the norms & standards of the Maharashtra Pollution Control Board.
- ii) Rain water harvesting for roof run- off and surface run- off, as plan submitted shall be implemented. Before recharging the surface run off, pre-treatment must be done to remove suspended matter, oil and grease.



- iii) The solid waste generated shall be properly collected & segregated before disposal. The In-vessel bio-conversion technique shall be used for composting the organic waste.
- iv) Any hazardous waste including biomedical waste shall be disposed of as per applicable Rules & norms with necessary approvals of the Maharashtra State Pollution Control Board.
- v) The green belt design along the periphery of the plot shall achieve attenuation factor conforming to the day and night noise standards prescribed for residential land use. The open spaces inside the plot shall be suitably landscaped and covered with vegetation of indigenous variety.
- vi) Incremental pollution loads on the ambient air quality, noise and water quality shall be periodically monitored after commissioning of the project.
- vii) Application of solar energy shall be incorporated for illumination of common areas, lighting for gardens and street lighting in addition to provision for solar water heating. A hybrid system or fully solar system for a portion of the apartments shall be provided.
- viii) A Report on the energy conservation measures confirming to energy conservation norms finalized by Bureau of Energy Efficiency shall be prepared incorporating details about building materials & technology, R & U Factors etc and submit to the Ministry in three months time.

PART - B. GENERAL CONDITIONS

- i) The environmental safeguards contained in the EIA Report shall be implemented in letter and spirit.
 - ii) Six monthly monitoring reports shall be submitted to the Ministry and its Regional Office at Bhopal.
10. Officials from the Regional Office of MOEF, Bhopal who would be monitoring the implementation of environmental safeguards shall be given full cooperation, facilities and documents / data by the project proponents during their inspection. A complete set of all the documents submitted to MoEF shall be forwarded to the CCF, Regional office of MOEF, Bhopal.
11. In the case of any change(s) in the scope of the project, the project would require a fresh appraisal by this Ministry.
12. The Ministry reserves the right to add additional safeguard measures subsequently, if found necessary, and to take action including revoking of the environment clearance under the provisions of the Environmental



(Protection) Act, 1986, to ensure effective implementation of the suggested safeguard measures in a time bound and satisfactory manner.

13. All other statutory clearances such as the approvals for storage of diesel from Chief Controller of Explosives, Fire Department, Civil Aviation Department, Forest Conservation Act, 1980 and Wildlife (Protection) Act, 1972 etc. shall be obtained, as applicable by project proponents from the competent authorities.

14. The project proponent shall advertise in at least two local Newspapers widely circulated in the region, one of which shall be in the vernacular language informing that the project has been accorded environmental clearance and copies of clearance letters are available with the Maharashtra Pollution Control Board and may also be seen on the website of the Ministry of Environment and Forests at <http://www.envfor.nic.in>. The advertisement shall be made within 7 days from the day of issue of the clearance letter and a copy of the same shall be forwarded to the Regional office of this Ministry at Bhopal.

15. These stipulations shall be enforced among others under the provisions of Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and control of Pollution) act 1981, the Environment (Protection) Act, 1986, the Public Liability (Insurance) Act, 1991 and EIA Notification, 2006.

16. If in future, it is found that any condition is in violation of Environment (Protection) Act, 1986, legal action shall be initiated against the project proponent.



(E. Thirunavukkarasu)
Deputy Director (IA)

Copy to: -

- 1) The Secretary, Department of Environment, Government of Maharashtra, Mumbai.
- 2) The Member Secretary, Maharashtra State Pollution Control Board, Mumbai.
- 3) The CCF, Regional Office, Ministry of Environment & Forests, RO(WZ), E-5, Kendriya Paryavaran Bhawan, E-5, Area Colony, Link Road-3, Ravishankar Nagar, Bhopal - 462016.
- 4) IA - Division, Monitoring Cell, MOEF, New Delhi - 110003.
- 5) Guard file.
- 6) For Website.



(E. Thirunavukkarasu)
Deputy Director (IA)

