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Abstract

The UK's 2016 decision to leave the European Union signals a departure from the Common Agricultural Policy. The current proposals for a post-Brexit agricultural policy describe a shift towards a model that subsidises producers for implementing environmentally beneficial practices, rather than high production levels. Studies on existing forms of this subsidy model demonstrate mixed results in terms of improving biodiversity, and studies on farmer's uptake of such schemes and their attitudes towards them are similarly mixed. These results have implications for policy design given that farmers are the implementers of such schemes. This study will draw on the existing literature as a context through which to investigate the perceptions of farmers and farm managers regarding the proposed agricultural policy landscape they will potentially inhabit. We conclude that ensuring that future schemes are both evidence-based and are planned and implemented with the help of people with a background in agriculture is paramount to their success.

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Abbreviations:

AES: Agri-Environment Scheme
BPS: Basic Payment Scheme
CAP: Common Agricultural Policy
DEFRA: Department of Environment, Food, and Rural Affairs
EAFRD: European Agricultural Fund for Rural Development
EAGF: European Agricultural Guarantee Fund
EU: European Union
GHGE: Greenhouse Gas Emissions
NGO: Non-governmental Organization

Introduction

Agriculture covers 38% of the Earth's ice-free surface, accounts for 30-35% of greenhouse gas emissions (GHGE), and is a primary cause of deforestation, soil erosion, and water pollution (Foley *et al*. 2011). The human population increase predicted to occur over the next few decades is expected to exacerbate these issues (Foley *et al*. 2011). As a result of this expectation, the conservation and agriculture sectors are being increasingly exhorted to work together to slow this environmental degradation. Collaboration between the two sectors is particularly important in the UK; as of 2017, 72% of the UK's land area is devoted to agriculture (DEFRA 2018) with some of these landscapes having been managed for up to 2,000 years (Kleijn *et al*., 2006). Given the ongoing destruction of undisturbed landscapes which may have served as primary habitats, many species have adapted overtime to depend on agricultural landscapes (Kleijn *et al.*, 2006)

Post-World War 2, there was a political emphasis on increasing levels of agricultural production, which has led to a steep decline in on-farm biodiversity levels that has continued to this day (Robinson and Sutherland 2002). The conventional agricultural methods that proliferated during this time have been widely reported as having negative impacts on biodiversity globally and locally, as well as ecosystem service provision, and are also a contributor to global anthropogenic climate change (Robinson and Sutherland 2002). Intensive agricultural methods particularly, characterized by high petrochemical inputs in the pursuit of increased levels of production, are considered to have detrimental impacts on environmental indicators (Brickle *et al.* 2001; Fuller *et al.* 1995; Whittingham *et al.* 2011; Donald *et al.* 2001). As a result of the above factors, the conservation of biodiversity in the UK is inherently linked to the management practices of agricultural lands. The key mechanisms for altering or shaping agricultural practices are top down, "command and control" policies, which legally prohibit or limit certain practices, or market mechanisms, which either penalize producers for certain actions or encourage certain practices through subsidies. Top-down governmental policy is usually utilized in more extreme cases, for example when the UK government banned the use of the pesticide

“DDT” for health and environmental reasons, while market mechanisms are more favoured when attempting to curb undesirable practices or to encourage desirable ones. Market mechanisms in the form of financial subsidies are the area of concern for this research project.

This dissertation will investigate the perceptions of English farmers regarding the proposed post-Brexit agricultural policy, specifically the shift of the subsidy regime away from area-based payments towards one that allocates money for the delivery of environmental goods and services. It will begin by outlining the policy and academic landscape surrounding the research, particularly regarding the efficacy of agri-environment schemes and factors determining their success and uptake among the farming community. This research will then examine farmer’s perceptions of agri-environmental subsidy systems and place them on a Spectrum of Participation (Morris and Potter 1995) according to self-reported values and beliefs regarding the role of these policies in shaping producer’s management practices, and their role in conservation. Data will then be used to identify factors seen as priorities by farmers when shaping future UK agricultural policy.

The Common Agricultural Policy

This section will begin by contextualizing the research topic by outlining the policy instruments currently utilized by the Government to govern agricultural and rural landscapes in the UK. It will then examine the impact Brexit is projected to have on UK agricultural policy, and the current political discourse on the topic as demonstrated through the Health and Harmony document published in February 2018.

The dominant policy governing rural and agricultural lands in the UK is the Common Agricultural Policy (CAP), which applies to all European Union (EU) member states, and is comprised of Pillar 1 and Pillar 2 payments. The CAP is legislation established by the European Union in 1962, which primarily aimed to provide financial support to the agricultural sector in order to enable increased food production, facilitate food security,

provide a stable and fair income to producers, and to protect the market against volatility in the wake of World War 2 (Zobbe 2001, 2). Its other mandates are “to ensure a fair standard of living for the agricultural community ... to stabilize markets ... to ensure the availability of supplies … (and) to ensure that supplies reached consumers at reasonable prices” (Zobbe 2001, 5). Currently, payments are delivered under a two-pillar system; Pillar 1 payments consist of direct income support, known as the Basic Payment Scheme (BPS), whilst Pillar 2 payments consist of agri-environment schemes (AESs) and rural development funding. In 2015, the total EU budget for the Common Agricultural Policy was €60 billion, with the UK accounting for €4.1 billion (Institute for Government 2018) of which 76% accounted for Pillar 1 payments.

i. Pillar 1: Basic Payment Scheme

Basic Payments (which accounted for €3.1 billion of the UK’s CAP funding in 2016) are annual subsidies delivered through the CAP which aim to buffer farm income from market volatility and production problems (such as those arising from extreme weather) and guarantee a fair wage and standard of living (European Commission 2015). In order to avoid distorting the market by incentivizing overproduction, basic payments are delivered according to the area of land managed, on a per hectare basis. The money is distributed through the European Agricultural Guarantee Fund (EAGF) (European Commission 2018) and administered through national ministries. In the case of the UK, it is administered through the Department of Environment, Food, and Rural Affairs (DEFRA) (Institute for Government 2018). In order to be eligible, farmers must adhere to certain environmental and health standards; failure to comply with these standards can lead to reductions in funding or exclusion (European Commission 2018).

ii. Pillar 2: Rural Development and Agri-environment Schemes

Pillar 2 of the CAP is administered by the European Agricultural Fund for Rural Development (EAFRD) and DEFRA, and accounted for €0.8 billion of the CAP budget in the UK in 2016, a substantially smaller amount than Pillar 1 payments. Pillar 2 payments

acknowledge the role that agriculture plays in supporting rural communities, cultural heritage, and shaping the environment. They are devoted to achieving three broad goals (Nègre and Moller 2018):

> "1. Fostering agricultural competitiveness;
>
> 2. Ensuring sustainable management of natural resources and climate action;
>
> 3. Achieving balanced territorial development of rural economies and communities, including the creation and maintenance of employment. "

Pillar 2 payments are designed to be more flexible than Pillar 1 payments, and to be modified according to the needs and challenges of the communities and regions within which they are administered (European Commission 2015).

Within Pillar 2, 82% of funding goes towards Agri-Environment Schemes. Agri-environment schemes are voluntary agreements undertaken by farmers who agree to meet certain environmental standards of production in exchange for payment, whether through additive or "greening" measures, or by refraining from certain ecologically damaging practices (European Commission 2018). They are also intended to financially compensate farmers for any losses in productivity or income they might incur because of adhering to the standards of these schemes (Kleijn and Sutherland 2003). These schemes are specifically designed to ameliorate the negative impacts agriculture can have on biodiversity and ecosystem functioning by financially incentivizing producers to undertake measures beneficial for the environment or by abandoning harmful ones.

Brexit

On the 23rd June 2016, the UK voted in a referendum to leave the European Union (EU), a decision known commonly as "Brexit" (a contraction of "British Exit"). This decision will result in the UK's departure from the CAP. The CAP has long been criticised in political and academic circles for promoting productivity at the expense of environmental health,

and for inefficient distribution of funding. The Basic Payment Scheme (BPS), in particular, has elicited ire from many due to the perception in the media that payments benefit wealthy landowners rather than ordinary farmers. Partly in response to these criticisms, the Government has put forward a rough framework for a post-Brexit Agricultural Policy in the 25-Year Environment Plan and the Health and Harmony document. This new policy is based on shifting away from Pillar 1 payments in favour of the Pillar 2 framework of Agri-Environment Schemes, and providing support for farmers who implement practices on their farms which have a positive impact on the environment and biodiversity, and contribute to the functioning of ecosystem services. While currently Pillar 1 payments account for the lion's share of funding, in future, Pillar 2 payments are to comprise the majority of payments. The Right Honourable Michael Gove, Secretary of State for the Environment, has termed this "public money for public goods" (Health and Harmony 2018, 8), and the plan is heavily influenced by the concept of Natural Capital as put forward by economist Dieter Helm (Helm 2015).

The UK is set to formally leave the EU in March 2019, but Basic Payments will continue until 2022, in order to support farmers through the transition period.

i. "Health and Harmony" Document

This dissertation centres on the proposal in the Health and Harmony document that funding is redistributed from the highest receivers of area-based payments and dedicated to new agri-environment schemes, culminating in the eventual phasing out of Basic Payments (DEFRA 2018, 7). This is an acknowledgement of the various criticisms of the current system, as well as an acknowledgement of the roles farmers play in society outside of mere food production, and also recognizes the relationship and potential for positive interchanges between agriculture, and public services such as flood alleviation, water purification, soil conservation, or tourism (Whittingham 2006; Pretty and Sutherland 2003). These changes are reflective of a discourse that displays an increased understanding of the role of farmers in society; they are not simply producers of food, but stewards of the environment, and shapers of landscapes that are intimately linked in the

cultural consciousness to national heritage and identity. This discourse and the subsidy reform generated by it provide the contextual underpinning for this research.

Literature Review

This section will contextualize this study through the relevant academic literature. It will begin by outlining some of the studies which examine factors associated with the uptake of agri-environment schemes, and will follow with studies that investigate the relative efficacy of agri-environment schemes at achieving improved biodiversity. If the future UK agricultural subsidy regime is to be based on the current system, it is vital we have a thorough understanding of those factors that are correlated with or deterministic of high uptake of schemes, and of scheme efficacy.

Agri-Environment Schemes and Farmers

Studies have concluded that a variety of (sometimes contradicting) factors can be linked to the uptake of voluntary agri-environment schemes. For example, while some studies suggest large farms with high incomes tend to be associated with the uptake of conservation measures (Napier 2000), Buttel *et al.* (1981) discovered the opposite relationship. Older farmers have been found in some studies to be less likely to join a scheme (Potter and Lobley, 1992; Morris and Potter 1995), whereas in other studies older age was associated with high uptake when schemes were particularly financially lucrative (Wilson 1996).

It has been hypothesized that younger farmers may join such schemes for conservation reasons, whereas older farmers who join such schemes may be more likely to do so for pragmatic financial reasons (Wilson 1996). Farmers who have successors in place after their retirement were also found to be more likely to join schemes than those who did not (Potter and Lobley 1992; Featherstone and Goodwin cited in Ahnström *et al*. 2009). Wilson (1996) did not find education correlated with uptake of AESs generally, but found that higher levels of education were associated with the uptake of less financially appealing schemes. Morris and Potter (1995) found more financially stable farms were more likely to be party to agri-environment schemes. Some studies found that larger farms were more likely to take part in schemes, particularly if their income was not solely

dependent on farming (Ruto and Garrod 2008; Morris and Potter 1995). Falconer's 2000 paper theorized this was likely because the transaction costs were not as large a burden for these farms (cited in Hodge and Rader 2010, 278). Ryan and Ogden's 2006 study found that farmers with positive attitudes towards conservation viewed the schemes as a means of enacting practices that they would otherwise be in too precarious a financial position to justify (cited in Dobbs and Pretty 2008). Prior experience with agri-environment schemes was found to be positively correlated with subsequent participation (Toogood *et al*. 2004, 25).

Whilst some studies focus more on correlative relationships associated with uptake of agri-environment schemes, others focus more on the motivations for either joining or abstaining from a scheme. An EU survey from 1997 revealed a variety of reasons given by farmers for their participation in AESs (Table 1). Reasons ranged from the financial (the majority) followed by convenience, sympathy with conservation goals, prior participation, and social encouragement, from both officials and peers (Wilson and Hart 2001). These participants were divided into 'Active Adopters' who were as interested in the conservation outcomes of a scheme as the financial gain, and 'Passive Adopters' who joined because little to no change in management style was needed. Non-participants were categorized as 'Resistant Non-Adopters' who were opposed to the schemes, and 'Conditional Non-Adopters' who had not entered because the financial incentives were insufficient or the schemes did not suit the management of the farm, but were otherwise not opposed to them (Wilson and Hart 2001).

Reasons given by farmers for entering schemes		
	Cambrian Mountain: Environmentally Sensitive Area (%)	Countryside Stewardship: Devon (%)
Financial Reasons	87	65
Fitted in with farm management plan	83	74
No changes in farm management needed	67	41
Provides a secure source of income	63	46
Wish to promote environmental conservation	23	66
Encouraged to join by officials	17	9
Already participated in earlier scheme	11	3
Because neighbours have joined	10	9
Wish to reduce farming activities	3	6
Note: multiple answers could be given by respondants		
Source: EU survey, 1997		

Table 1. Reasons given by farmers for entering schemes. Reproduced from Wilson and Hart 2001, 262

It is commonly accepted there may be discrepancies between attitudes and enacted behaviours. Carr's 1998 study (cited in Beedell and Rehman 2000) suggested that farmer's attitudes towards environmental concerns were poor predictors of actual behaviours. Therefore, while farmers may hold positive views of a variety of ideas, or purport to agree with statements regarding their stewardship of the natural environment, these may not translate into their management practices and styles.

As a result of this understanding, a key question in regard to agri-environment schemes is whether they result in persistent, attitudinal changes in farmers and land managers, or whether they amount to little more than 'temporary bribes, shallow in operation and transitory in their effect' (Morris and Potter 1995, 52). Agri-environment schemes may achieve their goals during the length of the scheme, but it has not been ascertained whether they are effective at promoting long-term change that would persist were the subsidies to desist (Ahnström *et al.* 2009, 41; Morris *et al*. 2002 cited in Toogood *et al.* 2004, 23). Indeed, Burton & Paragahawewa (2011) have suggested that financial rewards for voluntary actions serve to delay positive attitudinal changes stating that "without changes in social norms, people often revert to old ways when incentives end or regulations are no longer enforced, and so long-term protection may be compromised" (Burton & Paragahawewa 2011, 96). Additionally, there is a risk that encouraging farmers to set aside areas for conservation simply encourages them to 'disown' these areas and focus on increasing productivity on the areas not party to the scheme, which does nothing

to encourage the incorporation of conservation practices into agricultural management more generally (Burton & Paragahawewa 2011).

Burton and Paragahawewa (2011) and Hodge (1999, 101) also contend that many schemes, due to their prescriptive nature and reliance on actions rather than results for payment, stifle innovation and creativity since there is no incentive to do anything beyond the bare minimum required to qualify for payments, an idea supported elsewhere in the literature (Dobbs and Pretty 1998, 293). In this sense, they argue that eligibility for payments should be results-based, although this itself has several negative side-effects as will be discussed in a later section. Furthermore, they argue scheme participation may be associated with a loss of cultural capital for the farmer and a loss of standing within their local community as their peers may view the 'untidiness' associated with schemes negatively (Dobbs and Pretty 1998, 99). Indeed, 'tidiness' of farm landscapes recurs in literature as a positive virtue, perhaps signifying industriousness, against which concerns of the 'untidy' aesthetics associated with some AESs (such as not mowing field margins) are frequently compared (Fish *et al.* 2003, 25; Egoz *et al.* 2001; Nassaur 1988 cited in Ryan *et al.* 2003).

Perhaps one of the most crucial weaknesses of agri-environment schemes for Burton and Paragahawewa (2011) is their vulnerability to shifting political and economic priorities, both in a broader policy sense and on the part of the farmers, meaning that they are liable to being weakened or abandoned depending on the whims of those in positions of power (Burton and Paragahawewa 101). By failing to make AESs culturally salient to producers, conservation is hypothesized to always be framed as either lost income, a less appealing use of resources and land, or an inconvenience, rather than as an integral part of farm management practices (Toogood *et al.* 2005).

One particular factor that must be acknowledged is that agri-environment schemes are rarely designed solely to provide ecological benefits, but are usually designed to reconcile 'a *range* of ecological, socio-economic, administrative and political interests' (Buller *et al.* 2000 cited in Kleijn et al 2006, emphasis added). These trade-offs often lead to

conservation results that are sub-optimal, since some agri-environment schemes are not designed for maximal conservation at the expensive of other stakeholders. This can be considered a practical decision in scheme design, since schemes which privilege biodiversity conservation over all other concerns are unlikely to receive much support from other stakeholders, such as farmers or politicians.

Farmers, as the users and implementers of agri-environment schemes, have described many of the operationalization and administrative issues associated with agri-environment schemes. Frequent criticisms describe the 'hassle factor' and complexity of schemes, such as the bureaucratic processes associated with signing up to schemes and the inconvenience involved with their administration and implementation (Toogood *et al*. 2005). Similarly, many producers resent the lack of trust they perceive in the administrative and governing bodies of the schemes (Toogood *et al.* 2004, 16) and the lack of control they have over how schemes are operationalized on their farms (Dobbs and Pretty 2008). This issue relates to the perceived tendency of the conservation community to view farmers' knowledge and understanding of nature as illegitimate, a failing which undermines attempts to foster trust and mutual respect between these communities (Harrison and Burgess 2000). In contrast, the same could theoretically be said of farmers, who may view the knowledge of academics and officials as illegitimate compared to their own.

Another commonly criticized feature of AESs in the UK is the rigidity of the schemes, and the lack of flexibility and autonomy farmers have over them (Harrison and Burgess 2000; Espinosa-Goded *et al.* 2010; Emery and Franks 2012, 225). Harrison and Burgess (2000, 1120) also noted the frustration from farmers who viewed schemes as not only discounting their knowledge of the land but reduced their position to that of a 'technician' whose role was simply to follow instructions given by experts with no agricultural background.

Farmers tend to be risk-averse, due partly to the narrow profit margins generally experienced within the industry, and the vulnerability of farms to fluctuations in market

prices or poor weather. AESs that take this factor into account are more likely to experience high uptake (Toogood *et al.* 2004, 25). Skeratt's 1998 study (cited in Dobbs and Pretty 2008) found that Scottish farmers viewed joining AESs as a risk that was compounded by the possibility of restrictions being added onto the scheme in future. Pretty (2002) suggested that this risk is exacerbated by the fact that the agricultural sector has developed around assumptions of scale, productivity and petrochemical usage that make it particularly difficult to shift towards more diversified and labour-intensive alternative systems. Dobbs and Pretty (2008) suggest that further social capital and resources are needed before conventional farmers feel supported enough to risk the transaction costs associated with changing their management style towards those associated with greater environmental and conservation benefits. There is also the issue that emerged in Hodge and Reader's 2010 study which suggested that the most popular schemes tend to be those that require fewest amendment to existing farm practices, such as field corner and grass margin options, which have little impact on biodiversity (cited in Batary *et al.* 2010).

Agri-Environment Schemes and Biodiversity Conservation

This section will examine current studies which have investigated the efficacy at biodiversity targeted AESs, and outline some of the particular flaws and benefits of various schemes.

A primary issue with AESs is associated with their evaluation. The effectiveness of agri-environment schemes at achieving their stated goals is highly variable. This is unsurprising given that they aim to achieve a variety of goals through a range of methods (Ahnström *et al.* 2009; Carey *et al*. 2005). Kleijn and Sutherland's (2003) meta-analysis concluded that while some agri-environment schemes demonstrate positive impacts, others revealed 'no effects, negative effects, or positive effects on some species and negative effects on others'. The analysis also uncovered a positive bias towards intensively farmed areas, which are more frequently evaluated, and which tend to have lower levels biodiversity at the start of schemes (Kleijn and Sutherland 2003).

> ‘for schemes that have no demonstrable positive effects it remains unclear whether this is because of the agri-environmental measures being ineffective, the implementation of measures by farmers being suboptimal, the schemes being implemented in the wrong locations or a combination of these causes.’ (Kleijn *et al*. 2006)

The lack of evidence for success of agri-environment schemes can be attributed to a variety of factors. In some cases, the evaluation of scheme impact is simply never incorporated into project design, or data are too scarce or of too poor quality to allow a full evaluation (Kleijn and Sutherland 2003). Many schemes are lacking counterfactual baseline data that would allow for an accurate measure of scheme impact, meaning that impact evaluation is not robust (Kleijn *et al.* 2006). Additionally, farmland is heterogeneous and hosts a plethora of variables (not least of which are weather, climate, geomorphology, floral compositions, and changing management) making the kinds of empirical analyses valued by academics and policy-makers difficult to generalize or extrapolate from (Kleijn *et al*. 2006). In the same vein, factors which may serve as accurate predictors in one location or scenario may hold little value when applied to other contexts, emphasizing the need for contextually appropriate and evidence-based AES implementation rather than a generalized application of schemes on a national scale (Whittingham 2006). This can also be applied to different time scales, as a scheme might be found to have positive results one year, but not in the next, possibly due to external factors.

Whittingham (2006) suggests that evaluating the success of AESs is confounded by several factors: i) the rate and density of occurrence of target species varies between locations of occurrence; ii) habitat preference may vary between species across different regions; iii) the likelihood of species utilizing an AES is determined in part by their distance from breeding individuals; and iv) species often require multiple resources in order to breed successfully, requiring larger home ranges and more dense distributions of a variety of resource locations/AESs.

From a biodiversity perspective, the short length of most AESs in the UK (many require a minimum of five years) is shorter than required to restore certain species and ecosystem functions (Olff and Bakker 1991; Walker *et al.* 2004 cited in Kleijn *et al*. 2006) In consideration of this, it is likely necessary for schemes to be evaluated over several years, since results measured in one year may be anomalous (Chamberlain *et al*. 1999).

Potter (1998, 91, cited in Dobbs and Pretty 2008) suggested that AESs may be successful at preventing further decline in existing ecological capital on farms but may not serve to increase biodiversity. Similarly, several studies have suggested that AESs may serve to increase the number of common farmland species rather than conserving or increasing vulnerable or high value species (Batary *et al*. 2015, 1010; Kliejn *et al.* 2006). Schemes are more likely to result in increased populations of target species if they are adapted to the specific needs of such a species, a system Peach *et al*. found in 2001 to not account for a particularly high proportion of AES (cited in Kliejn *et al.* 2006).

Targeting AES schemes to areas of high biodiversity value or richness is important (Whittingham 2011), as is ensuring that funding is not wasted in areas less suitable to target species (Whittingham 2006). Targeted schemes have been found to be more effective than non-targeted schemes (Kleijn and Sutherland 2003), which Pywell *et al*. 2012 paper found to be true particularly when directed towards in-production schemes aimed at conserving threatened species (cited in Batary *et al*. 2015, 1011). Furthermore, a 2004 paper published by the European Environmental Agency raised questions over the possibility that schemes were not adequately distributing funding towards high biodiversity value agricultural areas (cited in Toogood *et al*. 2004, 10).

Such targeting measures are termed ‘zonal’ schemes in comparison to broader ‘horizontal’ schemes which fit more easily into general farm management and aim to mitigate the harmful impacts of some conventional farming practices on the environment (Kleijn & Sutherland 2003). It can also be useful to differentiate between schemes that apply to non-productive areas such as field margins or hedgerows, which Garibaldi *et al*.

termed ‘off-field practices’ in their 2014 paper (cited in Batary *et al.* 2015) and those that are implemented in productive or on-field areas, which may be characterized by practices such as limiting pesticide application (Batary *et al*. 2015).

In the UK, zonal schemes have been found to be more effective at increasing farmland bird numbers than more broad, horizontal schemes (Batary *et al.* 2015, 1013), perhaps due to the aforementioned reliance of many species on multiple resource bases during their lifespan. Feehan *et al*. (2005) suggest horizontal schemes may be better suited for ecosystem services and ecological processes, whilst specific biodiversity needs are better served by zonal schemes.

A 2001 study by Weis suggested that due to the length of time that it takes for results to manifest in nature, we may simply be too early to gauge adequately the impacts of some schemes (cited in Batary *et al.* 2015). However, caution must be used when implementing schemes that target specific species, as there is a risk of creating a cascade of unintended and possibly negative effects on other species or systems (Keenleyside *et al*. 2014, 7). This is a risk due to the poorly understood relationships between AESs and multiple ecosystem services (Batary *et al.* 2015, 1012).

It must be acknowledged that not all AES areas provide equal conservation value. For example, distance between patches, patch size, and quality are all indicators of their value towards biodiversity conservation; AES locations serve little value if they are too small to provide sufficient resources to species, too widely dispersed to allow travel between them, or too poor quality. They differ from more conventional protected areas in that they often apply to small, disarticulated areas of land such as hedgerows, ditches, field margins, or steep inaccessible land, sometimes creating larger heterogeneous mosaics of protected areas (Whittingham 2006). Protecting highly fragmented areas may be less valuable for wildlife than larger areas, which may provide more resources and shelter (Whittingham 2006). A move towards landscape-scale schemes rather than field corners and boundaries may be a more effective use of resources.

The long-term viability of many taxa is dependent on conserving varying and often multiple spatial scales (Gabriel *et al.* 2010). AESs may be achieving their goals at local levels but this may not be sufficient to maintain viable populations on a broader level (Whittingham 2011), particularly when species require different resources over their life cycles (Gabriel *et al*. 2010). Landscape-scale implementation of AESs may, conversely, serve as a source population from which individuals may 'spill' out (Gabriel *et al*. 2010) but the success of this is dependent on these individuals having adequate resources and habitat to successfully inhabit. While evaluation of AESs may take place on individual field or farm scales, this is not the scale at which significant impacts may manifest in many species (Gabriel *et al*. 2010).

Similarly, it is now acknowledged that the character of the landscapes surrounding and between AES areas is also a contributing factor to their success, in part because intensively managed or developed areas may hinder the dispersal of species into new areas (Hodge 1999, 102; Whittingham 2011; Harrison and Burgess 2000, 1120). Gabriel *et al*. (2010) suggest that the types of landscapes surrounding AES areas may be influential enough to mask or inhibit the impacts of these schemes, to the extent that their impacts are only observable when surrounded by a matrix of intensively managed systems, serving as a kind of biodiversity vacuum. For example, despite the fact that meadow birds are more numerous in protected areas than in farmland under AESs, the size of these protected areas (PAs) may be too small to sustain viable populations, calling for greater investment in creating secondary habitats in farmland that can be successfully colonized (Batary *et al*. 2015, 1013). It has been suggested by some that promoting the extensification of agricultural practices on farms on a landscape scale may provide greater biodiversity benefits due to the non-linear relationship between biodiversity and intensification (Whittingham 2006; Kleijn and Sutherland 2003).

There is some suggestion in the literature that positive change could be enacted by shifting the delivery of AES payments from an action-based system towards a results-based payment system (Toogood *et al.* 2004, 16), a theory that, combined with Natural England's piloting of results-based agri-environment payments for possible

implementation after the UK leaves the European Union, shaped the direction of this research.

This research will use the studies examined in the literature as an academic context from which to examine the perceptions of participants regarding the proposed subsidy reform, investigating both issues of uptake, and of delivery of services.

Methods

All data were collected, analysed, and stored according to the University of Oxford's research ethics guidelines (CUREC). Data were collected through structured, qualitative interviews, which were then anonymized and analysed using QSR International's NVivo 12 qualitative data analysis Software.

Interview questions (Fig. 1) were established based on questions that arose during literature research, and then piloted with academics and professionals in the field of agriculture and conservation in order to detect whether bias was present in the questions, whether the questions were leading, and to help determine whether these questions were pertinent to the research. Several questions were replaced, reworded, or omitted altogether as a result of this pilot period, and the number of questions reduced in order to make the interviews shorter and therefore more convenient to the participants involved.

Structured interviews were selected as the optimal method of data collection, since the research sought to investigate insights into individual attitudes and beliefs regarding a complicated topic; one that was likely to elicit strong emotions. However, a structured interview also allowed consistency and replicability. Therefore, while the questions and phrasing were identical between interviews, answers were open ended and could be as lengthy or brief as participants wished. The interviews were preceded by ten demographic questions (see Fig. 1), which were then cross-compared with responses to the open-ended interview questions in order to determine any correlations:

QUESTIONS

1. Gender:
2. Age Range: 20-25/25-34/35-44/45-54/55-64/65-74
3. Farm size (ha):
4. Position:
5. Farm products:
6. Qualifications/Education:
7. Number of years experience in farming:
8. Environmental stewardship schemes party to (if any):
9. Successorship plans (if any):
10. Number of generations farming in the family:

Fig. 1 Demographic interview questions

In order to be eligible to participate in the research, participants had to be farmers, farm owners, or farm managers at commercial farms in the South East and West Midlands of England. Ten participants were ultimately recruited for interviewing. Due to the variable nature of farm work the majority (nine out of ten) interviews were conducted over the phone, at times that were convenient to the respondents. Participants were recruited by directly contacting individuals and by "snowball" sampling, (a form of non-probability sampling) both through standalone individuals and through other participants of the study. Several farm managers at farms owned by non-governmental organizations (NGO's) were also contacted, both to be interviewed and to request that they snowball the interview requests to their peers.

1. Do you think that this proposed subsidy reform is an effective way to *engage* farmers in conservation?
2. Do you think the proposed subsidy model will help conserve or improve biodiversity on agricultural holdings, both your holding and in general?
3. High uptake of schemes does not necessarily mean that they deliver what they aim to do. What do you think are the most important factors that should be included to ensure they do deliver?
4. What actions (if any) are [Farm Name] taking in the face of the proposed subsidy reform?
5. Do you think the scheme should be results-based or action-based for delivery of payments? Why?
6. What, if any, are your reservations about the proposed subsidy reform?
7. What were/would be your main reasons for applying for conservation grants/agri environment schemes?
8. Is there anything else in particular you'd like to mention or say?

Fig 2. Structured interview questions

All participants were given written or verbal descriptions of the nature of the research, what would be expected of them if they chose to participate, and their rights regarding anonymity, access to the research, and withdrawal from participating in the research. All participants gave verbal and written consent to be audio recorded for the interviews. At the start of the interview I discussed the proposed subsidy reform that I would be interviewing the participants about, in order to ensure that we both had a similar understanding of what was entailed. Interview times ranged from 13 minutes to 32 minutes in length. Responses were transcribed after the interview, read comprehensively, and coded using NVivo qualitative software into key themes. After all of the transcripts had been coded into “essence-capturing” mini-themes, these were then consolidated into broader themes which were considered relevant to the research question, the conceptual framework, and the general literature review. Ultimately there were seven final categories; Hassle Factor, Famers versus Officials, Aesthetics, Conservation as Loss, Risk Aversion and Uncertain Futures, Financial Motivations, and Miscellaneous. These categories were then used in order to place participants along the Spectrum of Participation as outlined by Potter and Morris (1995). Applied thematic analysis was used to allow the interview data to generate theory rather than fitting data into pre-existing theories and hypotheses, resulting in the creation of a final “miscellaneous” node. This was utilized for data which did not fit into the other categories or were not relevant to the spectrum of participation, but were relevant to other themes within the literature or were interesting in their own right.

The interview design was shaped mostly by themes that re-occurred frequently during the literature research, and by prior research into qualitative research methodologies.

Results and Discussion

i. Demographic results

Ten farmers and farm managers were interviewed, of which nine were male (90%) and one female (10%). 13.1% of agricultural holders in the UK are female, so this small proportion is not unexpected (FAO 2010). Age was determined according to ten-year brackets, with the youngest participant occupying the “under 25” bracket, and the most senior respondent occupying the “75-84” bracket. The number of years working in farming was similarly varied, ranging from three years to sixty years; however, eight (80%) participants stated that outside of their careers, they had been working informally on farms since childhood.

Currently in the United Kingdom over a third of those holding agricultural land are over 65 years old, with the median age being 60 years old, making the participants of this study non-representative of the general farming population in terms of age. 40% of the participants were owners of the land they managed, with the remaining 60% being hired managers. 90% of the respondents were party to at least one agri-environment scheme, with only one respondent not being party to any. The most common AES was the Countryside Stewardship Scheme (Mid Tier) which 60% of respondents were party to, with Higher Level Schemes and Entry Level Schemes being found in 30% of cases. Three (30%) were certified Organic. One participant was part of a Woodland Creation Fund, whilst another was part of a Pollinator Facilitation Fund.

The size of the holdings managed ranged from 39 hectares to 890 hectares. The holdings primary products covered a range of agricultural systems, with the majority having some form of livestock, whether for dairy or meat (70%) on the holdings, many having arable land (60%), and one producing more specialist goods such as horticulture and fishing (10%). 90% of the farms were diversified, producing more than one product. Education amongst participants also varied, with all but one participant carrying some form of agricultural qualification. Three (30%) carried National Certificates in Agriculture, three

(30%) were Bachelors of Agriculture, one (10%) had an MSc in applied entomology, and two carried agronomy degrees in addition to their other qualifications. One had a second qualification in organic farming, and another had a second qualification in the form of a diploma in farm management.

In terms of successorship, seven participants (70%) had no successorship plans in place, whether because they were hired managers of the farm and so were not in a position to make such decisions, or they owned the farm themselves but did not have a successor in place. Two of the participants (20%) were themselves working on the farm that they would eventually take over. One (10%) had uncertain succession plans.

ii. Interview Results and Discussion

This section of the interviews aimed to investigate the perceptions of the farming community over the shift away from the Basic Payment Scheme towards a subsidy system characterized by agri-environment schemes and "public money for public goods".

Question One: Engaging farmers in conservation

The questions covered several topics and began with gauging farmers perceptions of whether such a subsidy reform would serve to encourage the farming community to engage in conservation or develop a greater interest in on-farm conservation. Due to the current uncertainty regarding the exact formatting of the schemes, most participants expressed uncertainty as to whether the proposed subsidy change would elicit a greater interest in conservation amongst the farming community. Five participants suggested that it would encourage greater engagement in conservation, but only conditionally. One participant stated that it would encourage greater engagement only if the financial support was at a level that it enabled farmers the freedom to engage more in conservation, stating:

'it's a very difficult one because we are quite stretched on a farm as it is, and as much as you want to do things for the environment, you've got to put bread on the table first, so as far as a financial incentive it certainly allows you to ... there's justification behind doing things, I love doing things for the environment, but my primary role is to bring money in and keep things turning over'

The second participant that responded in the affirmative echoed the above sentiment, and suggested that it would do so due to the fact that farmers are generally profit-driven, and would respond to the opportunity for greater financial reward and possible penalties. A third participant agreed that the subsidy reform would engender greater interest in conservation, but only because it was considered the only mechanism by which it was possible to do so. A fourth participant to give an affirmative to the first question asserted

that it would work due to the fact that many farms are non-profitable without subsidies, and would therefore be forced to comply with new reforms, while the fifth believed that it would be only to a limited degree.

Looking at these conditional affirmatives in the context of Morris and Potter (1995) and Burton and Paragahawewa (2010) raises the question of whether these conditions would result in significant and lasting attitudinal changes within the farming community, or, rather than prompting greater *engagement* with conservation, would simply encourage farmers to continue 'following the money' as it was put by one participant. One respondent stated that they didn't believe that such a policy reform would result in greater engagement from the farming community, on the basis that such a scheme would still be too unwieldy for the average farmer to utilize seamlessly.

The remaining three participants were undecided as to the impacts of the scheme in regard to farmer engagement with conservation. One participant suggested that due to the lifestyle associated with farming that farmers tended to have positive feelings towards the landscapes and environs they worked within, but that productivity-oriented ideologies hampered conservationist tendencies. Another suggested that while such a scheme could encourage greater engagement through financial incentives, simultaneously farmers often rebelled against further or new regulations.

Question Two: Effectiveness of schemes

The second question asked whether participants believed that the proposed subsidy reform would be fit-for-purpose in terms of delivering results in the form of improved or conserved biodiversity, both on their holding and more generally. Only one farmer felt positively that the reform would deliver such benefits, without further conditions. One participant suggested that they would, but would have greater impacts on less profitable farms who would be more willing to join such schemes than would the larger more profitable ones who might find the financial reward did not cover the transaction costs of changing their management systems. A second participant had similar feelings, stating

that low barriers to entry would encourage higher take-up of schemes, but that historically such schemes had not been the most beneficial to biodiversity, whereas the more targeted schemes were less popular but more effective. This was echoed by another participant who thought that such a system could improve biodiversity but was only likely to do so on livestock operations (particularly the more marginal livestock systems characteristic of the Uplands), but was doubtful that such a reform would serve to improve biodiversity on large-scale commercial arable systems. One farmer was uncertain but stated that it was a trade-off of sorts, between more effective regulation, which was more likely to see resistance from the farming community, and financial incentives which would see greater uptake but perhaps have less positive impacts for biodiversity. Another participant also voiced uncertainty in regard to this aspect of the reform, as they perceived the CAP to have historically disadvantaged small farmers and the environment in name of larger agribusiness, and so was unwilling to pass judgement on the efficacy of future schemes at benefiting biodiversity. Another participant asserted that the efficacy of future schemes was dependent on learning from the mistakes of the current system, saying:

'I mean that was one of the problems with some of the CSS you've got these deadlines to meet in terms of planting seed and if the weather's not right you've gotta get on because you got to do it even if it's wrong because that's what the scheme says,'

Another participant shared this view, stating that the reform might be beneficial if it were more 'user-friendly' to farmers, which would encourage greater uptake, but that it would also have to allow more autonomy and flexibility to the individual farm rather than blanket prescriptions.

Question Three: Important criteria

For this question, participants were questioned as to what elements would be necessary to include within future schemes to help ensure that they did deliver what they purported to. Two participants stated that it was important for schemes to be straightforward, and urged DEFRA and Natural England to streamline the administration associated with

implementing the schemes on their holdings. A third participant followed in this vein, by suggesting that it would be beneficial to start with appealing and easy-to-implement options which could then lead into more specialized targeted schemes. Another had found that many of the schemes were unrealistic given the work requirements involved in running their operation, and that designing schemes to fit the wide range of farm systems would be the biggest determining factor in their success. One farmer suggested that the most important factor would be getting the large-scale commercial arable operations to participate, arguing that

'I think that... the agreements should be area specific and should be aimed at communities of farmers rather than on an individual basis. It doesn't help the wildlife if one farmer farming 50 acres of land is doing great things and his neighbour is a 2000 acre intensive arable man with no agreement in place'

Two participants suggested improved monitoring might be beneficial, with one believing inspections to be essential. This participant was also a proponent of schemes being regionally tailored in order to represent the wide variety of landscapes and agricultural systems across the UK. One participant explained that encouraging farmers to take pride and ownership in their work and not simply 'tick boxes' would be beneficial to the success of schemes, saying that there was little incentive for farmers to go beyond the bare minimum required to qualify for the scheme. Part of achieving this however, this participant explained, would be allowing farmers the flexibility to operationalize more of the schemes at their own discretion. One participant elaborated a range of changes, stressing the importance of learning from previous experience of the schemes in order to make the new agricultural policy one that is evidence-based. They also stated that scheme length was an important thing to consider, since many current schemes are five years in length; too short for many ecological changes (whether positive or negative) to become apparent. They also iterated that connectivity between farms was important, as was ensuring that farms did not simply implement the easiest, most broad options, but endeavoured to implement enough options that biodiversity would have effective resources bases on holdings.

Question Four: Current actions

The fourth question asked whether the participant was taking action on their own holding in anticipation of Brexit and the departure from the CAP, and if so, what actions were being taken. Two of the farms were expanding their dairy herds, feeling that this sector would prove more resilient to the volatility of a post-Brexit market than other agricultural goods. The remaining eight participants were all in a state of 'wait and see', unwilling to enact change to their business and management practices until there was further information from the government. Six of these were cautiously optimistic that they might fare better than other farms as they were already attempting to improve biodiversity through their existing management practices, both within schemes and at their own prerogative. Several of these voiced the hope that they would receive payment for actions that they were already implementing, although one was doubtful of this, saying;

'they've [other farmers] flattened everything and taken everything out so they get paid to put it back in, and we don't get paid for the stuff that we've kept, which you kind of go "eh"'

Question Five: Results or Action-based?

The fifth question concerned mechanisms for the delivery of payments, asking whether participants believed that results-based, or action-based payments were preferable. This question was included in light of recent literature and media covering which suggests that payment-for-results subsidies should or may be implemented in order to increase the effectiveness of some schemes at improving biodiversity (Harmony Document 2018, 41). This is in light of suggestions that action-based payments do not encourage farmers to implement schemes with diligence and care to their outcome, since payment is delivered simply for completing certain actions (Burton and Paragahawewa 2011). Three participants supported action-based payment systems, citing the unfairness of not delivering payments when farmers have given time and money to action certain schemes,

but which did not succeed at producing the right or substantial enough results due to forces outside of their control. One farmer put it the following way

'there are so many things that are beyond your control, that if you don't achieve the results you're supposed to and you've put a lot of effort it, and it's not necessarily your fault'

Another participant seconded this sentiment, stating;

'the whole agricultural scene is like that, we get good and bad crops, we try to get the best ones but we don't always get them, not through lack of effort but you know things outside our control, and it's the same with the wildlife, I can't make a lapwing land in a field and lay eggs simple as that really, I can encourage it to but at the end of the day I don't have that ultimate control over the thing and wildlife is wildlife, so let's not put the onus on the man in the scheme to try and achieve the results, just give it his best shot'

Five participants were in favour of a combination of results and action-based payments of varying forms. These participants felt that either results or action based systems would have significant failings. Results-based payments were considered prejudicial to farmers and managers who may have implemented schemes properly but who did not deliver results because of external factors such as weather. Conversely, action-based payments were deemed unfair to the taxpayer, as they did not guarantee results and did not incentivize farmers to try their utmost to deliver said results. As such, a combination approach was favoured by the majority of participants, although what exact form this would take varied or was unspecified. Some suggested that an initial flat rate could be paid for the implementation of a scheme, in order to offset lost productivity and to compensate for the time and resources used, with further scaled payments delivered according to the degree of success:

'perhaps if there was like, a flat payment and a bonus, like you get paid this much to carry out the options and to put them into action and then if you happen to have a guy come round and see that many lapwings you should get a bonus of so much'

Whilst another said; '*If it's results based with a bit of leniency maybe that's the way to go.'*

Another participant believed that it would be important for payments to be rewarded for actions and also results for different reasons, stating that action-based payments were important in order to compensate for loss of production, coupled with a tiered rewards-based payment system. One participant who supported a combined approach stated that it would be most important for there to be proper evaluations done in addition to monitoring results, saying:

'let's say I feed the birds in winter, is that making any difference? If it's not making any difference why is that? Is it climate, is it because we're giving the wrong food; what's the problem?'

Two farmers supported results-based payments, both on the condition that measuring the results of a scheme was fair and not down to the subjective judgement of an individual assessor. However, one participant doubted the ability of governing bodies to create a fair assessment system, and also stressed the importance of having assessors be people who were well acquainted with farm work and ideally the farming community in question. Similarly, the other participant in favour of results-based payments also believed that inspectors and assessors should have agricultural backgrounds and perhaps be farmers themselves.

Question Six: Future fears

The sixth question was more general, asking participants what, if any, were their reservations about the proposed subsidy reform. Predictably, this question elicited a wide range of responses. Two respondents were concerned that the new subsidy reform would

not provide enough to compensate for the loss of the Basic Payment Scheme. Two participants voiced concerns that DEFRA and Natural England would not have learned from previous mistakes, and relayed stories of previous CAP changes which had resulted in several years of upheaval, delayed payments, incorrect mapping, and administrative chaos, a cycle which they described as apparently repeating itself without learning from past reforms.

One participant was worried that the shift would result in a loss of small and marginal farmers and an increase in large, commercial farms. They anticipated that it would benefit larger profit-oriented farms who could afford to hire managers who would abide by the letter of the schemes, if not the spirit, and would result in the loss of smaller holdings, which were ironically considered by the participant the ones most likely to be interested in the conservation ideology behind the schemes. Another participant wished that more people would contribute to the consultation and have input and was concerned that few people were aware that they could input their thoughts. One farmer was concerned about future security, believing that the new schemes would emphasize biodiversity at the expense of food production. In a related vein, one participant was concerned that higher welfare and environmental standards post-Brexit might mean that they faced greater competition from imports produced in countries with lower standards. Another participant was most concerned that the future advisors of the schemes would continue to consist of "non-farming farming experts" who would uphold what were considered to be unreasonable standards. The final participant was uncertain that schemes could be accurately evaluated considering the wide range of variables involved in producing food on a farm by farm basis.

Question Seven: Reasons for applying to schemes

The seventh question investigated what were the main reasons the participants had for applying to agri-environment schemes on their holding (and if they were not party to a scheme, what reasons might induce them to apply). This question was partially inspired

by the Wilson and Hart 2001 survey (Table 1) which investigated the same topic, but was also considered important in placing participants along the Participation Spectrum.

Most participants had several reasons for applying. One farmer who was not party to any schemes said that they could be encouraged to join if there were less hassle involved and greater financial incentives, but stated that it would require too much effort and loss of production to meet scheme standards. Two participants joined as they were already implementing farming practices that matched the schemes, such as being certified organic. Two participants found the financial reward associated with the schemes as a way to justify implementing practices that they already were interested in, but hadn't implemented due to the transaction costs associated with the decreased production. One also cited the guaranteed income from the scheme as a positive factor, as this could be incorporated into the farm's annual budget. One farm, which was managed with the help of a conservation organization, stated that wildlife and conservation were considered integral to the farm's management practices, and to be as important as production. One participant stated they could be encouraged to join more intensive schemes if the funding matched the input in time and resources required to action the scheme, and if they could be convinced that the scheme would have tangible results. Another participant cited several factors that contributed to their decision to join an AES, ranging from participating in the creation of landscapes deemed 'proper' for the English countryside, to pleasing landlords, and the standards of the schemes not being a far departure from existing management practices. Similarly, another participant cited the aesthetics associated with the results of a scheme beautifying the landscape as one reason for joining, along with the capital grants and a desire to see the wildlife they enjoyed as a child. One farmer cited a love of wildlife and the nature of the British countryside, along with the financial freedom to implement schemes, and a desire to atone for harmful farming practices that they had undertaken in the past as their reasons for joining.

Question Eight

The final question was simply an opportunity for participants to expand on any of the previous points or to bring up a point that they believed to be salient that was not covered by the existing questions. Two participants had concerns over the personnel involved in the designing and implementing of schemes, emphasizing how important it would be that schemes be designed by those who understood agriculture and farming, not by academics.

One farmer said that despite worries amongst their peers that food security would be lessened by emphasizing AESs that they believed environmental health to be directly tied to food production. Similarly, another reiterated their opinion that organic food systems could produce as much as food as non-organic systems, and also had concerns over the National Farmers Union and agri-business impeding progressive farming policy. Conversely, two participants had fears that food production would suffer as a result, with one also voicing concerns over increased regulation as they already felt overburdened.

One participant stated that the onus was on farmers to not ‘dig in their heels and keep their heads in the sand’ and be flexible to change, stating that the community had experienced good subsidies for several decades now and could not expect that to continue indefinitely. Another participant felt bleak about the future of agriculture, believing Brexit and the loss of the EU market as leading to greater trade with the USA and China, who had lower environmental and welfare standards. They also believed that subsidies should only be provided for marginal producers, while producers that had income over a certain level should be ineligible for support. Another farmer felt that it was most important that the government let the farming community know soon what the future policy landscape was going to look like so that they could begin to prepare themselves.

Participation Spectrum

The “participation spectrum” first put forward by Morris and Potter in their 1995 paper ‘*Recruiting the new conservationists: Farmers' adoption of agri-environmental schemes in the U.K*.’ classes farmers along a spectrum according to the character of their engagement or non-engagement in agri-environment schemes. The spectrum ranges from Resistant Non-Adoption, characterized by farmers who would not participate in a scheme under any circumstance, through to Active Adopters, who appreciate the wider conservation goals of schemes, view conservation as a “legitimate use of time and resources” (Morris and Potter 1995, 60), and “often regard the scheme as a facilitator of 'no regret' adjustments to their systems of farming” (Morris and Potter 1995) Between these extremes are Conditional Non-Adopters, who could be persuaded to join a scheme in future if the conditions were more amenable to their farm management or the financial incentives were higher, to Passive Adopters, who found the financial incentives appealing and were more “likely to compartmentalize their farm into ESA and non-ESA land and to use agreements far more opportunistically” (Morris and Potter 1995, 59).

Participants were placed along the spectrum using the data generated from the earlier coding. The perceptions and objections of participants to particular aspects of schemes were logged. If farmers were against the scheme or aspects of the schemes on principle then they were categorized as Resistant Non-Adopters, whereas if they were open to the possibility of joining a scheme at some point, if conditions were changed, then they were Conditional Non-Adopters. Passive Adopters were determined if they were members of a scheme for opportunistic reasons, compared to the Active Adopters who were conservation enthusiasts.

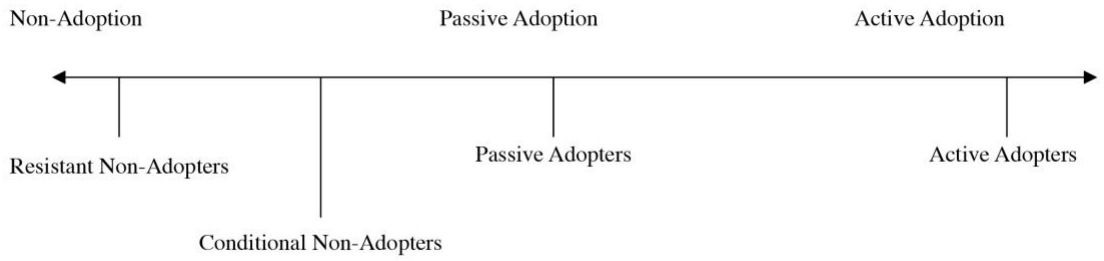

Fig. 3 Adapted from Morris and Potter's 1995 Participation Spectrum. Participants are classes along the spectrum according to the character of their adoption or non-adoption, ranging from Resistant Non-Adopters to Active Adopters

Ultimately, among the participants in this study there was only one "Resistant Non-Adopter", and one "Conditional Non-adopter". The Resistant Non-Adopter fitted neatly into this bracket of the spectrum according to the description given by Morris and Potter themselves, in that some of their reasons for non-participation in schemes were "insufficient level of payment, the restrictive nature of the contract, and typically regarding the schemes in a cynical fashion as short term, political measures for controlling production" (Morris and Potter 1995, 59). However, in contrast to Conditional Non-Adopters who might be persuaded to join a scheme were the criteria to be different, this Resistant Non-Adopter was unconvinced that schemes would ever prove to be satisfactory enough to be a sensible decision. The Conditional Non-Adopter however was not opposed to the schemes on principle, and in fact had great affinity for the conservation ideology that underpinned the schemes, valuing the diversity of ecosystems found on their own holding. This participant found the schemes in their current manifestation to be incompatible with the financial and labour demands of their farm, saying:

"It's got to financially stack up, you know, it's got to be worth the time put in, I can't justify running the kit around and doing all the work without it returning. As I say, the farm is on such a fine margin as it is, and the time involved in doing these things you just can't justify it, if it's not worth doing."

While this participant was classed a Conditional Non-Adopter, they displayed several qualities that would have potentially placed them in either Passive Adopter or Active Adopter brackets. Their emphasis on the financial incentives of the scheme and the need for the schemes operationalisation to fit in with the current management system of the farm could suggest that they could be coded as future Passive Adopters. However, at other places in their interview they self-describe as having great sympathy with the goals of agri-environment schemes, and outline some of the non-scheme conservation actions they take on their farm at present. This places them more convincingly into the path of being a future Active Adopter, if the situation should change in future.

Three of the participants were categorized as Passive Adopters. These participants had demonstrated positive feelings towards on-farm conservation abstractly to varying degrees, but their main impetus for joining schemes were the financial rewards, coupled with the fact that the actions involved with joining a scheme did not require a significant departure from existing farming management practices. In theory, while these farmers were Passive Adopters to the schemes they were already in, they may also be classed as Conditional Non-Adopters to the more rigorous targeted schemes that place higher demands on participants.

The remaining five participants were classed as Active Adopters. These participants all stated that biodiversity conservation was a central tenet to the management of their holdings;

“wildlife and the landscape is at the very core of our impetus for owning and managing the farm, that is a primary reason, ensuring that there is abundant diverse wildlife across the land”

“I wholeheartedly embrace only money for farming that increases biodiversity and also I don’t want any money going to ANY farming that doesn’t increase biodiversity.”

"I think I'm possibly not your typical farmer; I have a great love of conservation, wildlife and that and so I've been doing this for a long time way over and above what I've ever been getting paid to do half the time, as long as I can earn enough money out of my farming operations to do that I shall continue to do it"

The style and motivation underpinning a farmer's participation in or abstention from a scheme has real implications for future scheme design. Determining what factors draw farmers to schemes or repel them should be of great significance to policy-makers.

Other findings

This section will examine the original nodes that emerged from the interview transcript data. These nodes were used to inform participant location on the Spectrum of Participation, but also held interest in their own right, as they all represent themes or concepts that came forward frequently in the transcripts and often in the literature.

i. Financial Motivation

There were several themes that were present in the majority, if not all, interviews. One that recurred frequently both in the literature and in all the interviews was that of financial motivation. This was referenced in a variety of contexts, such as participant's duty towards keeping their farm financially solvent, which was often linked to the financial rewards associated with particular schemes. One aspect of schemes that was deemed important by several participants was their role in financially offsetting the loss of production associated with joining some of the schemes, which often entailed not managing the land as intensively as they had previously, with two participants saying "*they enabled us to take areas out of production and get compensated for it*" and "*to offset the loss of production*", respectively.

Some farmers participating in schemes found many aspects appealing for opportunistic reasons. One such perspective that was broached in regard to financial incentives was

the idea that the subsidies would provide an income from areas of the farm that were marginal and currently unprofitable from a production perspective, with one participant saying "*from a farm business point of view it is providing reasonable income for areas of the farm that from an income point of view are unprofitable*". Others found that they already aligned with existing management practices, and so would receive subsidies for very little adjustment. One participant put it like so:

"We applied because if you're an organic farmer it's much easier, you get in on the organic basis regardless, so that's just a win-win that's relatively easy to do, and we were just finishing another stewardship scheme so we could just roll some of the options we had already into the new scheme."

ii. Conservation as Loss

One of the nodes established through analysing the interview transcriptions was that of "conservation as loss", meaning that these participants equated undertaking conservation actions, like those in the AES, with a loss of productivity. One participant put it so; "*unless the farmer's got a natural interest in conservation he sees it as a detrimental aspect of his farm*". Another said "*to take a 5-10 acre field with easily managed corners out of production to create a wildflower meadow, I can't see the logic of that, it's better to use it for producing food*". This contrasted with the perspective of one participant who felt very strongly that farming systems that incorporated conservation into their management were just as capable as producing adequate amounts of food as more conventional agriculture, as long as there was adequate human labour.

Iii. Aesthetics

A minor theme that evolved as motivating factors to join a scheme related to the role of farmers as active producers of the landscapes associated with British cultural heritage,

and normative ideas of what the rural landscape should look like. For example, one participant said;

"*there are some areas around us that are just so farmed its very bare, it looks boring they've ripped out hedges, whereas if you look where we are you look at the nice countryside and you look at the wilder and you go on walks and so on so I suppose that side of things was why we do it*".

While the concept of farmers preserving certain landscape aesthetics was mentioned in the literature (Daugstad, Ronningon and Skar 2006) but most commonly in reference to a responsibility to maintain "tidy" landscapes, for example, keeping fields, margins, and hedges neatly trimmed (see Fish *et al.* 2003, 25; Egoz *et al*. 2001; Nassaur 1988 cited in Ryan *et al.* 2003).

iv. Farmers versus Officials

A frequent complaint from participants was the reported adversarial dynamic they experienced with advisors and inspectors, who they felt frequently had little experience with agriculture. The official's lack of agricultural background was a common point of contention, as farmers felt that this led to official's often emphasizing minor points of schemes without understanding the greater context of farm work or the challenges associated with working within the natural environment. One participant reported attempting to join a scheme related to conserving a particular species of farmland bird after sighting several nesting pairs in one of their fields, (hoping to be compensated for not mowing the field until the birds departed) only to be told that the field size was too small to be eligible, despite the presence of the birds in question; "*How am I supposed to justify not mowing that field then? If I'm losing money leaving it*?"

One participant described wanting to

"*not being hounded by people all the time about 'this is too shor*t' *or* '*that's on the wrong side of the fence'*; *the pettiness needs to go out of it, there needs to be much more understanding about how farms actually work, and the role of a farmer and how this can be integrated amongst it."*

Participants reported feeling condescended to by academics, which engendered feelings of resentment counterproductive to the collaboration needed to achieve the best results. One participant put it like so:

"That's the other big aggravation of a lot of farmers is academics know better, and you kinda go we're not doing it the way we're doing it because we don't know what we're doing, we are a lot of the time, there's a lot of incredibly smart people farming, and they don't do what they do for no reason, there is logic to it, you might not agree with some of it but there is a lot of logic to them".

This behaviour was considered a challenge to the legitimacy of the farmer's knowledge and experience. One participant stated: "I don't want to be told how to farm, I'm a farmer. I've been told how to produce food to the best advantage to all, and I don't need people telling me how to do it, I've been doing it for too long."

While another said *"We know our farm and we know what animals will thrive here and what won't, and how, not all the time, but we have a pretty good idea how to encourage them."*

Conversely, there was an assumption on the part of many participants that officials, not farmers, were the ones guilty of a lack of knowledge and understanding, particularly given their outsider status in the industry;

"There's an awful lot of very educated people who have not got a clue about the practical elements and it's a real problem we face in agriculture now, there are not many people clued into the actual is that going to work scenario, and they're lovely ideas when you look at them on paper but you start going into how to do it and you just think it's just not practical."

This sentiment occurred frequently in the interviews, as seen in the following examples;

"[there is] a lack of understanding, as to how things work in agriculture. It isn't an air-conditioned office at the end of the day, we face the elements and every year is different and we need a lot more flexibility".

"The fact is that the wrong people will be blasted trying to administer it who don't know what they're talking about, and I'm sorry to say that".

"It is showing how naïve some of the people are that are actually coming up with these things, they don't seem to have a good understanding of how these things need to be put in place to gain good value for money for habitat creation, and this is where I go to what I'm saying, we need good sound advisors, to work with us and look at how this money can be best spent because at the moment half of it's being squandered".

V. Hassle Factor

Another theme that emerged from the interview data was ultimately labelled "Hassle Factor" (in reference to the 2004 Toogood *et al*. paper). This referred to the frequent criticism from participants both within this research and the wider literature that there is an overly onerous administrative burden associated with joining AESs, which were not "realistically met by payments" (Toogood *et al*. 2004, 16).

One farmer complained "*We're that over-regulated as it is, that if they stuck another layer of regulation on it would break a lot of people*" whilst another said "*I think the system has*

got too unwieldy, become too prescriptive,". Other complaints were that schemes were "*totally and utterly ruined by the red tape attached"* and that there were "*Too many boxes to tick. There is too much supervision*"

Flexibility

Whilst Hassle Factor refers to specific aspects of scheme design that farmers dislike, its sub-node Flexibility refers to themes in the data which reflect participant's wish to see schemes incorporate more of this trait in their design. One participant believed that the most important goal for policy makers designing the future schemes was to;

"[make] it a fit within the system and unfortunately there are so many different systems that it's quite a challenge; I don't envy the people who have to try and concoct something to make it fit, it's a real challenge, we're so diverse, but that's one of the key factors is actually making it fit within the system."

Another participant also disliked this particular facet of the current schemes saying: "*options are just so rigid, we need a lot more flexibility*". Another participant also stated that this was their greatest desire for the final version of whatever future schemes were implemented, hoping for regional schemes "*so it fits to the farm and the connectivity for that particular landscape*."

vi. Risk Aversion and Uncertain Futures

Dobbs and Pretty (1998) describes farmers as generally risk-averse, a factor which contributes to their participation or abstention from agri-environment schemes. This trait also emerged as a node when coding the interviews, perhaps unsurprisingly given the period of uncertainty the UK is entering because of Brexit. This is particularly true for the agricultural sector, given that there has been little detailed information published as to what farmers can expect their subsidy environment to look like. One farmer described the state of concern among many producers saying "*certainly the small beef and sheep farms*

in the UK are non-profitable without a subsidy", which related to another participant's concern that the future subsidies would not fully compensate for income lost from ending the Basic Payment Scheme.

Vii. Miscellaneous

This node emerged for themes that were otherwise anomalous in the interviews but bore further investigation in their own right or due to their association with existing literature.

While many of the participants supported broad, entry level schemes that would appeal to a wider community of farmers, several participants acknowledged that the more appealing schemes were not necessarily the ones that provided the most conservation impact: *"... if everyone does it in terms of it not being of massive benefit to the environment [if] they only choose the minimal options*" implying that the number of farmers joining a scheme is not directly correlated with the depth of impact, if the schemes that are most popular are appealing due to their low requirements (such as trimming hedges every other year). Another farmer also acknowledged this saying

"if the bar is too low then there won't be much of an environmental gain, the higher the bar is set the more likely that there will be benefit for the environment but the farmer will likely have to do more than he or she is used to get that subsidy."

Which supports the opportunistic approach of many farmers who were party to schemes. One farmer in particular gave some personal experience in this mind-set, relating the following;

"I can quote some very classic example over the years of when I've been involved in schemes, when it's clearly been nothing more than financial gain for me why I participated in it, a classic one was ditch maintenance, when we were paid 3 pound a meter to scrape ditches out when it cost us next to nothing, now that obviously everyone jumped on the bandwagon, now that's totally wrong"

This relates to the theory of Burton and Paragaweha on the subject of subsidies failing to generate substantive attitudinal change, which also emerged in the transcript data. One participant criticized the process, "*as long as you can show you've created or put the effort in you can tick the box and get paid and there's no incentive to put extra effort in to increase the quality".*

Another concern was the concept of agri-environmental subsidies being less appealing to more profitable farms, which was mentioned several times. One participant said "*I suppose the modern farms that are more profitable anyway would think that it's getting in the way of their farming practices*". suggesting that large-scale industrial farms would be less attracted to schemes that required departing from their current management practices as the transaction costs associated would not be covered adequately by the resultant subsidies. This was iterated eloquently by another participant who also believed that the "main offenders" in agriculture were ironically the ones least likely to join schemes, as they stated:

"[It's] all to do with benefitting the big agriculture businesses […] the big slick efficient ones…The trouble is the HLS [Higher Level Scheme] *and ELS* [Entry Level Scheme] *were based on income foregone of about 400 pounds per hectare, but I think what we're seeing is very much the separation between the farmers who can do very efficient production and end up with gross margins potentially of 750 pounds a hectare or more, against the majority of farmers, the smaller ones who won't be making that kind of gross margin"*

A third participant agreed, saying

"Unless arable monoculture production is challenged, not a lot will change in the big arable areas, which are the areas that need it most[…] It doesn't help the wildlife if one farmer farming 50 acres of land is doing great things and his neighbour is a 2000-acre intensive arable man with no agreement in place"

Conclusion: Implications for Future Policy Design

The transcript data and literature have both evinced the idea that if agri-environment schemes are to be more popular with the farming community and if they are to achieve their goals further reform is necessary. Currently, it can be seen that even those who are Active Participants in schemes find there to be several aspects of AESs that bear revision in future, ideally in the imminent post-Brexit agricultural policy reform.

Results or Action Based?

The interview data revealed no consensus among the participants whether results-based or action-based payments were preferable, although those in favour of a combined approach were the majority by 10% for reasons outlined in the Discussion section. However, some participants supported results-based payments as long as inspections were undertaken that were thorough and fair to the farmer in question. One participant supported inspections that included evaluations so that changes could be implemented that would be more likely to result in success. The remaining participants believed that action-based was the superior option, possibly because that was a system they were familiar with and felt functioned well. Overall, this research suggests that a combined subsidy payment system would help mitigate the potential negative side-effects born by an either-or system.

Persistent Attitude Change

Several questions and areas of concern also emerge from this research and the surrounding literature and bear further consideration for future research and policy design. As raised by Burton and Paragaweha, there is little evidence to determine whether or not agri-environment schemes result in long-term attitudinal change in favour of the practices incentivized by the scheme. Whether AESs accomplish effective attitudinal change is important in itself, but also has implications for another concern raised by these authors; the vulnerability of these schemes to external changes. AESs

are subject to the changing political and economic concerns, as such, if conservation actions are to persist after the potential end of a scheme's existence, profound attitudinal changes must be generated by their implementation. This relates to a second related area of concern, which is the idea that joining schemes has little impact on attitudinal shifts because farmers are able to simply "disown" scheme areas, and focus production on conventionally managed remainder of the farm. While it is useful to differentiate between on-field and off-field practices, it is vital that conservation actions are not limited to non-productive margins alone. As a participant and scholars have said, the landscapes between AES areas are a crucial contributing factor to the efficacy of schemes and of species' population health more generally.

A recurring idea that emerged in the literature and conversations with participants was that farmers are currently being denied the option and opportunity to apply their own innovations and ingenuity to the implementation of schemes. Future schemes may benefit from allowing farmers to participate in deciding how particular outcomes can be best achieved on their land, which would encourage farmers and advisors to collaborate and share knowledge, changing their roles from that of a technician whose job is simply to "follow orders" to one that respects their knowledge and skills.

Context and Understanding

Regionalising agri-environment schemes recognizes in policy recognizes the heterogeneity of agricultural landscapes in the UK, allowing for more contextually appropriate actions. This is in contrast with (or perhaps in addition to) broader more horizontal schemes, such as hedgerow options, but would acknowledge the ecological specificities of different areas and allow for more effective targeting. One participant supported the idea of tailoring schemes on the farm level, having an advisor come and work with the farmer in order to determine the most beneficial course of action.

Furthermore, and in addition to the above points, it is vital that advisors and administrative officials involved in the operationalization of the schemes either have agricultural

experience themselves or are aware of the idiosyncrasies involved in working in an agricultural environment. Several participants said that they would prefer it if advisors had agricultural backgrounds, and one suggested that in addition to this, the ideal situation would be if each farming region had its own advisors who could develop relationships and contextual understandings of the communities they worked within. Developing relationships with a community of farmers would serve to improve communication and understanding between parties, and to increase trust.

Evidence and Evaluation

Undertaking evaluation of schemes at the appropriate temporal and spatial scales is a key factor in determining their utility. It is clear from the literature (Whittingham 2006) and the interview data that future schemes must be carry forth the lessons learned in their earlier iterations. This also entails building regular impact evaluations into the schemes themselves, so that it is possible to discern less effective schemes and remedy them.

Evaluation of effectiveness should take place at multiple scales, not just on-farm, in recognition that species utilize a mosaic of environments in order to meet the range of resource and habitat needs throughout their lives. Species may be present on a certain farm, but this does not necessarily mean that there is a viable population on a regional level, or that they have the resources necessary to persist successfully through all life stages. This has implications for another important factor in future schemes, which is connectivity. Evidence from the literature and this study suggests that it is important to ensure that the landscapes between AES areas are hospitable to biodiversity, and provide a range of resources that are valuable to species at different life stages and with different requirements. Additionally, care must be taken to ensure that funding is not squandered on low value AES areas (Whittingham 2006), in order to facilitate the likelihood of them achieving of their goals. It must be remembered that the goals of AESs are dependent on the values of the designers, so which species are considered a priority for conservation efforts may vary. For example, some schemes may emphasize the

prioritization of endangered species, whilst another may seek to pre-emptively increase populations of near threatened species.

Additionally, the issue of temporal scale was raised both in the literature and by participants as a flaw of current schemes, given that ecological change, whether positive or negative, likely requires more time to become apparent than the typical scale length. Because of this, and because of the variability seen in these schemes, evaluation should take place over multiple years as well, in order to avoid judging the efficacy of a scheme by one year that may have been anomalous.

There is evidence to suggest that horizontal schemes and broader options hold less promise than targeted, zonal schemes such as those that are directed at specific threatened species or habitats (Kleijn & Sutherland 2003). This has implications for the development of the new agricultural policy, given that the most popular schemes tend to be horizontal ones. Bearing in mind that participation does not necessarily lead to delivery, this suggests that more effective utilization of funding could be achieved by redirecting resources towards zonal schemes.

Additionally, the literature should serve as a reminder that extrapolating results from one scheme, study, or area across multiple agricultural landscapes and scales is largely unhelpful; as discussed in the literature review Kleijn ***et al.***'s (2006) study revealed that factors which have a causal relationship with results in one area may not have the same relationship in other contexts, meaning that policy makers should be very wary of extrapolating results during scheme formation without a proper evidence base.

Leaving the Common Agricultural Policy after over five decades and at a time of environmental decline carries an obligation to ensure that future policies avoid the mistakes of the past, and are fit for a changing future. It is imperative that the government utilize the lessons learned over the previous decades to facilitate evidence-based collaboration between the agricultural and conservation communities that will benefit both communities and the environment.

Limitations

There were several flaws with this research that should be rectified if this research were to be repeated. Ideally, a larger set of farmers would be interviewed in order to establish a greater data set. At the current size of ten individuals it is difficult to extrapolate the results across the broader farming community. Nevertheless, the findings in this study can be considered useful for future policy design. The study would benefit from additional questions, both in the demography section and the long-form interview questions, whilst nevertheless bearing in mind that longer interviews may be less appealing to potential participants (particularly in the agricultural industry during the summer period). This could be negated to some extent by seeking participants from a larger population pool so that the overall number of participants does not decrease. Ultimately, the unavailability of concrete information regarding the exact form of the future policy for farmers meant that they found it difficult to anticipate the efficacy of the scheme; instead, responses were most often positioned in terms of their existing experience with a range of agri-environment schemes. Additionally, some of the questions could have been subdivided into two parts in order to increase clarity. Q. 5 on results versus action-based payments may have benefitted from being subdivided into two parts, for example, as it may have been unclear whether the question as referring to biodiversity or farmers themselves as the beneficiaries of the alternative payment systems. Similarly, this question may have benefitted from a third option of a combined approach since this is what most participants suggested with spontaneously on their own.

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