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**Evaluating the Role of Public Private Partnerships for the delivery of
Ecosystem Services in UK Agriculture: The case of Local Nature Partnerships
(LNPs)**

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Abstract

Agriculture covers the largest proportion of land worldwide. The way in which agriculture is governed can have implications, for both the societal public and private goods it provides. Agriculture provides a wide range of environmental public goods, which are termed ecosystem services (ES). One of the ways to deliver these ES within agriculture is by using Public Private Partnerships (PPPs). These PPPs are advocated as a method by governments to reduce inefficiencies that occur if the government or the public sector were to deliver ES alone.

This study evaluates the role PPPs have in the delivery of ES within UK agriculture, using the PPP example of Local Nature Partnerships (LNPs) and case study of Cumbria. LNPs were one of the most understudied PPP examples and have diverse structures, with no LNP structurally the same as another.

ES mapping was carried out using a model called LUCI. Map outputs showed several ES or contributing features to the delivery of ES. Synergies and trade-offs between different ES were also analysed. Semi-structured interviews with policy makers, partnership implementers and practitioners took place, alongside two deliberative workshops. These methods elicited information on how partnerships should work and the challenges they face.

The thesis argues for a redrawing of the PPP model, which incorporates the third sector as a key part of PPPs operating within agriculture. Secondly, it argues for increased involvement from the public and private sectors to ensure that resources are adequate to make PPPs sustainable. Finally, it calls upon the government to foster trust and implement advocacy work to publicise LNPs. The remit government has given to LNPs is extremely broad, with limited support beyond that. Much more needs to be done, in terms of training stakeholders, engaging with other partnerships and communicating more effectively with the wider community of farmers.

Author's Declaration

I, the author, confirm that the Thesis is my own work. I am aware of the University's Guidance on the Use of Unfair Means (www.sheffield.ac.uk/ssid/unfair-means). This work has not been previously been presented for an award at this, or any other, university.

Signed

Date

Daniel John Casey

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List of Abbreviations

AES	Agri-Environment Schemes
AONB	Area of Outstanding Natural Beauty
BAP	Biodiversity Action Partnership
BEETLE	Biological and Environmental Evaluation Tools for Landscape Ecology
CaBA	Catchment Based Approach
CAP	Common Agricultural Policy
CBP	Cumbria Biodiversity Partnership
CFN	Cumbria Farmers Network
CEH	Centre for Ecology and Hydrology, Bangor
CLA	Country Land and Business Association
CLNP	Cumbria Local Nature Partnership
CR	Critical Realism
CS	Countryside Stewardship
CSF	Catchment Sensitive Farming
CSR	Corporate Social Responsibility
DEFRA	Department for Environment, Food and Rural Affairs
DTM	Digital Topography Model
ELM	Environmental Land Management
ELS	Entry Level Stewardship
ES	Ecosystem Services

EU	European Union
GIS	Geographical Information Systems
HLS	Higher Level Stewardship
HWBs	Health and Wellbeing Boards
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
LDNPP	Lake District National Park Partnership
LEP	Local Enterprise Partnership
LNP	Local Nature Partnership
LUCI	Land Utilisation Capability Indicator
MEA	Millennium Ecosystem Assessment
NEA	National Ecosystem Assessment
NEAFO	National Ecosystem Assessment Follow On
NGO	Non-governmental Organisation
NFU	National Farmers Union
PES	Payment for Ecosystem Services
PFI	Private Finance Initiative
PPP	Public Private Partnership
RSPB	Royal Society for the Protection of Birds
SES	Socio-Ecological Perspectives
SI	Sustainable Intensification
TESSA	Toolkit for Ecosystem Service Site-based Assessment

UK	United Kingdom
WTO	World Trade Organisation

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Chapter 1: Introduction

1.1 Agricultural Studies

Agricultural research is important for several reasons. Firstly, as it relates to many societal questions regarding food security and food production. Sustainable forms of agriculture are increasingly important for the future given the effects of climate change and pressures on food supply from a growing population. The fifth assessment report from the Intergovernmental Panel on Climate Change (IPCC) stated that by the end of the twenty first century, relative to between 1986 and 2005, that mean global land temperatures could rise by up to two degrees Celsius. This increase would increase the frequency of extreme weather events and lead to challenges for agriculture (IPCC, 2014).

Moreover, the Food and Agriculture Organisation (FAO) have documented that the worldwide population is set to rise to almost ten billion people by 2050, double the global population in 2013 (FAO, 2017). This will cause challenges for agriculture with increased demand for food alongside heightened environmental stressors (Foresight, 2011). Therefore, policy makers are having to provide innovative solutions to ensure the future sustainability of agriculture, which relies upon environmentally sound practices being adopted in the industry. To address these factors, the concept of ecosystem services (ES) came about, in order to conceptualise the benefits which human wellbeing can gain from the environment (Millennium Ecosystem Assessment, 2005).

In order to further understand how agriculture provides ecosystem services, and can address environmental sustainability alongside food security, there has been an increase in interdisciplinary research (Waage et al., 2017; Brasier, 2019). However, there is still a need for more such research to consider the complexity of assessing the environmental benefits or disbenefits, and the social complexity, involved in delivering ecosystem services which balances agricultural production and environmental concerns (Herzog, 2015; McDonough et al., 2017; Sole and Ariza, 2019). The research in this thesis provides findings to develop research within this interdisciplinary area.

1.2 Agriculture and the Environment

The way in which agriculture is managed can lead to either positive or negative consequences for the environment (Bourgoin et al., 2019; Roos et al., 2019; Vázquez-Rowe, 2019; Pathak et al., 2018; Yu and Wu, 2018; Lee et al., 2016). Historically, agriculture has been critiqued for negative environmental externalities (or unintended consequences) arising from certain practices. For example, Carson (1962) in *Silent Spring*, first raised environmental concerns around the use of pesticides, from the negative effects that they were having on wildlife and the environment, to the misinformation being provided by the chemical companies providing them. This helped to start an environmental movement, which started to critique agricultural practices, and lobby for more sustainable methods to be used in the industry. Following the 1960s, the 1980s then saw increased understanding around the negative environmental degradation, resulting from the overproduction of food, use of pesticides and machinery which the Common Agricultural Policy (CAP) was causing (Spelman, 2011). Thus, there was increasingly a need to account for the environmental benefits and disbenefits that agricultural practices were having on the environment.

Therefore, researchers have begun to try and quantify the environmental benefits which farming can provide society with (Boone et al, 2019; Jensen, 2019; Monge et al., 2016; Goulding and Whitmore, 2012). This culminated in increasingly interdisciplinary assessments, including the mapping of ecosystem services (Natural England, 2019). Within these assessments it was found that agriculture had much to offer economically to human well-being as well through the ecosystem services agriculture can produce. For instance, through the improvement of pollinator services and carbon sequestration services which, in turn, benefit societal wellbeing with a wider variety of flora available and cleaner air, helping to regulate the climate (Millennium Ecosystem Assessment Report, 2005).

1.2.1 Multifunctional Landscapes and Payments for Ecosystem Services (PES)

In turn, agricultural activities began a shift towards 'multifunctional landscapes', where the multiple benefits, ecosystem services, or functions, across the landscape which farming could produce were better understood (Lombardi et al., 2019; Meuwissen et al., 2019; Tohidyan Far and Rezaei-Moghaddam, 2019). This meant that rather than simply focusing upon the production of food, agricultural landscapes diversified to deliver a wider range of products and ecosystem services.

Through a series of CAP reforms, and policy shifts, farmers could be paid directly for their delivery of these ecosystem services, through schemes known as Payments for Ecosystem Services (PES). PES schemes are designed to not distort trade or production but instead compensate farmers for any income lost and expenditure they have had to use to look after the environment (Mennig and Sauer, 2019). For instance, flooding mitigation has become a prominent activity, as policy makers and practitioners began to understand the importance of the environment to benefit wider society (He et al., 2019; Genovese et al., 2016; Di Domenico and Miller, 2011).

However, the specific impacts such 'multifunctional' agriculture has is influenced by trade-offs between several of the ecosystem services which agriculture offers (Plieninger et al., 2019; Vallet et al., 2018; Jessop et al., 2015; Hussain and Tschirhart, 2013). For instance, mapping work conducted in Northern Australia, found that if agricultural decisions were taken solely on agricultural production potential that this could have many negative impacts for biodiversity (Morán-Ordóñez et al., 2015). Therefore, through an understanding of the multifunctional landscape, the way in which agriculture is governed and the benefits agriculture can have for society, agriculture can become more sustainable by addressing any emerging trade-offs highlighted in ecosystem services mapping approaches. Studying land management and different governance structures (such as those in section 1.3), enables synergies or trade-offs between different ecosystem services to be comprehended and relevant PES schemes to be implemented.

1.3 Governance Models

1.3.1 Agri-Environment Schemes (AES)

One of the longest historically running schemes to deliver PES schemes, and work with farmers, came in the form of agri-environment schemes (AES). The UK introduced its first AES in 1986 (Lobley, 1998; Dobbs and Pretty, 2004). The various aims of AES include “reducing nutrient and pesticide emissions, protecting biodiversity, restoring landscapes and preventing rural depopulation” (Kleijn and Sutherland, 2003, 947). AES to meet these aims include farmers adopting practices which are more environmentally friendly, and which maintain or restore semi-natural habitats, such as hedgerows (Zingg et al., 2019). These schemes are funded under the Common Agricultural Policy’s (CAP) budget, as discussed further in section 1.4.2.1. Between 2007 and 2013, the CAP budget set aside 22.2 billion euros across the EU for AES (McCracken et al., 2015). England, Wales, Scotland, and Northern Ireland all have their own AES. These evolve over time, in line with CAP reforms, and new and old schemes may run concurrently for several years (RSPB, 2020). Harris (2020, 1) discusses how the evolution of these schemes aims to make them more effective, provide greater efficiency, and focus on ecosystem services which are needed at the time.

However, Dwyer (2019) also highlighted emerging issues overtime with the schemes, with some of AES not considering local conditions, and with projects that were too narrow and parsimonious in scope. These issues caused some ecosystem services to be prioritised above others and solutions which lacked a consideration of the whole landscape. Moreover, other scholars have documented how farmer opinions and engagement with AES aims influenced AES outcomes. McCracken et al. (2015) conducted interviews exploring farmer attitudes to 48 AES across farms in Southern England. These researchers examined the effectiveness of newly created habitats regarding the availability of nectar, pollen and winter seeds for the biodiversity promotion of bees, butterflies and seed-bearing crops for birds. Results indicated that the effectiveness of habitats and environmental benefits varied widely depending, in part, on the farmer’s experience, concerns and motivation. Better

outcomes were seen where farmers previously had taken part in AES, those who value, and those who know about the importance of biodiversity alongside how it is interrelated to the broader environment.

Given these arguable limitations and policy makers wanting AES to become better equipped to deal with environmental challenges the UK has begun to investigate how other governance models, such as Public Private Partnerships (PPPs), could be strengthened to deliver ecosystem services.

1.3.2 Public Private Partnerships (PPPs)

An additional mode of governance to manage the delivery of these ecosystem services, like those in AES, is the Public Private Partnership (PPP). PPPs are seen by governments as a way of devolving power to local areas and enabling self-sustaining partnerships which are able to obtain funding from the private sector. These partnerships bring together public and private stakeholders to collaborate and deliver services that would have traditionally been provided by the government (Xiao and Lam, 2019). Pattberg and Widerberd (2015) argue that such partnerships can provide advantages from their flexible, adaptive, and decentralised nature, whilst some academics still critique the model on the belief that it empowers the private sector's agenda within the wider neoliberal economy.

However, studying these governance models is complicated and needs to be done at a localised scale given the diversity of agricultural landscapes and practices. The UK offers a useful context in which to study such a governance model and its effectiveness.

1.4 Agriculture and the UK

1.4.1 Importance of Agriculture

Within the UK, agriculture is a widespread industry, covering 71% of the total land area (Defra, 2019a). The Corine mapping project in 2012 highlighted the extent of land coverage associated with agriculture. The project indicated that approximately fifty two percent of the UK's land cover was

arable farmland and thirty six percent permanent pasture (Rae, 2017). Moreover, the industry employs an estimated 3.7 million UK workers, around 1.5% of the UK's total workforce, and provides £180 billion of gross value added (GVA) income to the economy (Defra, 2019b). Therefore, whilst agriculture is not substantial in terms of contribution, representing approximately 0.5% of GDP, a lot of land is under agricultural production (Defra, 2019a). Therefore, an understanding of agricultural land management across the UK is important to assess which governance strategies are best suited to the delivery of ecosystem services.

Agriculture within the UK is also fundamental for UK consumers from the public goods (e.g. the wider environmental benefits) and private goods (e.g. food) it can supply (Angus et al., 2009). Cook et al. (2017) document the different forms in which these public goods are offered, whether that be agriculture in the UK acting as a cultural and recreational activity for people, or as agriculture offering flooding protection to vulnerable communities. These benefits were valued in the UK's National Ecosystem Assessment (NEAFO) Follow On report (2014), as being significant to the rural economy and agricultural businesses. In line with these benefits the policy landscape has changed to take these findings into account.

1.4.2 UK Agricultural Policy

1.4.2.1 Delivering Public Goods through the Common Agricultural Policy (CAP)

Understanding that UK agriculture covers most of the landscape and that it can deliver several ecosystem services has impacted UK agriculture in notable ways, marking a prioritisation shift towards the delivery of public goods above private goods. UK agricultural policy has evolved over time, in line with European Union (EU) law. The main policy the UK abides by is the CAP. This policy has undergone numerous reforms as scientific and policy directions have changed. The CAP was introduced in 1958 – post World War II - to meet demands from a growing population and a shortage of food supply (Medina and Potter, 2017). The McSharry reforms of the 1990s then shifted policy away from a 'productivist' agenda (of focusing purely on food production), with shifts in

payments to heighten focus on food quality, farm diversification and environmentally sustainable approaches (Barnes et al., 2016). The Fischler reform in 2003 then introduced further regulations, where only farmers adhering to a strict set of criteria in relation to the environment, animal welfare and food safety were able to receive agricultural payments (Swinnen, 2008). More reforms then emerged in 2015, when new 'greening' requirements were introduced and payments increasingly became separated from production objectives (Barnes et al., 2016). In turn, such policy shifts have led to changes in the UK through the land governance schemes used to deliver these goods. Whilst the UK still engages in EU-wide AES schemes, many new forms of land management and PPP governance approaches are increasingly being adopted and considered, especially given Brexit and the UK government's devolution agenda.

1.4.2.2 Brexit and Future Approaches

Challenges in land management policy are currently at the fore of the UK, as the CAP is an EU-wide scheme, so when the UK's transition period ends for leaving the EU on December 31st 2020, UK agricultural policy will need to change. The Health and Harmony Consultation (2018) recognised the importance of the environment for societal wellbeing (economically, socially, and environmentally). Therefore, the UK views PES schemes as highly important to deliver ecosystem system services. The UK government, in order to maintain the ecosystem services currently being delivered through the CAP, have argued for a transitional period following Brexit to enable farmers to still have access to direct payments. After a period, these payments will be phased out and replaced with a new scheme based upon landowners being paid to provide public goods, as suggested in the UK's Agriculture Bill. Within this bill, the report argues for an Environmental Land Management (ELM) scheme underpinned by the environmental benefits farming provides, based upon principles devised by the UK's Natural Capital Committee, where public money is for public goods (Cardwell and Smith, 2018). The report argues that certain legislative powers should be devolved to enable local communities to decide on agricultural priorities, which has often been happening in the agricultural sector using

PPPs. Harris (2020) reports that Defra is hoping for 1,250 businesses to participate in the ELM pilot scheme in 2021, reaching 15,000 by 2024. The ELMs will replace basic payments and other AES initiatives and ELMs are expected to be fully incorporated into UK policy between 2024 and 2027.

1.4.3 The Local Nature Partnership (LNP)

One example of a PPP in the UK sector, which has come from the government's devolution agenda, is the Local Nature Partnership (LNP). LNPs were established in 2012 to promote the natural environment at a local scale. They were viewed as an opportunity to be self-sustaining partnerships which could operate with a variety of stakeholders to deliver environmental benefits (Natural Environment White Paper, 2011). However, the success of these LNPs overall to deliver environmental benefits across the landscape and within agriculture has been varied. The UK's Environmental Audit Committee (2015) report highlights a few cases where LNPs have struggled to meet their aims from a lack of resource support through to challenges surrounding the stakeholders involved in the partnerships. Therefore, the dynamics surrounding this approach, in terms of stakeholder participation, and stakeholder roles and responsibilities, including the successes and challenges of a PPP approach to the delivery of environmental benefits in agriculture need to be understood in order to understand how best to deliver ecosystem services. This is especially important given the limited evaluative research done to date on LNPs as opposed to other PPPs in the agricultural sector and as the partnerships are deemed by the UK's 25 Year Plan for Nature (2018) to be a continuing mode of governance delivery post-Brexit, arguably having a role within ELMs, as well as the UK government's devolution agenda.

Therefore, the study uses an interdisciplinary approach to provide an evaluation of PPPs, reflecting on what they should be providing and what happens in actuality – this allows us to critically assess this role of governance through the lens of one PPP approach and give indications, recommendations, and draw lessons on the sustainability of these models into the future. This is

important given the emphasis given to public goods in the Brexit debate and the continued narratives around devolved governance and PPPs in UK government documents.

1.4.3.1 Evaluative Approaches

Evaluation is a useful approach to study the way LNPs, as a PPP model, are delivering ecosystem services in UK agriculture, as an evaluation enables an understanding of the relevance, effectiveness and impact of various projects (Mwangi et al., 2015). In this case, by using an evaluation to understand partnership approaches to deliver ecosystem services within UK agriculture, the multiple impacts on society, especially given international discourses surrounding population and climate challenges within agriculture, can be better understood (Weißhuhn et al. 2017). This enables indications, recommendations, and lessons to be drawn on the sustainability of these models into the future, as mentioned in the previous section.

1.5 Research Questions

Given the importance of interdisciplinary research on agri-environmental outcomes and the governance models associated with agricultural land management, this project studied UK agriculture and examples of PPPs which aim to deliver ecosystem services. Specifically, the LNP model was evaluated, using the in-depth empirical example of Cumbria's Local Nature Partnership (CLNP). The project had 4 main research questions, which are presented below, underneath and overarching aim:

The first two research questions studied how PPPs should work in theory:

1. What different models of PPPs are currently in place to provide payments for ES in UK agriculture?
2. What ecological (dis)benefits should occur from PPPs when managing agricultural catchments for ES?

The final two research questions examined how PPPs work in practice:

3. What makes a good partnership approach? This includes considering who is involved, division of roles and responsibilities, modes of governance and the proportion of risk assigned to different stakeholders.

4. How do different stakeholders appraise the relative (dis)benefits of their involvement in PPPs, and what implications does this have for the sustainability of partnership projects?

1.6 Thesis Structure

Within this thesis, UK agriculture is explored in the context of PPP approaches to deliver ecosystem services. Chapter 2 outlines the academic debates surrounding the way agriculture has developed over time and some of the key challenges which agriculture faces into the future. The development of agriculture is then linked to changing agricultural policies over time, as policy shifted from being production orientated (private goods) to focusing more on the wider environmental benefits (public goods) which agriculture can provide. Contemporary policy revolves around delivering and being able to measure these environmental benefits, which are termed ecosystem services. The PPP is found to have been used as a governance model to deliver ecosystem services across the UK's agricultural landscape. One such example, being the LNP. The chapter concludes by offering the research justification for this study and the 4 research questions that this thesis answers.

Chapter 3 offers the justification for the methodological approach of the study through a lens of critical realism. As the study is interdisciplinary, multiple methods (desk-based, mapping, semi-structured interviews and deliberative workshops) are chosen which reflect a good evaluative approach informed by process evaluations which can meet the 4 main research questions. The case study of the CLNP is also introduced in more depth here as a basis for the results to be presented.

Chapters 4, 5 and 6 contain the results of this study. Chapter 4 presents the empirical findings based upon research question 1, using desk-based research. Chapter 5 discusses question 2 from the

findings of ecosystem services mapping. Whilst Chapter 6 gives findings from the final two research questions, from interviews and deliberative workshops.

A discussion of the empirical results, with reference to existing academic debates, is presented in Chapter 7, being based around key themes of power relations, local knowledge and partnership development. Key findings are presented on the types of PPPs in operation within UK agriculture; the ecosystem services benefits and drawbacks which can result from the land governance put in place; the foundations of a good partnership approach including the stakeholders who should be involved; and how these PPPs function in practice.

Conclusions are presented in Chapter 8. Key findings are noted, alongside an acknowledgement of the limitations of the research and opportunities for further study.

Chapter 2: Literature Review

Farming Practice, Policy and the Delivery of Ecosystem Services

2.1 Introduction

This chapter will begin by providing a brief overview of the challenges facing global agriculture before moving on to discuss the broad scale changes witnessed in UK agriculture and the movement from productivist to multifunctional agriculture. It will then contextualise these changes against the backdrop of policy developments over time and the increasing role of ecosystem services (ES) as a vehicle for delivering environmental benefits. Policy developments discussed include the use of the Common Agricultural Policy (CAP), which has given way to several movements and schemes like agri-environment schemes (AES). Finally, the chapter will discuss the enhanced role of PPPs and Payments for Ecosystem Services (PES) schemes within UK agriculture and the benefits and challenges inherent to such delivery models, through the key themes of PPPs, LNPs, ecosystem services and measurement approaches to the mapping of ecosystem services interweaved within this chapter. Current research gaps, surrounding new emergent partnerships that have not been evaluated for the delivery of ecosystem services, will be drawn upon to present the set of research questions to be answered within the remainder of the thesis.

2.2 The Perfect Storm

The Foresight (2011) report highlighted several challenges which will impact the UK and the rest of the world. Sir John Beddington referred to this combination of challenges, consisting of a changing climate, changing food and dietary needs, and a growing population, as a 'perfect storm'. Thus, agriculture is constantly evolving to meet these challenges, which are discussed here in turn.

Climate change is one of the main challenges facing the world today. Global weather patterns are experiencing unprecedented changes and extremes, causing environmental hazards to occur with increasing frequency (Schultz et al. 2018). For example, Doward (2013) discusses the implications of previous flooding events in the UK and how, as a result of the destruction of crops, many farmers decided to leave the industry during the 2000s. Flooding hinders not only agriculture but also rural development and growth. If, as predicted, these extreme events were to become more common in the UK, food security in the UK and around the world would be put at risk. As Kipling et al. (2019, 2) explain, "proactive adaptation undertaken today is likely to be less costly and more effective in reducing the societal impacts of climate change than delayed or reactive responses". These academics go on to state that climate change will have unprecedented and variable effects around

the world, placing pressure on agricultural systems to maintain their current level of food production, whilst sustaining environmental health. It is, therefore, argued that agriculture needs to adapt via changes to land management strategies and by promoting ecosystem services in order to address such climate change challenges.

Moreover, around the world, as living standards rise, dietary patterns and consumption are changing. Brigham et al. (2015) describe a westernised diet, like that in the UK, as comprising of high levels of processed meats and refined grains, high-fat dairy products, and sugary desserts and drinks. Not only does this diet cause wide-ranging health problems but it also changes the way that the farming industry in the UK produces food. For instance, the total agricultural land footprint in the UK arising from animal products was 85% of the total agricultural land cover, despite animals providing only 48% of the proteins and 32% of the calories consumed by humans (de Ruiter et al., 2017). Therefore, Smil (2013) talks of meat as an environmentally expensive food, due to the land required for its production and environmental externalities created through its production. As our food tastes become richer in choice, not only does this alter the quantity and type of food needing to be produced, but it can also impact upon the environment and raise an individual's ecological footprint (Alola et al., 2019). Many studies (see: Allen and Hof, 2019; Provenza et al., 2019; Yuan et al., 2019) document the large impact meat production can have on the environment. There are arguments that increased livestock production can lead to overgrazing, thus degrading the landscape (Hardin, 1968). Similarly, debates about the impact on water quality are increasingly common as more water is needed to produce feed, and in turn livestock grazing is seen to impact negatively on aquatic ecosystems (Hooda et al., 2000; Savci, 2012). Increased nitrogen and phosphorous, alongside decreased oxygen levels are sometimes witnessed which occasionally leads to the eutrophication of these ecosystems (Libal, 2017). As such, the way in which farmers manage these challenges is also becoming part of the environmental debate.

Population numbers around the world are increasing. By 2050, it is predicted that the global population will be double what it was at the end of the twentieth century (FAO, 2017). Additionally, the average lifespan worldwide in 2016 averaged 72 (WHO, 2016). In the UK, this has led to an ageing population, meaning that more people are living longer, and so more food needs to be produced (Foresight, 2011). Present population increases in the UK pose challenges for the sustainability of agriculture. These demographic and age profile changes may affect supply and demand in the future, and require management strategies which can address such an issue. Therefore, scholars are increasingly advocating for sustainable diets, which minimise food waste, are environmentally friendly, considering ecosystem services, and that are able to sustain a growing and aging population (Reutter et al., 2017; Reynolds et al., 2019; Willet et al., 2019).

To address the challenges of a growing population against the backdrop of climatic and environmental change, agricultural policy has shifted from a sole focus on food production towards delivering a wide range of ecosystem services, in the form of public goods (defined in Section 2.4). Various solutions have been put forward, with an understanding that global and national food policies will need to balance food production and environmental considerations (Godfray et al., 2010). Section 2.3 illustrates how the agricultural landscape has changed over time given increasing knowledge about these challenges and environmental concerns.

2.3 Transitional Farming Practices

Farming shifted under the guise of 'productivism' to 'multifunctionalism', where agriculture has functions other than food and fibre production and produces multiple services for society, in order to address issues of the perfect storm (Huang et al., 2015). Post-war UK agricultural policy had a strong emphasis on enhancing food production, whereas - since the 1980s - policy makers have increasingly acknowledged the interconnection between farming and the environment. As such, agricultural policy now places greater emphasis on looking after the environment and producing multiple environmental services which benefit not only the farming community but wider society. Sustainable intensification (SI) has been introduced as a key organising concept to aid the development of environmentally sustainable agriculture and is often heralded as a panacea given its ability to address the problems highlighted in Section 2.2 and balance agricultural production alongside environmental sensitivity under a multifunctional landscape.

2.3.1. Shift from Productivism to Multifunctionalism

Agriculture in the UK has evolved and witnessed many changes. Following World War II, agriculture was carried out under a productivist landscape. This is where farmers were specifically encouraged – primarily via income support payments - to produce food on a growing scale to compensate for shortages. This model came about following the war, in a desire to increase food availability following the rationing system imposed during this time (Duru et al., 2015). This is during the period when the CAP came into being. Farmers were rewarded directly through payments for growing and producing a wide range of food and drink products. The CAP will be discussed further in Section 2.6.2.

During the 1980s, it became apparent that this productivist ideology had many negative environmental consequences, with negative externalities arising from rising fertiliser and pesticide use to increase yields, leading to pollution and eutrophication (caused by runoff by fertilisers and pesticides from the land into water sources, leading to excess nutrients in water supplies) within

river catchments (Spiertz, 2014). The Millennium Ecosystem Assessment (MEA, 2005) and Foresight (2011) discuss the detrimental impacts that this type of agriculture was having on the environment and the different 'public goods', such as climate regulation, that farming helps to provide if it is done sensitively with the environmental conditions considered. The agricultural industry became increasingly questioned by government, academics and the public over its ability to produce food effectively and sustainably (Milone et al., 2015). This controversy resulted in a movement towards a different method of farming, one which looked after the environment at the same time as meeting consumer demands from food production.

With increased understanding about the different goods and services agriculture can offer and the detrimental impacts which productivism can produce, there was a move towards promoting more sustainable farming methods and multifunctional farming. This shifted the focus from solely maximising food production to emphasising the environmental benefits (or ecosystem services) that agriculture could provide (Huang et al., 2015). Hence, UK agricultural policy now has a clearer emphasis on multifunctional farming systems, which is exemplified in key policy publications such as the *25 Year Plan Environment Plan* (Defra, 2018). Hart et al. (2015) discuss multifunctional agriculture as being able to produce food at the same time as improving livelihoods and both restoring and protecting ecosystems. Multifunctional agriculture is important for not only delivering private goods (food) but also wider public goods (environmental benefits) which society can obtain from agriculture.

2.4 Public and Private Goods

Understanding what public and private goods are is important for helping to explain that many environmental benefits and natural elements of the landscape are public goods, which often are not considered in monetary terms. Therefore, resource management and governance approaches need to carefully consider how best to provide public goods, where otherwise these goods would be under-provided.

Elinor Ostrom (2005) was one of the key thinkers behind classifying goods to understand resource management. She theorised public goods as providing benefits that are not affected or lost as everyone uses them, which can be used by multiple individuals, who cannot be excluded from using such resources. Yet, alongside public goods common-pool resources also emerge. Ostrom discusses how these resources have benefits, where those who can use them are hard to exclude, but how everyone using that resource can subtract the benefit they carry for others. These goods can lead to what Ostrom and Cornes and Sandler (2003) refer to as the free-rider effect, i.e. because individuals can easily benefit from goods they may try to avoid the cost of providing these goods and expect

others to manage them. Hardin (1967) illustrated the example of a free-rider effect through the tragedy of the commons. Hardin used the example of cattle and grazing on public land (the commons). Here he argued that farmers would allow their cattle to overgraze, due to the commons being widely accessible. Thus, governance solutions are important to deliver such goods, like environmental benefits within agriculture, and ensure that the free rider effect is limited. Table 2.1 defines the difference between ‘public’ and ‘private’ goods, whilst table 2.2 illustrates the differences between public, private, common-pool and toll goods in relation to their excludability and rivalry (or ‘subtractability of use’).

Table 2.1 gives the definition of both a ‘public’ and ‘private’ good.

Table 2.1: Definitions of a ‘Public’ and ‘Private’ Good

Public Goods	A good that can be consumed simultaneously by everyone and from which no one can be excluded (Walker, 2019). A public good is one for which consumption is non-rival, meaning that no one competes over the resource, and from which it is impossible to exclude a consumer (Nipun, 2019).
Private Goods	A private good is one for which consumption is rival and from which consumers can be excluded (Nipun, 2019). Rivalry can be perceived as competition in consumption; for instance, if one person consumes a specific good, the other is not able to consume it at the same time. Additionally, the word ‘excludability’ refers to the restriction of a product, with the product only available to the people who have paid for it (Priya, 2019).

Table 2.2, adapted from Ostrom (2005), further delineates public and private goods into four classifications in relation to their excludability and usability.

Table 2.2: Four types of good and their Excludability alongside Usability within Society

Adapted from: Ostrom (2005, 24)

	Subtractability of use		
Difficulty to exclude specific beneficiaries		Low	High
	Low	Toll Goods	Private Goods
	High	Public Goods	Common-Pool Resources

There are several examples of what may constitute a public or private good. An example of a good is water. White (2015) explains how water can be perceived as both a public and a private good. This is because one of the common uses for water is at the household level, for drinking and so on. In this instance, water is a private good; it is rival, in that an individual drinking a glass of water can stop others from drinking it. Water is also excludable, in that once the person has drunk that water no one else can drink it. However, water is a complex commodity as it is also considered a basic human right, as identified by the Sustainable Development Goals (United Nations, 2015). Water in its most general sense also has no clearly defined property rights and can be considered a common-pool resource as individuals may access it freely. In this sense water is a public good, as anyone may access a water supply and use it, meaning that water is non-rival and non-excludable. Therefore, depending on water's use it can be both a public and a private good, making the management of this resource difficult.

The same difficulty of management also arises with other resources which are common-pool resources and viewable as public goods, as discussed by Ostrom (2005) and illustrated by table 2.2. There has been increasing acknowledgement of the importance of delivering public goods, especially as if the delivery of public goods is left to the private sector or voluntary donations alone, these goods will be under-provided (Slavov, 2011). In turn, some of these public goods, whether that be air, water, or nature in general, need to be delivered through novel governance structures which take this into account and bring both public and private sectors together in order to deliver them. One way this is currently being done is through the concept of ecosystem services, which can help to frame these public goods in economic terms in order to raise wider public interest in their delivery, as will be discussed in the next section.

2.5 Ecosystem Services (ES)

Ecosystem services are an important concept through which to understand various environmental features that can benefit human well-being, many of which can be classed as public goods or common-pool resources. This section outlines why such a concept is important, outlining its link to ideas of natural capital, which led to the invention of the concept. The ecosystem services provided within agriculture are then explored in more depth, with an understanding that farming can heavily influence these ecosystem services, both in positive and negative ways, and consequently a suitable management approach is needed which can carefully balance these sometimes competing agendas. Finally, ways of quantifying and measuring ecosystem services are discussed, through the example of PES schemes which are becoming more popular in UK policy to offset costs to farmers of delivering ecosystem services.

2.5.1 Defining Ecosystem Services

In order to conceptualise the environment and the benefits we obtain from our environment the concept of ecosystem services was devised. Being able to conceptualise ecosystem services helps individuals campaign for the protection of the environment alongside agricultural production. The concept of an ecosystem allows us to adopt a research approach to examine a wide variety of human management practises. An ecosystem was first defined scientifically by Arthur Tansley in 1935 (Schowalter, 2016). The United Nations (UN) define an ecosystem as “a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit” (UN, 1992, Article 2). Ecosystem services are a way of being able to conceptualise the benefits we, as humans, can derive from our surrounding environment and different ecosystems. Constanza et al. (1997, 253) define ecosystem services as “ecosystem goods (such as food) and services (such as waste assimilation) [that] represent the benefits human populations derive, directly or indirectly, from ecosystem functions”. The Millennium Ecosystem Assessment (MEA, 2005) following Constanza offers one of the most widely accepted and comprehensive definitions of the term, as shown by the language used in the recent Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) (2018) assessment. The MEA defines ecosystem services by splitting them into four main types: supporting services (or ecological processes/functions), provisioning services, cultural services and regulating services. Each of these services contribute to human well-being (see: MEA, 2005, iv). Buckley (2009) argues that one of the most compelling features of the ecosystem services concept is that it brings together major economic land-use activities, farming and forestry, and their environmental interactions. In turn, this helps governance and management structures acknowledge the value of the wider landscape across which they work.

Figure 2.2 diagrammatically represents some ecosystem services and highlights examples of how these services can influence human well-being.

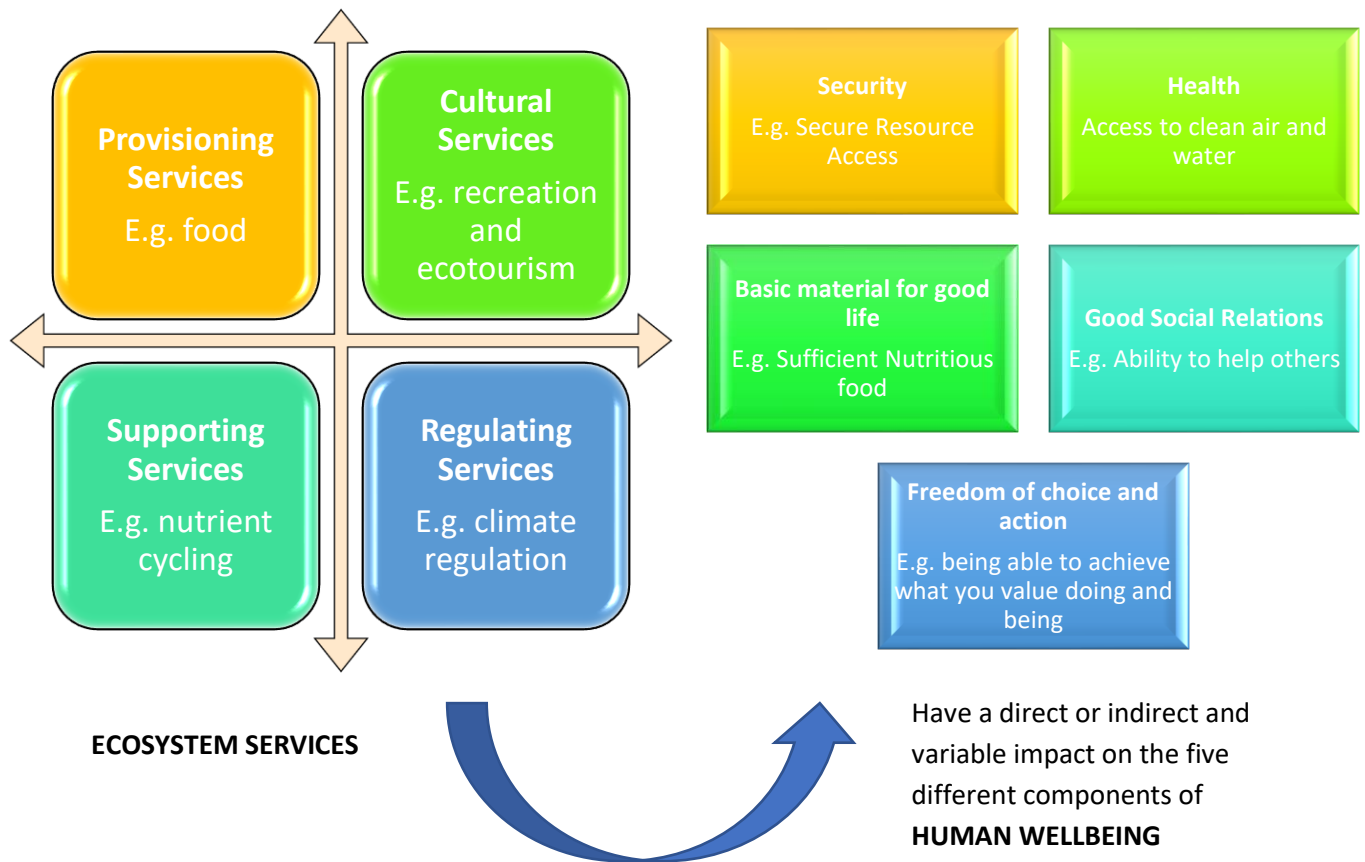


Figure 2.1: Supporting, Provisioning, Regulating and Cultural Ecosystem Services alongside examples of how these Ecosystem Services can impact upon Human Wellbeing
Adapted from: MEA (2005, iv); Lin et al. (2015, 3)

Following the MEA, recent research has re-categorised ways of conceptualising ecosystem services. Solé and Ariza (2019) underwent an extensive literature review of recent research and how knowledge surrounding ecosystem services has moved on since the MEA scheme. For instance, within their research they found that Haines-Young and Potschin (2009) discuss the cascade model, which contains a set of intermediate stages which represent ecosystem services as a production line, from biophysical structures and processes to human wellbeing. Whereas, the Economics of Ecosystems and Biodiversity (TEEB) was created to draw attention to the economic benefits of ecosystem services and the costs associated with their destruction, as highlighted in work by Baral et al., 2016). Most recently, the IPBES (2018) assessment sought to bridge the science-policy gap in ecosystem services research, by examining policy options to which would protect the delivery of

ecosystem services and stop their destruction. There have also been several capacity and flow models, which have looked at the spatial distribution of ecosystem services to inform policy makers about potential underproviding of some ecosystem services (Solé and Ariza, 2019). Whilst these models are different in their approach, they all recognise the need to provide and quantify ecosystem services for human wellbeing.

The ability to understand and quantify ecosystem services first stems from natural capital. Schumacher (1973) was probably the first scholar to refer to natural capital. Natural capital refers to:

“the world's stock of natural assets, which includes geology, soil, air, water and all living organisms. It is from this natural capital that humans derive this wide range of ecosystem services such as protection against natural disasters, climate regulation, pollination and nature-based recreation, all of which make human life possible.”

(Vallecillo et al., 2019, 196).

These natural assets are classed as public goods, as discussed in Section 2.4, as they are both non-rival and non-excludable. The concept of ecosystem services aids the conservation of these public goods by being able to quantify and place their value in economic terms. For example, IPBES (2018) in their assessment report present findings that value the regulation of freshwater quality at \$1,965 per hectare per year, habitat maintenance at \$765 per hectare per year, the regulation of climate at \$464 per hectare per year, and the regulation of air quality at \$289 per hectare per year across European and Central Asian areas. Braat and DeGroot (2012) discuss how, through framing these ecological concepts in economic terms, it is easier to stress societal dependence on natural capital and raise the public's interest in environmental conservation. This economic language appeals to the private sector as the sector works within economic terms, in a way which talking about the environment would not be able to do.

2.5.2 Ecosystem Services and Agriculture

Agriculture has an important role to play in looking after the environment and aiding the delivery of ecosystem services (see: Aspinell and Staiano, 2019; Dumont et al., 2019; Martin et al., 2019; Rattan, 2019; Sandhu et al., 2019). Pywell et al. (2015) present a study that demonstrates the link between enhanced habitat and agricultural yield. The authors highlight a study between 2005 and 2011 of an arable farm on the Hillesden Estate in Buckinghamshire, located in central England. The farm spans 900 hectares. Through ecological intensification and enhancement of ecosystem services in controlled sites to support and regulate production, it was shown that yields increased as a result of the creation of wildlife habitats, as shown by Figure 2.3. The study supports beliefs that wildlife

management which supports ecosystem services directly benefit crop yields. This study represents the crucial role that farmers have as environmental stewards, showing that biodiversity which helps provide ecosystem services, and ecosystem services themselves, are critically important for agricultural productivity (Ruhl, 2008). Through protecting and looking after our environment there are direct gains to wider human welfare, ensuring food production targets are met alongside the promotion of other ecosystem services as a result of biodiversity, for example pollination.

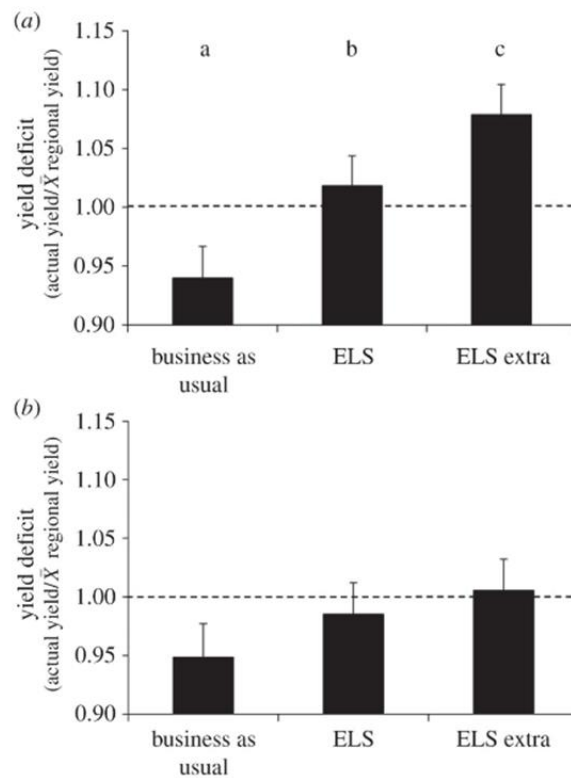


Figure 2.2: Results of statistical analysis highlighting that ‘ELS’ land (creation of wildlife habitat on 3% of land) and ‘ELS extra land’ (creation of wildlife habitat on 8% of land) produces more favourable yields than simply a ‘business as usual’ Approach

Source: Pywell et al. (2015)

Moreover, it is arguable that farming delivering ecosystem services alongside traditional food production can benefit both modern farming and productivity. Sandhu et al. (2016) speak of the need for farming to realise the urgent need for the industry to improve natural capital and ecosystem services in food systems globally. These scholars argue that such an emphasis will lead to large scale employment opportunities, food security, and multifunctional landscapes which benefit not only farm communities but also society at large. Farming is well placed to deliver natural capital and these ecosystem services, given its land coverage and natural features across varied landscapes.

Farming is also dependent on ecosystem services itself to enable food production, showing the interconnectedness of multiple ecosystem services (Swinton et al., 2007). However, farming can also have negative impacts on ecosystem services, this emphasising the need for sustainable management which can benefit both farmers and wider society. Figure 2.3 illustrates the proportion of economic value through different types of ecosystem services which can be provided under alternative farming regimes, with trade-offs between ecosystem services. Additionally, Table 2.3 outlines how farming contributes to, benefits from and can also detract from different ecosystem services. However, the exact measurement of ecosystem services against human welfare is difficult to gauge and many different approaches to measuring ecosystem services are currently being refined, as discussed in Section 2.5.3.

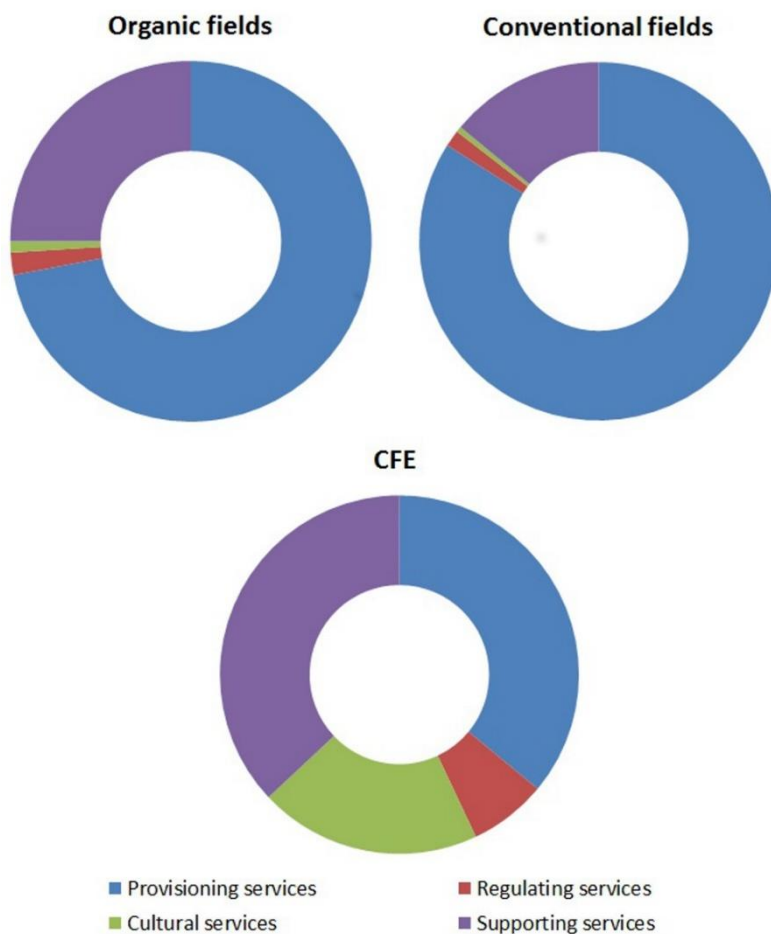


Figure 2.3: Proportion of four different categories of Ecosystem Services provided by organic fields, conventional fields, and combined food and energy systems
Source: Sandhu et al. (2016, 45)

Table 2.3: Table of benefits provided by Farming to promote Ecosystem Services, and the challenges that Farming can present for Ecosystem Services

Adapted from: FAO (2019)

Positive Impacts on Ecosystem Services from Farming	Negative Impacts on Ecosystem Services from Farming
Agriculture provides habitats to species and creates aesthetic landscapes. In agriculture, pollinators are essential for aiding crop growth and seed dispersal. Pollinators such as bees, birds and bats improve production by 75% of the leading food crops worldwide.	Pesticides, as well as landscape homogenisation, can decrease natural pollination
Forests help maintain healthy aquatic ecosystems and provide reliable sources of clean water	Deforestation or poor management can increase flooding and landslides during storm events
Animal excreta can be an important source of nutrients and seed dispersal, and can maintain soil fertility	Excess of animal excreta and poor management can lead to water pollution and threaten aquatic biodiversity
Sustainable and integrated aquaculture can enhance flood protection	Overfishing has a negative impact on ocean communities as it destabilises the food chain and destroys habitats
Vegetation cover prevents soil erosion and ensures soil fertility through natural biological functions such as nitrogen fixation.	Soil erosion leads to land degradation, loss of soil fertility and desertification, and contributes to decreased productivity of downstream fisheries.
Agriculture is a large consumer of water, and at the same time has strong impacts on water flow regulation.	Agricultural land use and improper land management can also cause flooding and lead to negative effects for communities further downstream.
Agricultural landscapes have high cultural values for many societies.	If pollination services decrease or environmental changes take place, some of these cultural sites may be lost.
Grasslands host a wide variety of medicinal plants.	Degradation will lead to the loss of these medicines.

2.5.3 The measurement of Ecosystem Services through Payment for Ecosystem Services (PES)

Schemes

There are various ways of measuring ecosystem services and directly correlating this with how much different ecosystem services are worth. This is important for enabling evaluation and measurement of the success of ecosystem service delivery schemes, and for quantifying how much different ecosystem services are worth to society. This is especially useful within farming, as if some ecosystem services are to be prioritised above others, as represented through figure 2.3, it is necessary to understand which ecosystem services are more valuable to society and that should be delivered the most. Also, as farming activities have the potential to lose income as a result of delivering ecosystem services which are often public goods and not paid for, schemes need to be able to assess the worth of what agriculture is providing to compensate farmers for their work.

One common approach to measuring and valuing ecosystem services is through using Payments for Ecosystem Services (PES) schemes. PES is a method through which ecosystem services can have an economic value attached to them. Wunder (2005, p.3) defines PES as

“... a voluntary transaction where ... a well-defined ecosystem service (or a land-use likely to secure that service) ... is being ‘bought’ by a (minimum one) ecosystem service buyer ... from a (minimum one) ecosystem service provider ... if and only if the ecosystem services provider secures ecosystem services provision (conditionality)”.

An illustration of how PES schemes work in practice is shown in figure 2.4. Such schemes can help to readdress trade-offs involved in making landscape management decisions that result from environmental, economic and social pressures (Demistihis et al., 2019; Ellis et al., 2019; Matthies et al., 2016).

PES are also representative of economic shifts and a neoliberal agenda of marketisation, highlighting an increasing interest in a green economy and green capitalism (Scales, 2014). Scales (2014) explains that green capitalism is a philosophical position, which is based upon the belief that environmental degradation results from the failure of markets to incorporate the environmental costs of production and consumption and the value of natural capital. The trend of green capitalism argues that assigning economic values and private property rights to the environment is the best solution and way to manage natural resources (Farber et al. 2002).

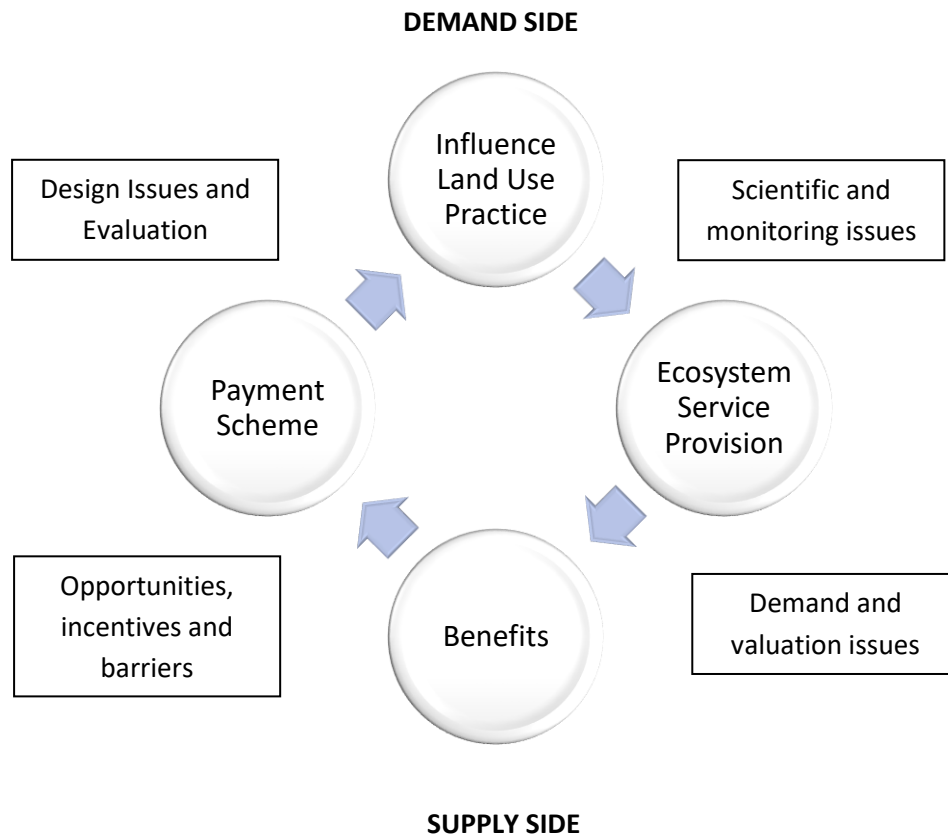


Figure 2.4: Illustrative PES Cycle

Adapted from: Dunn (2011, 6)

Ultimately, this scheme helps decision makers decide which ecosystem services should be valued most highly, given that ecosystem services are not always visible or immediately obvious, and as ecosystem services are public goods they often are not considered in economic decisions. Examples of where PES schemes have aided ecosystem service delivery are highlighted in the *Payments for Ecosystem Services: A Best Practice Guide* (Defra, 2013). One example mentioned in this policy document is that of the *Uplands Ecosystem Service Pilots* run by Natural England, with one pilot located in Bassenthwaite, Cumbria. Natural England (2013), in their evaluation of the progress of these PES pilots, noted several successes of the scheme, particularly through being able to pay farmers for their delivery of ecosystem services from the individuals who directly benefit. One example is where Natural England worked with Nurture Lakeland in the Lake District National Park, to develop several smart phone applications that have enabled visitors to invest in projects that deliver ecosystem services. The project offers a “visitor payback module” that can be added to existing or future apps in other locations. Natural England (2012) discuss the success of the project, with the potential for a self-financing PES system through visitors being piloted. The pilot was able to work through previous partnerships to deliver the ecosystem services needed and improve upon

lessons learnt in the past, paying farmers and other stakeholders for the ecosystem services they were able to provide.

PES schemes may also create other benefits. For instance, Knoop and Rickenbach (2014) explain how financial incentive programmes play a prominent role in encouraging the management and protection of privately held forests in the United States, thus ensuring forest-related benefits sought by society (Kilgore et al., 2007). These programmes may even contribute to wider ecosystem services delivery across the landscape, through forestland connectivity and other ecosystem services provision (Locke and Rissman, 2012). Incentive payments from agri-environment schemes - for example, agglomeration bonuses - encourage farmers and other partners to continue delivering ecosystem services and follow partnership goals (Parkhurst et al., 2002). Agri-environment schemes are discussed in more detail in Section 2.6.3.

However, Silvertown (2015) argues that the concept of ecosystem services has been oversold and that PES valuations are ultimately wrong. Sandel (2012) talks about times when society does not necessarily place a price on things and argues that it is morally correct to reject market valuation in several instances. Sandel (2012) furthers his argument by stating that markets degrade some goods by valuing them. The idea that a value can be placed upon nature is not true, as nature in itself is not an actor in the market. Hence, Silvertown (2015) argues that nature is devalued by PES, especially considering all the various benefits nature provides to humans, especially through cultural ecosystem services, to which it is very difficult to attach an economic value. This raises questions around how we can truly measure the value of ecosystem services and their condition within the environment, where approaches to measurement are discussed later in the thesis.

In terms of agriculture, the challenges of valuing ecosystem services using PES schemes, become more pressing. Reed et al. (2014) mention the difficulty involved when understanding scientific uncertainty, the pricing of ecosystem services, the timing of payments, increased risk to land managers, compliance with World Trade Organisation (WTO) regulations, and also barriers to cross-boundary collaboration. Indeed, many scholars take offence at the use of PES schemes to deliver ecosystem services. For example, Van Hecken et al. (2015) argue that much PES work remains poorly theorised in political and social terms. This has led to an inability to develop evaluations which rigorously measure various outcomes, which this thesis seeks to address (Miteva et al., 2012). Therefore, clearer evaluative work around PES projects and partnership working needs to be undertaken.

2.5.4 Using mapping to understand the current state of UK Ecosystem Services

Before further evaluative work can be undertaken the current state of ecosystem services in an area needs to be understood, often this is done through the quantification and mapping of ecosystem services (Verhagen et al., 2016). However, there are numerous mapping techniques and a coherent strategy has yet to be developed to map ecosystem services, which means several mapping assessments are often carried out (Miteva et al., 2012). Both Boyd and Banzhaf (2007) and Degroot et al. (2012) discuss the need for mapping to be used in policy decision making, because accounting for final values of ecosystem services is especially important for policy. Such values are often not taken into account in decision making. Too often, these scholars argue, ecosystem services definitions are too broad. Boyd and Banzhaf (2007) argue that the mapping of ecosystem services needs to encompass three things: clarity in definition and quantities of measurement; aggregation of those quantities; and weighting to be applied to the different aggregate quantities. Degroot et al. (2012) furthering this discuss the relevance of mapping to then be able to understand the spatiality of those ecosystem services being provided. This enables policy makers to understand the individuals who can benefit from the delivery of these ecosystem services and explore where trade-offs between different services may be occurring.

Crossman et al. (2013) speak of a blueprint for these modelling studies in order to capture the range of diverse software and processes scholars use in order to better improve data collection, certainty and accounting information for ecosystem services' measurement. For example, part of this blueprint includes acknowledging the beneficiaries of the ecosystem services mapped. However, the authors note that each mapping study will need its own unique approach to modelling ecosystem services and that studies are driven by data and model availability, limiting some mapping approaches in what they can achieve. Nevertheless, such a blueprint model may offer an interesting direction for mapping work going forward given further refinement. Decision makers would then more easily be able to assess the state of ecosystem services in a given area and studies would be able to be more coherent in their approach.

The UK National Ecosystem Assessment Follow-On (UK NEAFO, 2014) illustrates the current state of ecosystem services in the UK, since the first assessment published in 2011, through using measurement methods, such as mapping, to assess this. The UK National Ecosystem Assessment (UK NEA, 2011) report found that ecosystems are important for human well-being yet are consistently undervalued through economic valuations. More robust modes of mapping, as discussed in the previous paragraph, could offer a methodology to help alleviate this issue. For instance, when examining the costs and benefits of different forest planting schemes showing the effects on the

area woodland would be planted, the report highlighted that if only maximising market value was considered in planting decisions there would be a total net loss of £65 billion annually from the forests. Whereas, if a wider set of ecosystem services were considered, for example climate regulation and recreation, there would be a total net gain of £546 million annually if forests were planted strategically considering ecosystem services. The ecosystem services derived from ecosystems were also found to have changed over the past 60 years in line with societal changes. Additionally, some ecosystem services in the UK were found to be doing well whilst others were still experiencing long-term decline. For instance, through a study of enclosed farmland, the report found that whilst soil erosion has increased and agricultural birds and pollinators decreased, other ES like climate regulation had improved resulting from a reduction in fertiliser use and livestock numbers. This supports Plieninger et al. (2019), who argue that one of the main ecosystem service trade-offs in European agriculture is between biodiversity or habitats and regulating ecosystem services. Therefore, agricultural management needs to take a more integrated approach to ecosystem service delivery, to ensure that as many of the trade-offs associated with ecosystem services are as minimised as possible.

The UK NEAFO (2014) added to the previous report and was highly interdisciplinary in its approach. The report highlighted what ecosystem services were, and was able to describe the interactions between governance and change which are required for the successful management of ecosystem services in the UK, with need for governance approaches to be adaptive to current societal needs and environmental challenges. The NEAFO (2014) argues that for ecosystem services to be maintained and improved there is a need for an ecosystem services approach. This involves an interdisciplinary approach bringing stakeholders together in new interdisciplinary partnerships alongside encouraging participatory governance (Verburg et al., 2016; Kusnander et al., 2019). Interdisciplinary research can be defined as:

“a mode of research by teams or individuals that integrates information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice”

(National Academy, 2004, 2).

The adaptive management of ecosystem services also requires such an interdisciplinary knowledge base, which necessitates multiple stakeholders coming together. For example, as the ecosystem services concept is so broad, it is necessary to pull together knowledge from economics, if using a PES approach to managing ecosystem services, social sciences to understand the social benefits

human well-being receives from ecosystem services, and more natural scientific approaches to understand the environmental processes at work in ecosystem services. The report highlights that there is currently not enough interdisciplinary research being carried out into ecosystem services, possibly because of the lack of high-impact interdisciplinary journals (UK NEAFO, 2014). Therefore, it is important to understand how ecosystem services can best be managed in the UK going forward, through interdisciplinary working (Craven et al., 2019; Rodela et al., 2019). Policy is one important vehicle through which this interdisciplinary agenda and collaborative approach can be advanced, as will be shown in the following section.

2.6 Rural Governance and Policy

The concepts of natural capital and ecosystem services, alongside measurement frameworks have become increasingly integrated into the agricultural policy landscape and governance of ecosystem services and agriculture in the UK.

Rural-local governance is important for understanding how best to manage and deliver ecosystem services across the agricultural landscape. Short (2015) speaks about the different approaches from two different perspectives: the socio-ecological (SES) perspective and the institutional perspective. Both approaches have strong links to one another. Short discusses how SES approaches, through a focus on collaborative management and ecosystem services, and institutional approaches at the local scale both complement one another, given their focus on change. Furthering this, Short discusses how governance, in turn, has seen a shift away from focusing solely on specific sectors to more local place-based approaches in governance and policy to which this chapter now turns.

2.6.1 The Landscape Scale Approach

Given the interconnectedness between different ecosystem services, highlighted in Section 2.5.2, such as pollinator services from wildlife and food productivity, a place-based landscape scale approach is advocated by policy makers to promote ecosystem service delivery (Natural Environment White Paper, 2011). It is argued that this approach allows farmers to sustainably intensify under a multifunctional agricultural landscape. This approach is important given that species and other environmental features depend on processes acting at several scales, not just the site-based level, for instance, an individual farm (Graham et al., 2018). Landscape scale approaches are defined by Reed et al. (2015, 1) as “a framework to integrate policy and practice for multiple land uses, within a given area, to ensure equitable and sustainable use of land while strengthening measures to mitigate and adapt to climate change”. There is still some debate as to how best to conduct this type of conservation, as discussed by Newton et al. (2018). However, a widely accepted

approach is that agri-environment schemes, will be able to improve the quality of agricultural land for nature, thus improving the suitability of the wider landscape (Pretty and Bharucha, 2014). Moreover, it is argued that such schemes can reduce the number of ecosystem service trade-offs, for instance, the trade-offs existent between agricultural production and carbon sequestration (Cordingley et al., 2015). However, Holt et al. (2016) argue that it is impossible to reduce ecosystem service trade-offs entirely and, in some instances, certain trade-offs may need to be accepted, particularly if the UK's food productivity is not to be harmed by the promotion of certain ecosystem services above others. Therefore, appropriate agricultural land management practices are still needed, which understand the need for projects to be adaptable and responsive to trade-offs.

Government White Papers, such as that of the Natural Environment 2011, reflects a government's intention to tackle problems by preparing policies which may be enacted into legislation (Shin and Choi, 2014). Many scholars suggest the Natural Environment White Paper set out a strong vision for environmental governance in the UK, representing a turning point in UK conservation policy (Adams et al., 2013). Below is an extract from the White Paper, which sets out its objectives:

“We want to improve the quality of our natural environment across England, moving to a net gain in the value of nature. We aim to arrest the decline in habitats and species and the degradation of landscapes...We will achieve this through joined-up action at local and national levels to create an ecological network which is resilient to changing pressures...Both the NEA [National Ecosystem Assessment] and Making Space for Nature identify the need for a more coherent approach, working at a larger scale to reflect natural boundaries, joining up across the landscape and encouraging collaboration between sectors”

(Natural Environment White Paper, Defra, 2011, 14-15)

This paper is indicative of the UK government's strategy towards conservation and managing ES. It was sparked by the realisation that “nature in England is highly fragmented and unable to respond effectively to new pressures such as climate” and challenges presented in Section 2.2 (Defra, 2011a, 3). These national intentions and priorities need to be contextualised within the wider supranational policy of the common agricultural policy and how Defra – as the key government department responsible for enacting agricultural priorities – has implemented EU level strategic agricultural policy.

2.6.2 Common Agricultural Policy (CAP)

Defra recognises that “sustainable economic growth relies on services provided by the natural environment, often referred to as ‘ecosystem services’” (DEFRA, 2011, 4). Consequently, many policies now focus on agriculture whilst simultaneously invoking landscape-scale conservation approaches and providing farmers with payments for the delivery of ecosystem services, via policies such as the CAP (Zavolloni et al., 2015). In order to keep pace with the multifunctional landscape approach, the CAP has undergone notable reforms. As stated in Section 2.3, the CAP was established in the 1950s in order to support food production as a response to widespread rationing of food during and following World War II (Barnes et al., 2016). During the 1980s The Commission of the European Communities (1991) began to recognise that food surpluses were increasing, and coined the terms ‘butter mountains’ and ‘wine mountains’. This triggered CAP reforms which started to transform policy away from supply-side policies towards food quality and environmental support, as seen in the McSharry reforms of the 1990s. As such, CAP reforms have been the focus of much research, often explored through political economy frameworks (Short and Dwyer, 2012; Dwyer, 2014; Rutz et al., 2014; Bateman and Balmford, 2018).

The CAP underwent another reform after a new agreement reached in 2013. Reed et al. (2014) discuss the continued transformation away from providing payments directly to farmers for production towards giving payments for the provision of ecosystem services, under a greening agenda, which limits environmental damage. The CAP now seeks to encourage a higher return of ecosystem services through spatially targeting the ecosystem services most valued by society and through providing incentives for cross-boundary management of certain ecosystem services at the catchment scale or wider scales, as part of a new landscape-scale conservation movement (Reed, 2015). The new reforms aimed to make agriculture more competitive and sustainable in the long term (Massot, 2019). Funding to Pillar 1 (direct payments and market related expenditure) was cut by 1.8% and Pillar 2 (rural development) was decreased by 7.6% in relation to the reformed proposal (European Commission, 2019). There has been a move away from providing direct payments to farmers towards providing payments directly related to having clear environmental benefits and delivering ecosystem services across the EU, which is currently also imposed by the UK’s national policy.

Further CAP reforms for the period after 2020 were announced in 2017. McEldowney (2018) notes how this funding, under the new greening agenda (to reduce environmental impacts) introduced in 2013, will be more targeted and more flexible for member states to choose the actions which they would like to introduce. Furthermore, generational issues around supporting young farmers and

issues around funding equity are being addressed. What is clear is that the ecosystem services delivery agenda is a key part of the reforms and that schemes within the CAP, such as agri-environment schemes will likely evolve again following future reforms.

2.6.3 Agri-Environment Schemes (AES)

As part of the CAP reforms, agri-environment schemes (AES) were introduced as a PES scheme, to ensure that ecosystem services were delivered alongside food production and to reverse a trend of biodiversity decline (McHugh et al., 2017). Farmers and land managers are incentivised to manage their land in an environmentally sustainable manner and are compensated financially (Raymond et al., 2016). The first scheme in the UK emerged in 1986 (Lobley, 1998; Dobbs and Pretty, 2004). Following this, such AES became widespread across the EU, following the 1992 McSharry CAP reformation (Hejnowicz et al., 2016). Franks (2019) notes how these schemes have changed over time, as knowledge surrounding the provision of ecosystem services and conservation targets has improved alongside a growing pressure on schemes to deliver ecosystem services at a lower cost. As mentioned in the introduction, scheme types have changed to the current Countryside Stewardship (CS) schemes, where two tiers exist – the mid and higher-level tiers, in line with the enhanced greening reformations of the CAP post-2013 (Natural England, 2019). Despite these advances in scientific understanding and evolution of schemes many scholars still challenge the effectiveness of AES for the delivery of ecosystem services (McCracken et al., 2015). As stated earlier in the previous chapter, Dwyer (2019) highlighted issues with AES, from them not considering local conditions, and with projects that were too narrow and parsimonious in scope.

Mills et al. (2008) postulate some success factors for AES to work. They argue that partnership working is of key importance, where individual stakeholders will be able to develop trust amongst one another and enable co-operative working. Additionally, training programmes are needed for group facilitators to assist in AES policy development. Furthermore, the need for AES to financially incentivise farmer participation, with the flexibility within contracts to allow farmers to choose how they allocate the resources (Mills et al., 2008). Finally, the authors recognise that not all farmers will want to co-operate with one another, as they may not share the same values or business networks as other farmers do. Whilst some of these factors are being adopted through AES, not all of them are. Ansell et al. (2016) highlight that there is mixed success amongst AES, with this due in part to poorly defined objectives, which hinder the cost-effectiveness of programmes. Additionally, they argue that this could also be down to a lack of co-operation between those from different sectoral backgrounds, with limited training and understanding to effectively deliver these schemes. Such a

point highlights the need for further interdisciplinary and collaborative work in the development of AES in the agricultural sector.

Other academics believe that the mixed success of AES is not only due to poorly defined objectives within AES schemes, but also the ecosystem services that AES prioritise, which can result in trade-offs. Warner et al. (2017) speak of one of the benefits of AES, for instance, in reducing the UK’s greenhouse gas emissions in agriculture because of a reduced use of nitrogen fertilisers and a lower cultivation frequency. However, this was also attributed to the removal of agricultural land from production, which the authors argue is not sustainable in the long term. They instead argue for SI methods to work alongside AES to increase the uptake of schemes amongst farmers and ensure that future food demands are also met.

Whilst the motives of AES seek to operate under a landscape scale approach and deliver multiple ecosystem services across a multifunctional agricultural landscape, their success has been mixed. Therefore, further studies are required to look into how to encourage the principles of partnership working that Mills et al. (2008) outline. AES show that agricultural policy continues to move towards greening and ecosystem services delivery agendas, in line with CAP reform. This move towards paying for ecosystem services delivery is in line with broader policy documents and governance agendas at a supranational level, as will be outlined in the following section.

2.6.4 Wider frameworks of Agricultural Policy

Table 2.4 offers an understanding of different policy levels and how different policies impact upon UK agricultural policy and partnership development. The information conveys how the delivery of ecosystem services and sustainable development is a key theme in policy circles, alongside a move towards a local level of delivery for this work, which includes the development of PPPs. Whilst much UK agricultural policy is currently dictated at the EU level, Brexit will change policy development going forward, with a focus on more national and local scale policy levels, as will be discussed in the next section.

Table 2.4: Different Policy Levels interacting to affect UK Environmental Policy

Scale	Policy
International	The ‘ <i>Agenda 21</i> ’ directive (1992) requires governments to draw up participatory governance plans for environmental sustainability. Agenda 21 focuses on different areas of economic activity and agriculture is one of these (Garcia-Montes and Monreal, 2019).

Scale	Policy
Supranational (EU)	The Common Agricultural Policy (CAP) has a key role to play in all EU countries and the UK, representing 37.2 percent of the EU's total budget in 2018 (European Commission, 2019). There are several aspects to the CAP, including direct payments to farmers and payments associated with infrastructure projects. CAP is currently undergoing reform to change the level and type of support (discussed in section 2.6.2). However, Brexit, with <i>Article 50</i> of the Lisbon Treaty triggered in March 2017, brings uncertainty as to whether EU policies will be used at a UK farming level moving forward. This is further discussed in section 2.6.5.
National	European directives are translated and interpreted into the national context through nationwide targets and legislation. <i>The Natural Environment White Paper (2011)</i> represented a commitment to focus on a landscape-scale approach to conservation, and set up Nature Improvement Areas (NIAs), using the National Ecosystem Assessment approach as a more integrated way of working (Ahern and Cole, 2012). There has also been a growth in PES schemes, delivered through agri-environmental schemes, in relation to the CAP. These schemes directly reward farmers not only for producing food but also for delivering a wide range of ecosystem services (Franks, 2019).
Local Authority	Local Authorities can designate and manage Local Nature Reserves, and the Environment Agency also produces Local Environment Agency Plans (LEAPs) to look after nature and the environment. More recently, Local Nature Partnerships (LNPs) were set up in the <i>Natural Environment White Paper (2011)</i> to drive a local, joined-up approach within farming for the management of ecosystem services. Defra's (2018) <i>25 Year Plan for the Environment</i> also recognises the importance of farming and delivery through partnerships at a local level. Currently four pioneer partnership projects are in place to trial this delivery, to pilot new tools and methods which would enable a natural capital approach to inform ecosystem services delivery.

2.6.5 Brexit

At the time of writing, the UK has left the EU, with a year-long transition period ending at the end of December 2020. The UK will leave the current system of the CAP and move toward its own system of providing payments to farmers (European Union Commission, 2017). Policy documents establish the position that the agricultural sector should retain as many of the benefits of current schemes in

operation, whilst adopting a system which addresses many of the inequalities and drawbacks from the CAP experienced in the past. MacMillan (2019, 1) argues that “meeting these challenges will require bold new ideas that change the rules, we can’t just reinvent the Common Agricultural Policy with a new accent”.

As MacMillan implies, there will be many challenges in creating a new policy, separate to the CAP. NFU Scotland (2017) suggested that the movement of labour, trade and support should be of key concern to any new policies. There have also been many concerns raised around funding, with one academic commenting in response to a government consultation that:

“EU subsidies make up between 50 and 60 percent of farm income in the UK ... However, it is estimated that 87 percent of total farming income in Northern Ireland, 80 per cent in Wales, and three quarters of total income from farming in Scotland is contributed by CAP payments.”

Greer (2017, 1)

Therefore, a significant amount of financial support will need to be allocated for farms to remain profitable, at the same level as the CAP provides. Defra’s 25 Year Plan for the Environment (2018) stated that the aim is to achieve a ‘green Brexit’; one which helps to restore nature and puts environmental policy at the heart of the UK’s domestic and international policy (Bateman and Balmford, 2018). Defra (2018) in their *Health and Harmony Consultation and Response* have outlined that payments to farmers will move from primarily land-based income support payments to a payment for public goods model. Thereby elevating the role of PES and natural capital accounting. Whilst this presents a significant opportunity for the UK to redefine policy, trying to achieve all these targets will be challenging. Government are emphasising the role of collaborative working to achieve landscape scale benefits (Defra, 2018). Therefore, it seems that partnerships and collaboration between multiple stakeholders will become increasingly important in post-Brexit agricultural policy and in the delivery of ecosystem services. It is to this subject that the chapter now turns.

2.7 Partnerships

Edwards et al. (2001) talk about the growing importance of partnerships in Britain since the 1980s, with funding bids, the EU, local, and national governments increasingly talking about their use in regeneration and initiatives. These are increasingly popular governance approaches as it is argued that a mixture of resources from several sectors, which is greater than individual sectors have at their disposal, offers a mode through which communities can become empowered to have their voices heard. Through the institutional approach to governance, which Short (2015) discussed, such partnerships, as new institutions and agents of delivery, can shape agendas and deliver promising

outcomes at the local scale in relation to ecosystem services and SES approaches. One new form of such partnership to emerge is the PPP.

This section will now introduce what a Public Private Partnership (PPP) entails. Firstly, given the scope of this term, the section attempts to define some of the main characteristics of a PPP, around the stakeholders who should be involved and risk and responsibility sharing, as well as the overall goals of this partnership approach. Several benefits and challenges are then highlighted, presenting the case for further research in order to evaluate a PPP to understand the benefits or drawbacks it may hold for the delivery of ecosystem services.

2.7.1 Defining Public Private Partnerships (PPPs)

One form of partnership common in agriculture is the PPP model. PPPs can take many different forms and include a variety of partners, ranging from the public to private sectors. Hart et al. (2005) highlight the importance of the wide variety of stakeholders involved in the process and of the need for these stakeholders to deliver multiple ecosystem services – so that agricultural landscapes have the political support and capacity to engage with different partners. In trying to create this multifunctional landscape, the UK has adopted a system of PPPs through which public and private partners can work together. Various definitions of what a PPP should constitute are highlighted below in Table 2.5.

Table 2.5: Definitions of a PPP

Author/s	Definition of a PPP
Infrastructure and Projects Authority; HMRC (2018, 1)	“long-term contracts where the private sector designs, builds, finances and operates an infrastructure project.”
Ismail (2013, 95)	Where “the government engages commitment from the private sector and transfers a certain level of responsibilities to the private sector in providing public facilities or services.”
Rees et al. (2012, 4)	A “particular form of collaboration, PPPs have also been a long-standing feature of certain areas of public service delivery, sometimes also involving third sector partners, and often involving long term contracts, major infrastructure renewal and private financing”

Author/s	Definition of a PPP
Asian Development Bank (2008, 1)	“PPPs present a framework that—while engaging the private sector—acknowledge and structure the role for government in ensuring that social obligations are met and successful sector reforms and public investments achieved.”
Organisation for Economic Cooperation and Development (2012, 18)	“... long term contractual arrangements between the government and a private partner whereby the latter delivers and funds public services using a capital asset, sharing the associated risks.”
Economic and Social Commission for Asia and the Pacific (2011, 1)	“The partners in a PPP, usually through a legally binding contract or some other mechanism, agree to share responsibilities related to implementation and/or operation and management of an infrastructure project. This collaboration or partnership is built on the expertise of each partner that meets clearly defined public needs through the appropriate allocation of: resources, risks, responsibilities, and, rewards.”
New Zealand Social Infrastructure Fund (2009, 1)	“A PPP is a long-term contract between the public sector (a Public Sector Client) and a private company or consortium of companies (a Private Entity) covering the design, construction, maintenance, and financing of an infrastructure asset. PPPs can take many different forms ...”

Table 2.5 outlines several PPP definitions. Certain common themes are immediately visible alongside differences. For instance, all definitions mention both public and private sector involvement. However, within these definitions there are variations between the proportion of involvement from the public and private sectors involved in the partnership makeup. For instance, the New Zealand Social Infrastructure Fund (2009) seems to imply that the private sector is responsible for the implementation of most of the partnership objectives, and in turn, carry the most risk and responsibility.

Conversely, other definitions seem to suggest a shared responsibility between public and private sectors is needed in order to enable partnerships to work. The OECD (2012) and Rees (2014) use terms like “sharing” and “collaboration” respectively to describe risks and responsibilities, suggesting that both risk and responsibility within the partnership is split more equally than alternative

definitions suggest. These definitions would argue that a PPP approach must ensure that there is a proper risk allocation between the partners involved (Kwak et al., 2009). Muhammad and Johar (2019) state that much literature argues for an equitable risk allocation and sharing of this risk within a PPP approach via reliable contractual arrangement. Literature noting such an arrangement includes work by Thomson et al. (2005), Li et al. (2005), Zhang (2005), Jin and Doloi (2008), Kwak et al. (2009), Hwang et al. (2013), and UN-Habitat (2011). Moreover, most of the listed definitions argue that the role of a PPP should be to deliver public goods, services or facilities, where the government transfers some of the risks to the private sector. Multiple definitions mention that the partnership should enter into a long-term contract; the definition from Reed et al. (2014) acknowledges the role that third sector partners can play within a PPP.

In practice, a wide variety of PPPs exist. The spectrum, across which PPPs may operate, with varying public and private stakeholder involvement, is represented by figure 2.5. Given the vagueness of PPP definitions, important questions exist around the extent to which the private sector should be engaged in the delivery of public infrastructure – minimally, extensively, or not at all? (Sclar, 2015).

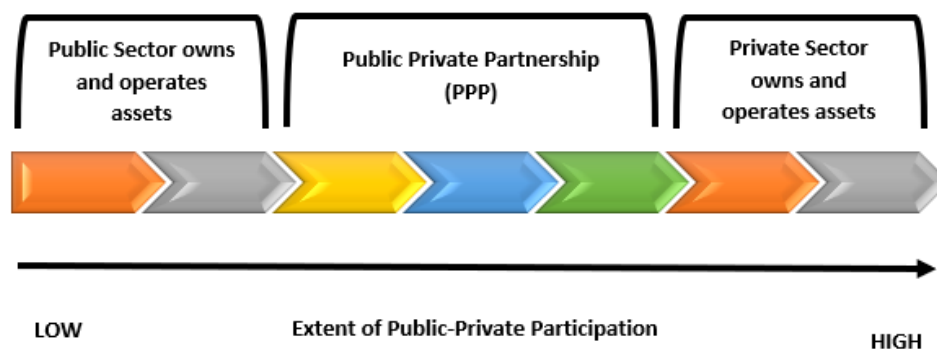


Figure 2.5: Spectrum of different PPP's Project Management from strong government control (left) to increasingly privatised control (right).

Adapted from: World Bank (2010)

2.7.2 Partnerships and Ecosystem Services

However, if one were to think about how partnerships work to deliver ecosystem services, definitions can become slightly more complex. In rural governance, Edwards et al. (2001) explain how partnership development has been informed by a mixture of policy discourses developed by various state agencies, with the term 'partnership' taken to mean very different things in the context

it is being used in. When considering ecosystem services delivery, ecosystem services are often referred to as an example of either public goods or common pool resources. Carlsson and Berkes (2005) explain how co-management of these ecosystem services through partnership approaches are increasingly emerging. Co-management, they argue, aims to problem solve and make improvements to ecosystem service delivery. They theorise co-management to take potentially five different forms – of an exchange system (a relationship between separate spheres of dominance; exchanging information, goods and services), joint organisation (where the state and groups of resource users form cooperative units and may make joint decisions), co-management as a state nested system (where the state retains legal rights to a resource, with resource users entrusted to manage that resource or use it), co-management as a community nested system (similar to the state nested system, but where the scenario is reversed), and co-management as network (recognising that a state can operate through multiple bodies, institutions and agencies. Thus, in real-world scenarios there is likely to be a mixture of relations and agreements between different public and private sector bodies). Thus, the fifth form of co-management could operate as a mixture of the four aforementioned forms, highlighting that partnerships and PPPs in ecosystem services delivery are complex and just as ‘messy’ or diverse, like in other sectors.

The Curry Report (2002) reported on the Bowland Forest and Bodmin Moor pilot partnership projects with farmers for ecosystem services delivery. Projects were developed locally, in collaboration with farmers, local communities, and other stakeholders to improve ecosystem services and address rural development issues occurring in the relevant areas. The projects were able to deliver integrated advice and facilitation at the local scale. This brought multiple stakeholders together and encompassed multiple co-management forms, as Carlsson and Berkes (2005) defined. Increasingly, in the UK, such partnership examples have moved towards having a more localised focus, like that discussed in the Curry Report. Marsden and Sonnaro (2008) discuss multifunctional agriculture, as explained earlier in the chapter, and partnership development in the UK, as being fundamental. They explore how partnerships are useful governance avenues through which to address rural issues and progress multifunctionality. The scholars refer to the Agri-food partnership review (2001) and how partnerships can ensure multifunctionality through numerous strategic goals which are interdisciplinary and which offer a ‘joined-up’ approach. Such partnerships arguably enable more institutions and individuals to work together, in order to differentiate their agricultural products and meet the needs and expectations of an evolving consumer market, with many consumers who are increasingly environmentally conscious and ethical in their choices.

Through working together in partnership with different stakeholders, agriculture and ecosystem services, the scholars argue, can progress for the better.

2.7.3 Benefits of the Partnership Approach

Such partnerships can bring with them multiple benefits, as indicated by Allen and Overy (2012).

Firstly, PPPs enable the public sector to use the expertise and efficiencies that the private sector can bring to the delivery of certain facilities and services traditionally run by the public sector. Secondly, a PPP is structured so that the public sector body seeking to make a capital investment does not incur any borrowing. Rather, the PPP borrowing is incurred by the private sector body implementing the project and therefore, from the public sector's perspective, a PPP is an "off-balance sheet" method of financing the delivery of new or refurbished public sector assets.

Some of these agricultural PPPs aim to improve environmental governance within agricultural landscapes. Haas (2004) alludes to ways through which partnerships and governance can be analysed. Haas notes that there are three theoretical global governance deficits which PPPs should be able to address. PPPs are meant to address a regulatory deficit through encouraging co-operation and problem solving in areas where governmental regulation might not be apparent. Secondly, PPPs supposedly solve issues surrounding implementation where governmental regulations may exist but may currently not be being managed successfully. Finally, PPPs are viewed as being able to involve participants from multiple sectors in societies, not just powerful state actors and elites. PPPs are seen to offer higher participation from those not often involved in decision making processes, for example, the poor and indigenous people. Through engaging with multiple stakeholders in these types of partnerships PPPs can improve the implementation of national agreements in terms of legitimacy, accountability and the democratic quality of governance systems (Mert and Pattberg, 2015). In terms of agriculture, these aims would be achieved through ensuring a range of individuals were involved in PPPs, including farmers, consumers, councils as well as the state and international actors.

If Haas's three deficits are addressed, various benefits can be achieved. Kavishe et al. (2019) outline these benefits for ecosystem service delivery, which include: 'on-time delivery'; 'cost savings'; 'risk sharing'; 'output-based contract increases'; 'improved level of service'; 'enhancing public management'; and 'increases in the availability of infrastructure funds'.

Local knowledge is also another key benefit to emerge from the use of partnerships. Wynne (1996) in his paper speaks about how much trust or credibility the public are willing to invest in scientific or governance institutions. Through a study of the Lake District's hill-farmers in the UK, who were

dealing with the nuclear fallout from Chernobyl, Wynne was able to highlight how social relationships, networks and identities that emerge are highly important for gaining trust and credibility. As a result of misinformation provided to farmers from scientists and the government, around the fact that there would be no radioactive impacts in the area and any restrictions would only be in place for a short amount of time, farmers did what they were told until many negative externalities were encountered. Instead of listening to farmers, scientists tried to follow their own beliefs, which led to mistrust and public embarrassment. It is arguable that if such local knowledge of the area was obtained from farmers, through discussion and partnership with other organisations, that social capital could be built (Dwyer, 2014). In turn, this social capital would increasingly enable trust to be fostered between scientists and farmers alike (Wynne, 1996).

Dwyer (2014) speaks of some farmers being able to benefit from capacity building and co-operation, which partnerships can offer, through farmers being able to articulate their needs, leading them to engage more with different project aims and objectives. As such, local knowledge sharing will benefit everyone in the partnership – as where schemes like AES have failed in the past was partly a result of a lack of farmer interest and engagement with the projects (McCracken et al., 2015). Hence, where some schemes have failed to deliver as meaningful results as they could have for the environment, PPPs may offer a governance solution of greater benefit. Dwyer's point was also contemplated by Riley (2011) who spoke about the importance of local knowledge for helping science to gain credibility and enabling scientific research to be implemented in different unique areas. It was important, Riley argued for science (or conservationists in the domain of ecosystem services) to be listened to symmetrically alongside farmers. Citing Burgess et al. (2000, 131) Riley discusses how “neither farmers nor conservationists know best”, hence, both must be listened to and reach a mutual understanding at local scales to avoid the misinformation portrayed in the Lake District historically, as noted by Wynne (1996).

Fish (2011) discusses how local knowledge becomes evermore crucial when considering the topic of ecosystem services delivery. He argues that for projects to be successful a wider holistic approach is needed, given that ecosystem services are diverse and no one expert is likely to have all of the answers. Thus, he argues management approaches need to account for different needs, values and perspectives. A partnership would enable this to happen through being able to bring multiple stakeholders together and local viewpoints from different sectors to be better understood.

These benefits will be addressed in more depth in Chapters 4, 5 and 6, where the results and an analysis of PPP approaches to ecosystem service delivery will be discussed.

2.7.4 Challenges of the Partnership Approach

Whilst PPPs have perceived benefits, there are also challenges associated with such an approach. Pattberg et al. (2012) found from an evaluation of ecosystem service delivery PPPs that many of the PPPs fell short of resolving Haas's three government deficits. Pattberg et al. found that many partnerships were not active, with many not addressing the aims they set out to with respect to where their comparative advantage was. Whilst a few partnerships were seen to make a good contribution to the three governance deficits, overall many partnerships were not. For instance, Mert and Pattberg (2015) found that in terms of compensating for governance deficits, many of these PPPs only incorporated powerful actors (scientists, governments, non-governmental organisations (NGOs)) and failed to look at more marginalised groups. An underlying question arises which is related to the likelihood of such partnerships being able to deliver ecosystem services in the way that they are supposed to, if these deficits are not being addressed.

Moreover, Thompson (2018) argues that through ecosystem services delivery partnerships, an overdependence on private sector funding via corporate social responsibility (CSR) can occur, which centres decision making power with firms regarding how, where, and when programmes are implemented. This can, in turn, lead to a power imbalance, where private interests are placed above those of the public. Yoshida (2018) appreciates farmers' concern for their environments but suggests that this concern is hindered by their need to survive financially. Yoshida postulates that, due to production-oriented pressures of the agricultural industry and livelihood and humanitarian considerations, farmers' human–nature relationships are complicated and have limited their efforts to act upon personal perspectives around conservation and ecosystem service delivery. Thus, farmers must be compensated for their work, yet in a way which is independent of individualised agendas which could be overly influenced by the private sector.

This theme which Thompson and Yoshida discuss develops into a wider conversation around power relations. Michael Burawoy (1998) developed an extended case-study method. He spoke about power relations in Zimbabwe as an example. From a Marxist viewpoint, Burawoy argues that as workers transform nature into usable objects, they also give their own labour meaning, and produce, in turn, their own capital wealth (or profit). Workers return on further days to continue their work, as they are dependent upon capital, enabling a division of labour to form, and the position in which individuals find themselves within that division. Burawoy's premise is that this production (turning of nature into usable objects and profit) only becomes reproduction under a regime of power (resulting from capital and differences in worth and value in a division of labour). In terms of partnerships, there is still inherently a power dynamic and power structure which can be seen in the majority of

cases – as to produce ecosystem services and improve their value, and continue to reproduce these ecosystem services, various partners must take on different roles which are valued differently. As Thompson (2018) discussed how disproportionately much power lays with the funders (i.e. private sector organisations) of how to deliver ecosystem services compared to other stakeholders within the partnership. Contu and Girei (2014) warn that partnerships can fall foul to two main flaws in relation to these power dynamics, namely abiding by the goals and definitions of the most powerful in judging the success of partnership collaboration, and also by not critically uncovering the inner working of processes within the partnership, only considering what is visible. This is where critical realist approaches to partnership management can be better utilised and focused.

Numerous articles also consider this drawback of power hierarchies in relation to partnerships in the delivery of ecosystem services. Indeed, when Edwards et al. (2001) undertook a study of the mid-Wales rural development partnership they found that despite rhetoric around power sharing that state institutions often remain the dominant actors within partnerships. Moreover, Biggs et al. (2017) elaborate on a study of delivering ecosystem services in Kruger National Park, South Africa. They discuss how the Olifants River and loss of ecosystem services occurred for several years in the area due to a lack of cross-sector discussions. Referring to Ostrom's (1990) work, Biggs et al. detail how this is seen through nested hierarchies forming between different governance layers in the area. The authors allude to the difficulty of rural governance in a world where partnerships, like LNPs, are increasingly becoming the norm. They argue that increasingly power dynamics exist between stakeholders in partnerships. Therefore, some partners hold more power than others, and can direct ecosystem service delivery in ways that do not always provide beneficial outcomes, as in the case of Kruger National Park's partnership.

Additionally, often frameworks are not in place to fully enable PPPs to flourish under appropriate guidance. Legislative frameworks must be established for a PPP approach to flourish. Institutional issues reference the involvement of the public sector and its ability to institute an environment where a partnership can work (Panayides, Parola, and Lam, 2015). Issues include authority, legislation, regulation, and market openness. Authority denotes the specialised public agencies, for example, PPP-supporting units and knowledge centres at national or subnational government levels that aim to provide the key functions and services of PPPs, including policy guidance, capacity building, project promotion, assuring finance, and approval of projects (Jooste and Scott, 2012). Guidance from such public agencies would help in supporting the environment, the project's economic viability, and a technically competent consortium (Zhang, 2005). Without the relevant frameworks and advice from the public sector being operationalised, a 'cycle of failure' with limited institutional learning (i.e., feedbacks on the ecological reasons for failure) results (Thompson, 2018,

507). Without the establishment of this legislative framework, it is also more likely to cause the power imbalance private firms have had in the past within PPP governance structures. In order to ensure that these challenges do not occur, it is important to evaluate empirical examples which offer insight and lessons learnt from current PPP examples. Through critically evaluating current PPPs, PPPs which aim to deliver ecosystem services in the future can overcome these challenges.

2.8 Conclusion

This chapter has reviewed the challenges facing agriculture in the future and highlighted emerging issues associated with managing food production alongside protecting the environment. In doing so, the policy shift from productivism to multifunctionalism has been discussed. The role PES plays in this process indicates how ecosystem services can be valued and how farmers can be financially compensated for their delivery of ecosystem services. Agricultural policy has increasingly adopted PES schemes - of which AES are one example - to ensure that ecosystem services are provided. Partnerships are proposed as one of the delivery mechanisms for collaboration among different stakeholders to achieve a range of landscape scale benefits and ecosystem services through such schemes. Benefits and challenges outlined include the ability to reduce ecosystem services trade-offs through integrated management, and greater efficiencies through the pooling of resources and sharing of expertise. However, drawbacks were found in relation to poorly defined objectives, non-co-operation and limited resources. Critically, this review concluded by stating that there are not enough evaluations of PPPs in agriculture. This thesis seeks to address this by providing an analysis of PPPs in operation before moving on to focus specifically on the case study of LNPs and CLNP.

There are many directions which agriculture needs to consider in the future when delivering ecosystem services. This project studies this move towards multifunctionalism within the UK farming system. The project specifically focuses upon the governance of such multifunctional landscapes, using PPPs, and evaluates how this enables farming to deliver (or not) different ecosystem services. This project was devised at a time when little evaluative research existed on the running of PPPs for the delivery of ecosystem services (Miteva et al., 2012). Such interdisciplinary research into the delivery of ecosystem services has been called for by the National Ecosystem Assessment Follow-On Report (NEAFO, 2014). Several research areas are involved in studying ecosystem services, but the NEAFO argued that there is not enough research which currently builds on the strengths of the different research areas, which an interdisciplinary approach could offer. Additionally, at present there is no coherent strategy for mapping ecosystem services (Maes et al., 2012). Such mapping and spatial data is crucial to enable ecosystem services to feed into policy making. This project provides

an interdisciplinary approach to the understanding of ecosystem service delivery at a time when this research is required in both academia and policy.

Drawing upon the literature presented here, a series of research questions are now posed.

2.8.1 Research Questions

The overriding research aim of this project is:

To evaluate the role of PPPs in the delivery of ecosystem services within UK agriculture

The research questions that this project will answer are:

- 1. What different models of PPPs are currently in place to provide payments for ecosystem services in UK agriculture?*
- 2. What ecological (dis)benefits should occur from PPPs when managing agricultural catchments for ES?*
- 3. What makes a good partnership approach? This includes considering who is involved, division of roles and responsibilities, modes of governance and the proportion of risk assigned to different stakeholders.*
- 4. How do different stakeholders appraise the relative (dis)benefits of their involvement in PPPs, and what implications does this have for the sustainability of partnership projects?*

The following chapter outlines the methodological approach adopted to answer all four of these research questions and introduces the case study of Cumbria's Local Nature Partnership (CLNP).

Chapter 3: Methodology

“Research is a process, not just a product”

(England, 1994, 82)

3.1 Introduction

Chapter 2 situated this study within academic literature, which helped to present research gaps around interdisciplinary working, mapping approaches to ecosystem services, and a lack of evaluative research surrounding agricultural PPPs in the UK. These research gaps presented a set of research questions for this thesis to address. This chapter places the research questions in a methodological context, to highlight the justification for undertaking the study and the chosen methods. Firstly, the philosophical position of critical realism is evaluated, which underpins the interdisciplinary mixed methods approach of the thesis, where the terms ‘interdisciplinary’ and ‘mixed methods’ are also defined. Secondly, evaluative approaches are discussed, alongside why the study chose to adopt a mixed methods approach informed by process evaluations. The purposive and snowball sampling strategies used within this mixed methods approach are then discussed and justified. Each of the five main methods chosen: desk-based research, semi-structured interviews, case-study approach, ecosystem mapping and deliberative workshops, are then presented to highlight how each method answers the four project research questions (see logic diagram in Appendix 1). Strengths and weaknesses of each method are presented before moving on to outline the modes of analysis employed, such as coding and textual analysis. This enables the project’s framework and philosophical position to be understood and justifies the chosen case study of Cumbria’s Local Nature Partnership (CLNP). The logic diagram for the research is appended to the thesis in Appendix 1. This logic diagram informed the structure for this chapter, indicating how the philosophical approach led to method selection for each of the research phases and how this informed the empirical results and conclusions.

3.2 Philosophical Scientific Approach

The philosophical approach a researcher takes can heavily influence the methods, outcomes and analysis within a thesis. Thus, it is important that an individual’s philosophical approach is outlined at the start of an academic project. Figure 3.1 illustrates how philosophical approaches influence a research project. Through evaluating the philosophical approach taken, researchers can become more aware of their epistemological approach (sources of knowledge) to generating knowledge (Sperber et al., 2010). This is particularly important for ecosystem services research. For instance, Seppelt et al. (2011) found that many such studies were poorly defined in terms of their

philosophical approaches, which made the scientific rigour of individual projects difficult to judge, given the multitude of traditions and subject approaches adopted. Therefore, through research studies clearly outlining their philosophical approaches, it is easier for others to understand the underlying assumptions and validity of different projects.



Figure 3.1: Research gaps from Geographical Literature present Questions which are supported by the underlying Philosophies of a researcher that, in turn, influence the Project's Research Design
Adapted from: Flowerdew and Martin (2005, 14)

There is a large debate within the social sciences around the approaches and methods used to answer research questions. Philosophies stem from various research paradigms, of which Guba and Lincoln (2005) mention three: positivist, constructivist and critical. Positivism is a natural science approach which advocates for the discovery of truth and facts. This position is predominantly associated with quantitative research, which uses hypotheses that are proved or disproved through experiments (Holliday, 2002). On the other hand, constructivism argues for the construction of new knowledge, with an appreciation that individuals perceive reality in different ways when they reflect on their experiences (Olusegun, 2015). Finally, the critical paradigm seeks to challenge the traditional philosophical status quo, through understanding that there are power dynamics and several positionalities at play within society. Critical theorists must explore a problem but also come up with solutions to problems which then, in turn, can be implemented within society (Asghar, 2013).

3.2.1 Critical Realism (CR)

Within these perspectives, critical realism (CR) is one position which emerged in the postpositivist crises within the natural and social sciences of the 1970s and 1980s. The theory emerged from multiple social theorists trying to develop a postpositivist social scientific framework, which acknowledged that not all phenomena can be simplified to a 'true' or 'false' criterion, and where some forms of knowledge may not be fully tangible or observable, with Roy Bhaskar being the main proponent of the CR philosophy (Archer et al., 2016). CR as an approach, in its simplest sense, refers to the critical study of real-world phenomena. Critical realism is a contemporary school of thought, which can offer "... a set of guidelines which outline how to critically analyse and re-work existing conceptions of social processes" (Allen, 1983, 26). This framework offers a focus for research, to critically study phenomena within the real world. Archer et al. (2016) speak of how the framework enables the nature of causation, agency, structure and relations of phenomena to be explored, allowing for a mapping of the ontological (study of being or existence) character of social reality whilst being critically reflexive.

The critical paradigm is best suited to this research, given that the project sought to examine real world governance issues within UK farming for the delivery of ecosystem services. By using this philosophical approach, governance structures could be critically analysed more effectively (Easton, 2010). Indeed, as Bhaskar (2014, 36) has written "... society must be regarded as an ensemble of structures, practices and conventions which individuals reproduce and transform, but which would not exist unless they did so. Society does not exist independently of human activity (the error of reification). But it is not the product of it (the error of voluntarism)." Volkoff et al. (2007) argue that this examination of social processes and governance structures happens through studying such empirical events, which can be experienced or observed, in order to understand the causal relationships behind those events. In turn, the adoption of this approach enables an opportunity to critically evaluate theories attached to specific topics, like governance and ecosystem services, based upon empirical evidence (Miller and Tsang, 2010).

Other studies have already adopted critical realism as a philosophy. For example, the approach has had a great impact in the field of geography, where it offers a solution to many issues associated with positivism, as well as offering a mode through which to avoid the problem of subjectivism within research (Pratt, 2009a). Pratt (2009b) offers an appreciation of how CR was able to influence Geography from the late 1970s onwards in relation to the nature of practices, spaces, and places. From the late 1980s in Geography, scholars used it in relation to empirical studies on localities (ibid). One of the areas of geography where it is having the largest impact is within economic geography,

where it can be used to study several social dynamics and the emergence of institutions within regional studies (Yeung, 2003; Sunley, 2008). Evaluative projects have already been established using the philosophy, yet many scholars continue to argue for its increasing uptake as a philosophy (Yeung, 1997). Pratt (2009b) mentions how this was in part in response to economic geographers' concern with Marxist philosophy, where spatial dynamics were often ignored. Its uptake has also been seen in other areas of geography, from the urban to the social (ibid). Pratt (2013) discusses how CR should be considered further as it enables researchers to gain critical insights into events, methods, and helps individuals explore empirical examples in alternative ways that may help better explain a phenomenon, such as ecosystem services or partnership approaches. For instance, Dickinson (2006) evaluates the role of health and social care partnerships. Dickinson identifies that one of the many challenges of this type of evaluation is the definition of the partnerships themselves, with many different names and varying aims of partnerships. This diversity and that of the variety of stakeholders involved makes them very hard to evaluate. However, Dickinson advocates for the use of critical realism in order to do this, as it provides a framework in which multiple stakeholder perspectives can be dealt with and enables values and ideologies of real-world partnerships to be exposed. Kazi (2000) argues that this critical realist approach also offers a holistic approach to evaluation as it can often include the other main philosophical perspectives in research, building upon their strengths and discounting their weaknesses.

In rural development studies and agriculture CR has also been widely adopted. Fletcher (2017) speaks about her study on Saskatchewan Farm Women, a qualitative project which studied the social and gendered effects of major agricultural policy change on these women. There were two policy shifts, which included the cutting of a transport support program for grain producers, coined the 'Crow Rate', and secondly the 1990 policy of plant breeder rights, which provided intellectual property rights for seeds. The study comprised of interviews to come to its conclusions. Fletcher acknowledges how CR research is informed by theory initially, developing a research question, yet the outcomes of the research allow theory to be altered or changed, depending on the findings. This was important for this specific project in enabling a critical review of theories on how partnerships work to be explored in practice and a reconceptualization of the PPP model to be made. Bhaskar (1979, 6) also acknowledges the importance of not trying to remain static in allegiance to a particular theory, in order to respond to the results which the study is able to uncover and discuss what is happening in reality.

Fletcher (2017) then went on to look at events unfolding at the empirical level. She used statistics to see generalised trends ('extensive' data) and interviews ('intensive' data) to identify demi-regularities. Dieleman et al. (2012, 27) define a demi-regularity to be "a semi-predictable pattern or

pathway of program functioning". In the context of this research, desk-based research was utilised (as 'extensive' data) and linked to mapping, interviews, and deliberative workshops ('intensive' data) to identify demi-regularities in the functioning of PPPs for the delivery of ecosystem services in UK agriculture, with a specific focus on Cumbria's Local Nature Partnership (CLNP), which could then be analysed further. The use of coding as an analysis tool in the study enabled an identification of these demi-regularities.

Leading on from this stage is a process of abduction, which Fletcher (2017) refers to as theoretical redescription, whereby data is looked at in relation to theory, to see how this contributes or does not contribute to earlier theories. In this study, it draws particularly on threads of theory related to local knowledge, power, partnership development, and ecosystem services.

Fletcher then discusses the final stage of analysis, coined retroduction, a mode of inference, which examines the causes behind the empirical trends. In this step, the researcher has to understand the conditions needed for a mechanism to happen (i.e. partnerships, such as the CLNP, to be able to effectively work and deliver ecosystem services), transitioning from an understanding of the observed empirical events to the necessary factors that cause them to happen (ibid). Olsen (2007) mentions that the ultimate strength of this approach is the ability of CR to be applied to localised situations and studies, such as the CLNP. Through a 'three layered iceberg of reality' critical realists adopt in their research approach, moving from the empirical level (experienced and observed events), to the actual level (through abduction), to the real level (through retroduction), this philosophy offers an ideal approach for this research project to take and contribute to geographical knowledge through (Fletcher, 2017).

Yet, critical realism is not without its own weaknesses, for instance, Ogland (2017) speaks of CR's philosophical belief that some truths are measurable when he argues that they are not. Examples Ogland uses of non-measurable phenomena include agency and power relationships, where Ogland denies the plausibility of this philosophy to measure such things. He concludes that the philosophy confuses science with ideology and religion, with the argument that some things that are not truly measurable and should not be allowed to determine answers to research questions. However, proponents of this philosophical school of thought argue that Ogland's unmeasurable events are *observable*, through an understanding that there are structures which inevitably cause the observable events to happen and so they need to be addressed. For example, Decouteu (2016) argued that critical realism aids explanation within studies through three ways: by linking structure to agency; by accounting for the contingent, conjunctural nature of causality; and by using empirical findings to generate new theory and implications for the future.

Therefore, in terms of this thesis, CR offered a solid philosophical foundation for this project, given the need to critically evaluate the real-world phenomena of PPPs in UK agriculture. Firstly, through the adoption of a case-study approach; phenomena such as structures, agency and power dynamics can be explored in greater depth through a CR philosophy. This especially helps to answer research questions around what makes a good partnership approach, including stakeholders and the division of roles and responsibilities. Secondly, the approach enables a criticality to be employed, which contributes to the analysis of relationships between governance and the delivery of ecosystem services, through an understanding that all methods have weaknesses and that by adopting an interdisciplinary approach alongside the use of mixed methods, governance structures behind observable events can be better understood.

3.2.2 Interdisciplinarity

Following on from critical realism, this thesis is also interdisciplinary in nature. Haynes (2002, 17) defines the term interdisciplinarity as being usable for a project which “critically draw[s] upon two or more disciplines and which lead[s] to an integration of disciplinary insights”. Whilst drawing upon the geographical and ecological disciplines, this approach was considered the most suited within this thesis, given the literature review, which identified that ecosystem services research needed to become more interdisciplinary, because ecosystem services can have both social and scientific values attached to them (NEAFO, 2014). It was also evidenced in the literature review, that where certain ecosystem services delivery schemes fail is because of their inability for different sectors involved in schemes to communicate, i.e. economists and conservationists (Ansell et al. 2016). Through adopting this interdisciplinary approach, multidisciplinary methods and perspectives have been considered which will aid the language of communication between different sectors. Moreover, this interdisciplinary and mixed methods approach helps us to better understand the multi-faceted problems associated with ecosystem services and their delivery.

3.2.3 Mixed Methods Approaches

As the research is interdisciplinary, encompassing multiple disciplines, the thesis uses a mixed methods approach, adopting methods from both the social and natural sciences. Through adopting a mixed methods approach, which has been defined as an approach which “focuses on collecting, analyzing, and mixing both quantitative and qualitative data in a single study or series of studies” (Creswell, 2006, 5), the research is better able to provide insights into the project than a single method would have been able to produce alone. For instance, using quantitative (or deductive) methods such as GIS enabled an understanding of known phenomena, whereas qualitative (or

inductive) methods including interviews and workshops allowed for an appreciation of how and why phenomena occur alongside an identification of previously unknown processes (Pasick et al., 2009).

Using a mixed methods approach allowed for the strengths of several different research methods to be utilised and for more informative data which helped answer the four main research questions. For example, quantitative data allowed for an appreciation of the types and quantities of ecosystem services within UK agriculture to be understood, whereas qualitative data allowed for a greater insight into the relationships between different stakeholders involved within partnership approaches to deliver these ecosystem services. Each type of data was not independent of another. Quantitative and qualitative data had to be merged together, in order to fully answer the main research questions, through a mixed methodology. In turn, using this mixed methodology enabled an evaluative approach to be implemented.

3.3 Evaluative Research

Adopting this critical realist stance, underpinned by interdisciplinarity and the use of mixed methods, meant that an evaluative project could be created. The Magenta Book (2011), is a UK government publication, which highlights good practice for the completion of evaluations. Within the Magenta Book, evaluative studies are highlighted as crucial to understand specific policy interventions in influencing phenomena. To understand the successfulness of PPPs working within UK agriculture to deliver ES, an evaluation is an appropriate approach. Evaluations allow for an appreciation of how PPPs work in practice, i.e. the 'who' is involved, 'what works' and 'what does not' within partnership approaches. Scholars have identified four main types of evaluation when focusing upon policy programmes and interventions in research, however, other evaluative types also exist:

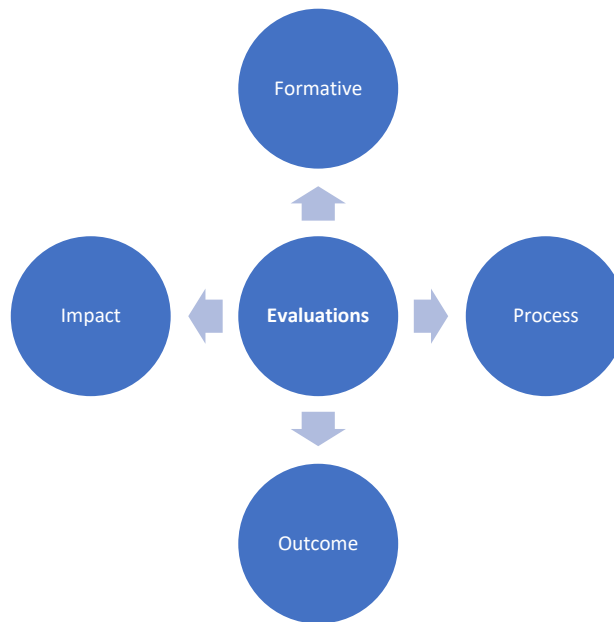


Figure 3.2: Types of Evaluation

Adapted from: Centers for Disease Control and Management (2007)

These four main types of evaluation and their definitions are summarised in the Table 3.1 below:

Table 3.1: Definitions of four different main Evaluative Types

Evaluation Type	Definition
Formative	These evaluations strengthen or improve the project or policy being evaluated - they help form the policy or project by examining the delivery of the program or technology, the quality of its implementation, and the assessment of the organisational context and so on (Trochim, 2006).
Impact	Impact evaluation is a broader type of evaluation and assesses the total effects, intended or unintended, of the program or project (Trochim, 2006).
Process	Process evaluations investigate the process of delivering the policy or project, including alternative delivery options. Process evaluations help stakeholders see how a project outcome or impact was achieved. The focus of a process evaluation is on the types and quantities of services delivered, the beneficiaries of those services, the resources used to deliver the services, the practical problems encountered, and the ways such problems were resolved (Linnell, 2014).

Evaluation Type	Definition
Outcome	An outcome evaluation assesses the effectiveness of a program in producing change. Outcome evaluations focus on questions that examine what happened to program participants and how much of a difference the program made for them (Linnell, 2014).

A mixed methods approach informed by process evaluation was best suited for this research, as this type of evaluation can directly address the overriding research aims. Process evaluation questions address programme operations, namely the who, what, when, and how many of programme activities and programme outputs (Center for Disease Control and Prevention, 2009). Being interdisciplinary, this study also relied upon collecting both social science and natural science data, allowing for the collection of qualitative and quantitative data from different stakeholders covering both subjective and objective aspects, which a process evaluation utilises (Magenta Book, 2011).

The alternative evaluation types would not be as robust to inform this project. For example, many PPPs in farming are a relatively new phenomenon. One type of PPP, the LNP, has only emerged since 2012 and is incorporated within the *25 Year Plan for the Environment* (2018) meaning that a thorough impact evaluation would not be possible for this type of PPP, as many of the partnership objectives would not have been met. However, an approach informed by a process evaluation allowed for an understanding of the mechanisms through which the partnership is currently operating as well as stakeholder relationships to date. Hence, this evaluative approach allowed for an appreciation of what works, what is not working and who is involved and enabled critical judgements to be made under a critical realist philosophy which, in turn, helped to inform the current and future running of this particular type of PPP within UK agriculture.

3.3.1 Mixed Methods Approach Informed by Process Evaluations

A mixed methods assessment approach informed by process evaluation is also best suited to address the current research gaps within ecosystem services research and the policy environment of this thesis. Paudyal et al. (2016) argue that relatively little evaluative work exists surrounding partnership approaches and that the ES approach is not well understood amongst policy makers, civil society and the private sector. This point is further supported by a report from the Ministry of Foreign Affairs in the Netherlands (2013), which stated that relatively few environmental PPP evaluations have been carried out. Despite this, evaluations are shown to be crucial for feeding into policy and project development (see Figure 3.3). This thesis addresses these gaps by providing an assessment informed by the process evaluative approach of an LNP that strives to promote ES within farming. This

evaluative approach will allow for a systematic examination of whether such PPPs can use ecological principles and criteria in their policies and whether they deliver on their primary purpose of promoting a healthy natural environment for all by delivering ecosystem services; through maintaining or increasing the stocks or flows of a desired ecosystem service (Prager et al., 2016).

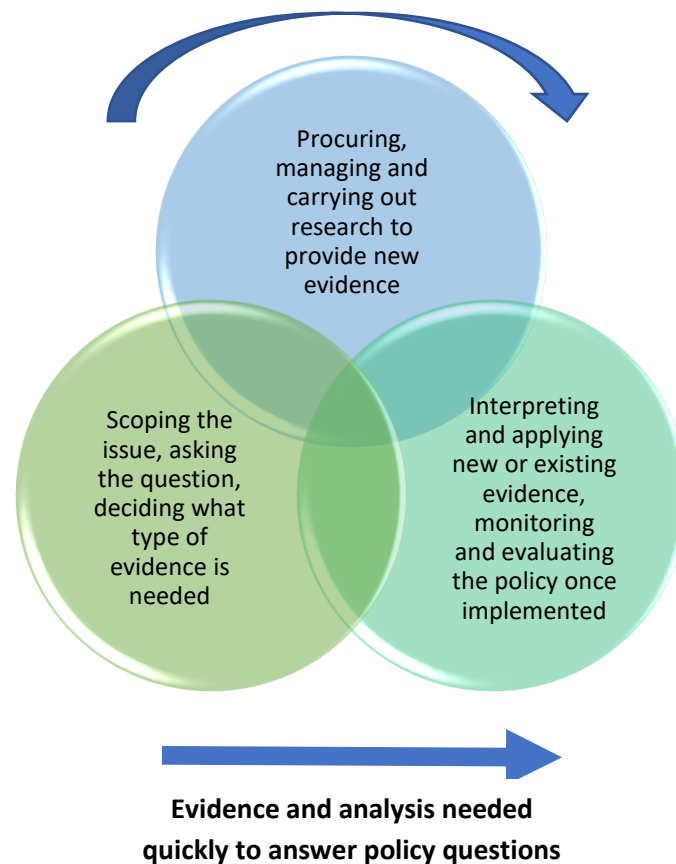


Figure 3.3: The cyclical importance of Evaluation for feeding into Policy

Adapted from: Shaxson (2014)

3.4 Sampling

Within an evaluative approach it is also important to consider the type of sampling strategy to be used. Many sampling strategies can be chosen when conducting research. A sample can be defined as “a proportion or subset of a larger group called a population ... A good sample is a miniature version of the population of which it is a part – just like it, only smaller” (Fink, 2003, 1). Addressing the appropriate sampling strategy from the outset is important as it enables research to be manageable, cost-effective, more accurate, efficient and time effective (Brown, 2006). Two main types of sampling exist, probability and non-probability (Wilson, 2014). Probability sampling (e.g. random) is where each unit has an equal chance of being selected, whereas non-probability

sampling (e.g. purposive) is marked by subjectivity, with a specified proportion of units selected and is not generalisable to a population (Lo, 2009). This research used non-probability sampling techniques, as it was the most efficient way to answer the research questions and gain access to key stakeholders involved within the specific partnership approaches which the project studied.

For instance, the qualitative sampling strategy was purposive. Through using a purposive sample, direct individuals of relevance to the research topic were approached for interviews and to attend deliberative workshops. Purposive sampling was also used for ecosystem service mapping, with the Greystoke area in Cumbria being mapped, which enabled the ecosystem services in the partnership area, where many of the interviews were conducted, to be better understood. This enabled a sample to be produced which can logically be presented as indicative of the population, whilst allowing for in-depth information to be elicited and an efficient use of limited research resources (Lavrakas, 2008; Palinkas et al., 2015). As Teddlie and Tashakkori (2003) explain, using purposive sampling is also useful in mixed methods approaches, as it enables an exploration of causal factors behind the success or failures associated with evidence-based practice through using qualitative methods. Quantitative methods then enable hypotheses to be tested and confirmed for the successful implementation of practice to occur.

Moreover, snowball sampling was also used within the project's wider methodological approach, to enable contact with an ever-expanding research base due to difficulties of accessing elites and more impenetrable social communities, such as policy makers and farmers, with whom the project was concerned (Atkinson & Flint, 2001). The researcher found that many in farming and policy communities were cautious of speaking with researchers, such as the researcher, due to a breakdown in trust between both groups. This issue of positionality, surrounding the researcher and the researched, is discussed more in Section 3.5. A research participant would be asked to provide the names of other actors who might be relevant to the research, through which a higher level of trust and access was established with different members of a community (Lewis-Beck et al. 2004). This was the most appropriate sampling strategy for the research, given the insular nature of some members associated in farming and policy communities.

3.5 Positionality and Reflexivity

Positionality is a key factor which needs to be analysed for research to be conducted accurately. Positionality "reflects the position that the researcher has chosen to adopt within a given research study" (Savin-Baden and Howell Major, 2013, 71). Simandan (2019, 4) states that "the intuition that what we perceive in the world at any given moment is shaped by our positionality, geographical location, biases, interests, blind spots, and by the inherent cognitive and perceptual constraints of

our species.” Simandan here is referring to how our own perspectives within research can be influenced relating to several of our own predispositions and opinions, which is why in order to generate reliable findings researchers need to be aware of these factors and their positionality within the research process. Corlett and Mavin (2018) argue that by being reflexive on these factors, which shape our own positionality, we can understand how the processes of conducting research influence the outcomes to reach certain conclusions. The process of being reflexive is important in situating the research and knowledge production so that the ethical commitments within research can be maintained (Sultana, 2007).

Within the farming community, the identity of both the researched and researchers have the potential to impact the research process, through perceptions of others, but also the way we think others will perceive us (Bourke, 2014). Throughout the research process the researcher considered themselves to be an ‘outsider’. In research, an ‘outsider’ is a researcher who does not share experiences or similar backgrounds to the people being researched (Flores, 2018). This position has multiple benefits, whereby findings are arguably more objective and keep an emotional distance, but there are often drawbacks to gaining access to participants (Kerstetter, 2012). Whereas, an ‘insider’ refers to social interviews conducted between researchers and participants who have a similar cultural, religious, ethnic or other background. This provides an advantage to the ‘insider’ in terms of access, yet also poses challenges related to allowing participants greater access to the private self of the individual, influencing the researcher’s objectivity within the research process (Ganga and Scott, 2006).

Stockdale (2016) would argue that researchers’ positionalities are temporal and can shift depending on specific circumstances. At one point, the researcher could relate to being an ‘outsider’ but overtime the researcher negotiated the research process to become more aligned to an ‘insider’ position. This was through conducting initial interviews and adopting the sampling strategy of snowballing, as highlighted in the previous section, to use these initial interviewees as gatekeepers to others working within the agricultural industry (McFadyen and Rankin, 2016). This enabled trust and rapport to be built with the agricultural community and individuals to feel comfortable when talking with the researcher.

Moreover, as also documented in Chiswell and Wheeler’s (2016) work, the intersecting positionalities of the researchers as ‘young’ and ‘non-farming’ enabled them to appear ‘non-threatening’ to the agricultural community and they were able to gain useful insights which otherwise would not have been gained. This shared positionality enabled the researcher in this thesis to overcome the issue of farmer fatigue and technocratic experts within the farming research

sector. Bennett (2016) described how farmers often experienced fatigue as a result of their long and intensive working hours, coupled with the industry being one of the most dangerous in the world. Additionally, this fatigue, Bennett argues, is related to farmers being an over-researched study group. This fatigue leads to a reluctance of those in the agricultural sector wanting to engage with research projects. Moreover, this fatigue is heightened when experts become involved in agricultural policy, where there is an argument that farmers' opinions are excluded, with some citizens having a lack of trust in technocratic experts (Bertsou and Pastorella, 2016). Therefore, farmers may have been more reluctant to speak with the researcher had they felt that they were in a more senior authoritative position.

3.6 Ethics and Risk

With an understanding of the researcher's positionality, it was also important to ensure that the research was carried out ethically. Laerd (2012) presents five factors for ethical consideration in any research project; minimising the risk of harm, obtaining informed consent, protecting anonymity and confidentiality, avoiding deceptive practices and providing the right to withdraw. In this research, this was ensured through ethical approval before the research was carried out. Risks of harm were considered to be minimal and a participant information sheet and consent form were written to inform participants of any potential risks (see Appendix 2), the researcher will also follow up with interviewees post-submission of this thesis to provide findings in an accessible format, to ensure that reciprocity in the research process is ethically sound. Moreover, informed consent was confirmed either verbally before the start of an interview, later to be electronically signed on a consent form and emailed back to the researcher, or by a hand-written signature on a printed consent form during face-to-face interviews, which also stated that participants had the right to withdraw from the study whenever they wished. Anonymity and confidentiality has been protected through the use of interviewee codes in the thesis, with non-identifiable information being used. Sensitive documents have also been password protected on the researcher's computer, to be deleted after three years from the thesis submission, allowing for further research outputs to be produced. Caretta and Faria (2019) argue that one of the advantages of 'slow scholarship' is that studies can be rigorous in the ways that they ethically engage with materials and reflect on the research process. The researcher considers that this study, alongside other PhD studies, was one such example of 'slow scholarship' which enables ethical considerations to be understood thoroughly.

Stemming from positionality and reflexivity, there is also a need within research to reflect upon ethical and health and safety issues that could arise during the fieldwork before starting work. The

context of agricultural related research offers very particular people-place relations which contribute to ethical considerations and risk within the research (Thomas et al. 2019). For instance, Chiswell and Wheeler (2016) document the challenges faced with the remoteness of farming communities, which leads to logistical and health and safety aspects which need to be considered when travelling to them to carry out fieldwork. This can lead to several risks, such as concerns around car accidents, getting lost as many farm residences are not clearly located on maps, weather conditions and a sense of emotional isolation. It was then important to implement the risk assessment produced before fieldwork, to ensure that risks were minimised and mitigated. Ethical forms and risk assessments submitted to the Department of Geography, University of Sheffield were carefully completed to uphold these standards discussed and subsequently approved (see: Appendix 3).

Whilst this chapter has already explained the relevance of adopting a philosophical approach of critical realism, embedded within a mixed-methods approach informed by process evaluation techniques, which uses purposive and snowball sampling to answer its research questions, and is ethically reflexive, methods also need to be considered. Yeung (1997) argues that whilst the philosophy of a project may be sound, the project is only truly rigorous if the correct methods are chosen. Therefore, the effectiveness of each of the five methods chosen for the project will now be discussed in turn, linked to the phases of the research.

3.7 Phase I: Desk-based Research

The first phase of research involved addressing the first research question: *What different models of PPPs are currently in place to provide payments for ecosystem services in UK agriculture?*

In order to fully understand the scope and scale of different examples of PPPs operating within the UK's agricultural sector, desk-based research was undertaken. This type of research involved collecting data from existing resources. There are two main types of desk-based work: internal (done within the organisational boundaries) and external (drawing on resources published outside the organisation, for example, government reports) (Rolfe, 2014). This research focused predominantly on external desk-based research to start formulating the project and inform other research questions. This initial stage in the research project helped to meet the original objectives of the evaluation process, as identified in the Magenta Book (2011) through: identifying the data requirements (i.e. what data is already and is not available on PPPs) and identifying the evaluation objectives and research questions (i.e. through understanding what PPPs were already evident within the UK agriculture sector and the data gaps missing within databases and prior PPP evaluations).

Academic articles were searched for using *Web of Science*, a searchable database record of academic references. Various academic articles provided information about the countries partnerships are operating in, the geographical scope, the original start date of the partnership, as well as the reported resources needed for each of the partnerships to function. Finally, articles also contained information about the impacts each partnership is having/has had, as well as where the programmes and activities of each partnership are recorded.

Key words were used, in order to run searches, including *public private partnerships, UK, farming, agriculture, ecosystem services, payments, partnerships*. A mixture of these words was used to ensure as much relevant literature and information was found as possible, relevant for the key question. Electronic database searches were then saved, so that past searches could be run later towards the end of the project, in case new PPP examples or literature emerged. Boolean logic, where exact phrases based on search terms could be identified in articles, was applied, which helped to return a definitive number of PPP results, to ensure no examples were excluded from the searches, through the words 'AND', 'OR' and 'NOT', as well as the use of an asterix to ensure that all the variants of word endings were searched for (see Appendix 4 for a list of search terms used within Web of Science). Phrases, such as PPP, were put in apostrophes, to ensure that only results with this exact phrase emerged from the findings where PPP was input as a key word. This ensured a relevant and specific set of results to emerge. Examples were categorised as to whether they were international or UK related.

3.7.1 Analysis

Relevant articles and examples were then recorded in an Excel Spreadsheet, with notes made on their content related to type of PPP, who was involved, benefits and drawbacks, as shown in the screenshot of Figure 3.4. A careful and thorough procedure was followed, as advanced by Moher et al. (2009), who discuss the suitable recording of desk-based data gathering. This study allowed for an approach which enabled the recording of desk-based studies and literature searches to be used in the research and analysed later, through four main research stages: identification, screening, eligibility and inclusion. The initial 'identification' stage involved searching databases for PPP examples, 'screening' took place by then scanning the abstract, introduction and conclusion of articles, 'eligibility' was confirmed if the PPP was UK based, but noted down elsewhere if international based. Studies were recorded under the following fields in Excel; 'Author/s', 'Year Published', 'Start of Partnership', 'Aim/s of partnership', 'Resources needed to Operate', 'Benefits (if any)', 'Challenges (if any)'.

Author/s	Year Published	Start of Partnership	Aim/s of partner	Resources Needed to op	Benefits (if any)	Challenges (if any)
Refsgaard et al.	2018	2011: Launch of Defra's new Catchment-Based Approach (CaBA) by government was part of the response to widespread pressures for improved implementation of the water framework directive, which led to environmental NGOs threatening to use a judicial review. At a local level, stakeholders including farmers recognized an impending threat of stricter and more vigorously enforced water protection regulation, but also an opportunity for more integrated land and water management strategies.	Stop diffuse water	Legislation, Financing, C	The pilot and evaluation phase of the CaBA was concluded in March 2013. Over time, it is expected that the CaBA approach will mature as a mechanism for ensuring that there is strong local support, consensus, effective coordination, and efficient channelling of existing finances, new funding, and additional resources to deliver local aspirations for the water environment. The CaBA partnerships drive cost-effective practical delivery on the ground, resulting in multiple benefits, including improvements to water quality, enhanced biodiversity, reduced flood risk, resilience to climate change, and greater community engagement with the local river.	Dutch case shows that if the co-governance initiative is purely voluntary and no central authority is part of the process, there is a low rate of participation and a risk of free riding behaviour.

Figure 3.4: Example of the author's desk-based research data entry

Through identifying UK models of PPPs across the agricultural sector, three main PPP examples to deliver ES were identified: the catchment-based approach (CaBA) partnerships, Local Nature Partnerships (LNPs) and pioneer projects. Quantities of articles relating to each partnership approach were able to be noted, along with differences between the number of international partnerships identified and UK based partnerships. Similarities and differences between PPP examples highlighted through this desk-based approach were then documented, which enabled a thorough analysis of PPP examples in chapter four. Through an initial desk-based research stage, other research method choices and some of the sub-research questions asked within these methods were then able to be informed through the evidence base already existent in the UK on agricultural PPPs.

3.8 Phase II: Semi-Structured Interviews

Semi-structured interviews formed the second stage of research. Interviews are useful methods for “explore[ing] their [individual’s] perspectives on a particular idea, program or situation” (Boyce and Neale, 2006, p.3).” Eyles (1988) argues that an interview can adopt more of a conversational format, enabling the interviewer to obtain both qualitative and quantitative data over using alternative research methods. As such, interviews can provide a wealth of information, with a diversity of layers (Burgess, 1984). In a process evaluation, interviews are key to the evaluative process. They act as a way through which rich subjective evidence can be gained into the running of PPPs. However, there are many different forms of interview to choose from.

Interviews range from being an oral history (open-ended) to structured (closed). Each interview type carries both advantages and disadvantages. For instance, oral histories are very useful for exploring what individual’s experiences were and for understanding historic events through participant’s memory (Boyle, 2009). Oral histories are very open-ended, with questions often beginning with ‘tell me about’, enabling a long historical dialogue from an individual to be obtained. Alternatively, semi-

structured interviews offer a bridge between open-ended and closed interview formats. These interviews have pre-defined themes and questions to be explored, whilst also allowing for flexibility to alternate questions within the interview. These types of interviews are self-conscious, orderly and partially structured (Longhurst, 2009). Conversely, Longhurst (2009) discusses how structured interviews have several pre-set questions, with each interview being conducted in the same manner and the same questions being asked. For the purpose of this study, semi-structured interviews were chosen as they enabled key themes to be addressed which helped to answer the research questions. Additionally, this form of interview allowed for flexibility to gather more information related to the individual expertise of research participants, whether that be in knowledge surrounding flooding as an ecosystem service or a specific type of farming.

Moreover, interviews were also expert in nature, whereby individuals had specialist knowledge in the research area. They were expert because specific individuals were targeted who had more specialist knowledge in specific areas than the researcher, for instance, policy makers. Expert interviews can provide insights not often gained in the social sciences, such insights allowed for unique information to be gained, relevant to all the research questions (Bogner et al., 2009). Rice (2010) discusses how certain groups of individuals are, in some studies, best suited to answer specific research questions. In the case of this research, policy makers alongside practitioner interviews and farmers were better suited to answer questions relating to the particularities surrounding the implementation and impact of these partnership approaches. Additionally, these groups were able to give a more specific overview than other individuals would have been able to.

An interview guide was established, based upon the research key questions and previous research studies which had been based around themes of farming, ecosystem services or the environment and partnership working (see Appendix 5 for the interview guide and indicative questions).

Moreover, questions concentrated on the concepts of risk, responsibility, and governance, building understanding of 'what works' in forming sustainable partnership approaches. One example of a past study where a template for interviews was consulted was Demsey et al.'s (2016). This study used evaluative questions such as 'How were the community engaged in the project? What was the level of input? How did this contribute to the development/management of the green spaces?'. This was changed within this project's interviews to focus on the community engagement within LNPs – a key rationale for their inception by government as outlined in the Natural Environment White Paper (2011).

Pilot interviews were carried out during the initial scoping interviews with different LNPs in the UK, where questions could be changed accordingly. The interview questions were responsive to the

answers given by the interviewees to enable more challenges to be elicited about the running of partnerships and information specifically relevant to that partnership approach to be gained (Clope et al., 2004). This allowed for more of a conversational approach in interviews, which was appropriate for this research and interviewing elites, because it was more flexible an approach (Sabot, 1999; Morgan et al., 2019).

As expert interviews were carried out, interviews were arranged in advance through contacting individuals by email and/or telephone. This often involved working through gatekeepers and so contact was made early in the research process with individuals to ensure meetings were arranged with enough notice (Wanat, 2008; Marland and Esselment, 2018). Despite this, the relative success rate of obtaining interviews was low, with approximately 30 additional potential participants not engaging in the research. The researcher faced many challenges, associated with inaccurate contact details, being ignored, cancellations, individuals' rescheduling, and weather extremes which posed an increased risk for the researcher at the field site. Similar challenges have been experienced by other scholars (See: Pollard, 2009; Punch, 2012).

Stakeholder interviews were held with individuals associated with different levels of the LNP process; policy makers, partnership implementers (LNP) and practitioners (farmers). 23 in-depth interviews were obtained in total, varying between one hour and three hours thirty minutes in length (see Appendix 6 for a list of interviewees and affiliations, broken down into different stakeholder categories). 6 policy makers were spoken to, 8 farmers, and 9 LNP members in total (with 3 of these individuals from the CLNP and the other 6 from several nationwide LNPs). Neely et al. (2005) argues that adopting such an approach and talking to people at different levels involved with the LNP is important, especially practitioners, when devising and evaluating policy interventions. However, power dynamics in relation to these interviews must also be carefully considered.

McDowell (1998) and Rice (2010) discuss how there are power differentials in interviews between elites and the academic interviewer. For example, personnel from local government will be able to control what information they provide, meaning that the researcher must develop an independent critical perspective at the same time as maintaining a good relationship with those being studied. To negotiate this in the research, during interviews the researcher's elasticity of positionality (where one has multiple positionalities or backgrounds which they can draw upon) was used to build up a rapport with the interviewee. In terms of elasticity, it was stated that the researcher is both an academic and comes from a family who historically farmed, which hopefully allowed the interviewee to feel comfortable in providing richer responses. Also, information was shared about the research

and any questions the interviewee had was answered to allow for reciprocity throughout the research process.

3.8.1 Analysis

Most questions were open ended. The purpose of this was twofold: to enable as much information to be elicited as possible and to allow the researcher to interpret the responses obtained whilst understanding the complexity and differences involved amongst PPP approaches. Each interview was recorded using an audio recorder, with permission for the audio recording of interviews and use of data in the thesis obtained through verbal and written consent. Demographic and professional characteristics of individuals were also captured through the consent form, to allow the sample to be categorised. Furthermore, written notes were taken during the interview. Interviews were then analysed through being transcribed verbatim by a professional transcription service and afterwards were thoroughly checked by both the researcher and research participant to ensure accuracy.

3.8.2 Coding

In keeping with the ontological basis of CR, analysis began with coding to identify demi-regularities, through key themes and patterns that emerged at the empirical level. However, Fletcher (2017) acknowledges the lack of literature when it comes to considering how to apply a CR perspective to coding, with references in the existing literature being vague. CR requires a more researcher and theory driven analytical approach.

Transcripts were then coded, at different levels. A code is “most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldana, 2008, 3). Coding helps to provide structure to interviews through organising thoughts and findings into key themes. There are two main types of coding: deductive and inductive. Yi (2018) discusses how deductive coding is often used when a rough codebook is already held and throughout the research new codes can be added to the codebook as they become apparent. Whereas, inductive coding is often used where little is known about the topic and the research is more exploratory, where codes are built from scratch from the data provided. For this thesis, coding was inductive, as PPPs and LNPs in farming are relatively new. Whilst some themes could have been established beforehand, themes directly emerged from the interviews themselves. Initial coding was the first stage, where transcripts were initially read through and a general overview of what the data was showing highlighted and notes taken. More detail was then established, through line-to-line coding, where initial codes were established. Categorisation then took place, to enable similar codes to be put into the same category. More detailed qualitative

themes then emerged from the interviews in the final stage of coding, such as 'financial', 'engagement', 'nature', 'knowledge' (see Appendix 8 for an extract from a thematically coded transcript) (Christians & Carey, 1989).

A traditional method of coding was used as it enabled the researcher to thoroughly look through and gain a sense of data. Whilst NVivo might have enabled a quicker analysis, it would not have allowed for the same thoroughness as reading through whole interview transcripts would have done, and some codes could have been missed if the coding process was automated. Zamawe (2015) acknowledges such concerns, by suggesting that NVivo may not be relevant for use in all studies. For instance, Zamawe discusses how being able to use the software effectively requires much time and is challenging. Additionally, in this study, the distancing of the researcher from the research is mentioned. For example, queries in NVivo, whilst helping accelerate the analysis process, can stop the researcher from understanding the context within which each query lies. This can serve to dilute the information, and lead to important phrases or codes being missed. Much information was elicited from these semi-structured interviews, but these are primarily a qualitative social sciences approach and so other quantitative methods were also consulted later in this chapter to provide a mixed-methods approach.

3.9 Phase III: Case-Study Approach: Cumbria LNP (CLNP)

The initial desk-based research and semi-structured interviews were used as a scoping exercise and helped to inform the choice of the CLNP as a case study. The case-study approach is important when in-depth information is required on a specific topic. Case studies can help to understand a phenomenon, such as a specific partnership, in the real-world. The approach allows for the utilisation of a mixed-methods approach and to bring out the viewpoints of multiple participants within a study (Hardwick, 2009).

Hardwick (2009) states that there are five main types of case-study, which include intrinsic, collective, explanatory, descriptive and exploratory. For the purpose of this study, an exploratory case-study example was used, as only one case-study example was studied in-depth which ruled out using a collective case-study approach. The researcher also had no personal or professional interest in a partnership, which discredited the use of an intrinsic case-study. The research questions were also more probing in order to try and understand how PPPs work in practice, eradicating the need for causal answers to questions, as in the case of explanatory case-studies. The study also did not require interpretive theory to be developed before the findings, as required if evaluating a descriptive case-studies (Hardwick, 2009).

The use of an exploratory case-study held many advantages, as discussed by Hancock and Algozzine (2006). They argue that a case-study can yield richly descriptive information, as it based upon varied and detailed sources of information. Moreover, a case-study can offer useful ways through which to disseminate information and help teach the discipline of geography, through showing how theory can be applied (Hardwick, 2009). For this study, the case-study approach allowed a detailed insight into the workings of the Cumbria LNP, as a PPP example, operating to deliver ecosystem services within UK farming. Using a mixed-methods approach, this case-study was ideal, as desk-based research helped to identify the LNP as a form of PPP operating in the UK's farming sector. Through an initial interview scoping study, Cumbria LNP, was highlighted as focusing strongly on farming to deliver ecosystem services. This case-study then offered the opportunity for mapping approaches and deliberative workshops to be undertaken in the area.

3.9.1 Romanticism with Nature

Cumbrian nature has long been an area of fascination to poets, literary writers, artists and the public imagination. This fascination stems from a romanticism towards nature, one where individuals believed they could generate ideas and connect with their own emotions through spending time in the natural environment (Kehoe, 2019). Famous individuals, such as William Wordsworth, helped to popularise Cumbria through writings on the Lake District National Park. Most famously, *Daffodils* was a poem in which Wordsworth 'encountered' a belt of daffodils in 1802 in Ullswater, Cumbria, and was inspired to write down his emotions in response to the event. The poem speaks of a connection with the land in which Wordsworth implies his pleasure through the emotions he experiences walking through the belt of daffodils. Wordsworth may not have realised at the time that he was referring to the importance of nature in providing us with a whole suite of ecosystem services. Hinchman and Hinchman (2007) note that we owe much of this appreciation for nature to the Romantics who popularised an enthusiasm for nature-preservation and showed the deeper connection that nature can have with humans to promote health and wellbeing.

Cumbria is today still known for its nature and wide range of natural capital. The county has a diverse range of landscapes and natural capital, with some of the most biodiverse wildlife habitats in England. It has numerous mountains and a significant number of lakes, and some areas of woodland, and is set within the Lake District National Park (Cumbria Wildlife Trust, 2019; Cumbria County Council, 2019).

3.9.2 Agriculture in Cumbria

Cumbria is also an area renowned for its agricultural activities. The geology of Cumbria is highly diverse, with the area having a largely industrial past and is renowned for harsh climatic conditions, poor soils and an upland topography, which is why livestock agriculture has predominated (Johnson, 2016). For over 7000 years the area has been farmed, as explained by Postlethwaite (2016). Today, agriculture comprises much of the county's land area, with over 3000 working farms (Cumbria Vision, 2009). Cumbria's LEP (2017) estimates that approximately 12,000 people in the area are directly employed in agriculture. Therefore, the sustainable management of ecosystem services in Cumbria is important to protect an activity which has notable land coverage and employs a substantial amount of the population.

Agriculture is also one of the main economic activities in Cumbria. Franks et al. (2003) discuss how livestock farming predominates in Cumbria, with cattle, sheep and dairy farming making up approximately 90% of agricultural land use. This dependency on livestock has left Cumbrian farmers especially vulnerable to changes in support payments and agricultural policy reforms (Tibble, 2018). Therefore, given policy reforms and Brexit, Cumbrian farmers are likely to be one of the largest UK communities to benefit from PPPs which can offer advice and assistance in the delivery of ES.

3.9.3 Cumbria's Local Nature Partnership (CLNP)

Cumbria LNP was established in 2011 by four previous partnerships and organisations: Cumbria Biodiversity Partnership, Cumbria Wildlife Trust, Cumbria County Council and the Lake District National Park Authority (CLNP, 2013). The CLNP is located in the North West of England and covers the entire county of Cumbria, an area 6,804km² in size with a population of 494,000 (Jackson-Pitt and Bullard, 2011). The partnership consists of a wide range of organisations including statutory agencies, local authorities, representatives of farming and landowning interests, research and educational institutions, businesses, voluntary organisations and community groups. Figure 3.5 highlights the extent of the case-study area, with the CLNP geographically overlapping with two other LNPs, the Northern Upland Chain LNP to the northeast and the Morecambe Bay LNP to the southwest.

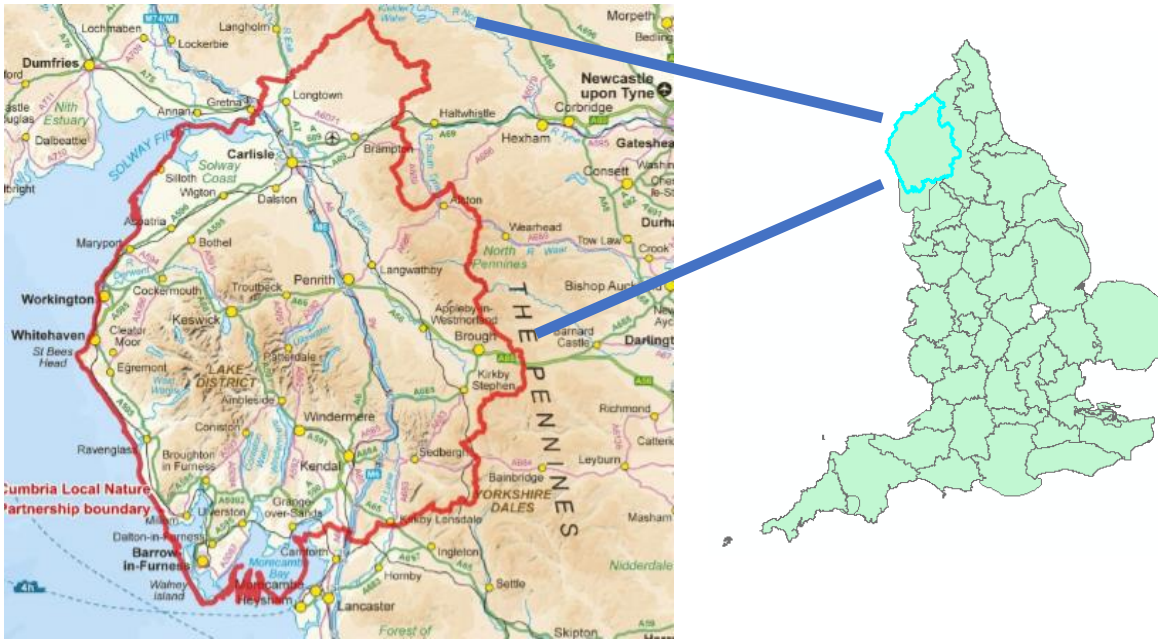


Figure 3.5: Map showing the boundaries of Cumbria LNP, denoted by the red line, alongside a map of England showing the extent of all the LNPs in existence, with the CLNP highlighted

Source: Cumbria LNP (2015)

Various projects include the Cumbria Connections project, which is working closely with the Cumbria Farmers’ Network (CFN) and Natural England to develop a project in the Ullswater and Bassenthwaite catchments of the Lake District National Park that secures and improves the long-term profitability of farm businesses. The project is led by farmers and has been developed through consultation with the local farming community. The CLNP has engaged with a variety of agricultural work in the past and its board is made up of some farming representatives, from organisations including the CFN, making it highly relevant for the purposes of this study and to evaluate what is working and what is not within PPP approaches. The following sections give more background on the increased interest in the natural environment, LNP creation and different aspects of the CLNP which made it relevant to use as a case-study approach within this study.

3.9.3.1 The Local Nature Partnership (LNP) Approach

One main way that PPPs emerge within the agricultural sector is through Local Nature Partnerships (LNPs). The Natural Environment White Paper (2011) states that the UK

“will encourage and support Local Nature Partnerships where local areas wish to establish them. These partnerships will work at a strategic scale to improve the range of benefits and services we get

from a healthy natural environment. They will aim to improve the multiple benefits we receive from the good management of the land.”

The establishment of LNPs sought to offer a localised alternative to top-down decision making. LNPs were a way to promote local action to connect people with nature, recognising and strengthening the ecosystem services that nature can provide to societal wellbeing. The government encouraged LNPs to be set up voluntarily in areas which wished to do so, and there are now 47 LNPs across England (ICF, 2015). Defra (2011) provided three key elements which LNPs should try to work towards:

- Drive positive change in the local natural environment, taking a strategic view of the challenges and opportunities involved and identifying ways to manage it as a system for the benefit of nature, people and the economy.
- Contribute to achieving the Government’s national environmental objectives locally, including the identification of local ecological networks, alongside addressing local priorities.
- Become local champions influencing decision-making relating to the natural environment and its value to social and economic outcomes through working closely with local authorities, Local Enterprise Partnerships (LEPs) and Health and Wellbeing Boards (HWBs).

Hence, LNPs are a PPP capable of bringing multiple stakeholders together to work towards a common goal of looking after and promoting their respective local natural environments. Defra (2012a) envisioned them as self-financing partnerships which would be able to build upon the strengths of past ecosystem services delivery. The aims of LNPs will be discussed in more depth through the results published in Chapter 4.

3.9.3.2 CLNP Projects

The agenda of the CLNP has been dictated by the Natural Environment White Paper (2011), subsequent Defra advice on the role of LNPs, and the strategy for biodiversity in England (Biodiversity 2020) (CLNP, 2017). The CLNP aims to work with a wide variety of stakeholders with an interest in natural capital and the provision of ecosystem services. In its latest 2017 strategy document, the CLNP lists the following stakeholders as being of key engagement importance: landowners, farmers and land managers, along with partnerships including the Cumbria Local Enterprise Partnership (LEP) and the Cumbria Health and Wellbeing Board (CHWB).

The CLNP is strategically currently working on several ES delivery projects, some of which were mentioned earlier in Section 3.9.3. The CLNP’s most recent project is a pollinator project. This is a three-year project to promote 115 hectares of flower-rich habitats in parks, school grounds and road

verges. There are further opportunities for public engagement at educational workshops and gardening events to get involved with the project (Heritage Lottery Fund, 2019).

The CLNP has a wide agenda focusing on ecosystem services, but there are projects more directly relating to agriculture. For instance, the work that the CLNP is doing on flooding, especially in the Staveley area of South Cumbria (which flooded in 2015), which will directly involve farmers to help with flood mitigation on their land. This will help to prevent further damage from flood events, such as that caused by Storm Desmond in 2015 (CLNP, 2018). Hence, the CLNP is an appropriate empirical example to use for the thesis, given its limited evaluations to date and involvement with the farming community in a PPP governance structure.

3.10 Phase IV: Ecosystem Services Mapping

The fourth phase of research, after the CLNP was chosen as a case-study, was to use an ecosystem service mapping tool called Land Utilisation Capability Indicator (LUCI) This would help to appreciate the effectiveness of PPPs within farming to deliver ecosystem services and ensure interdisciplinarity within the research. Ecosystem service mapping enabled an understanding into the ecosystem services on offer across the Cumbria LNP and areas where ecosystem services provision could be improved. This method primarily allowed for a greater understanding around the main enquiry research question of, *“What ecological (dis)benefits accrue from different governance approaches in managing agricultural catchments for ecosystem services?”*

Natural England (2014) previously produced a range of maps highlighting ecosystem service provision across the UK. Natural England realised that the mapping of ecosystem services is crucial for planning authorities and the development sector in understanding where ecosystem service stocks exist and where they could be improved. Hence, for an evaluation of this kind, mapping also proved useful to reinforce and understand other project findings, alongside the successes and challenges which face PPPs in delivering ecosystem services. Ecosystem service mapping approaches can offer land-water managers and policy makers a greater understanding of fundamental environmental controls on ecosystem services (Emmett et al. 2016).

3.10.1 Land Utilisation and Capability Index (LUCI)

The LUCI model is a contemporary ecosystem services model, which acts as a plugin to the ArcGIS software, which examines the capability of a landscape to deliver ecosystem services. The model offers an advancement of previous polyscape mapping approaches, described in Jackson et al. (2013), whereby various synergies and trade-offs between ecosystem services are mapped to support landscape management decisions. It was ideal for this project, as it offered a very local

resolution, at the farm level alongside the ability to also map ecosystem services at the landscape scale, as shown by Figure 3.7. Given that this research was focused on a local case-study area, LUCI offered a resolution and level of detail that other models would not have been able to provide. This meant that individual research participants could scrutinise the maps in depth and see whereabouts the maps produced were located. Moreover, LUCI offered an ecosystem services assessment approach, which was “quantifiable, replicable, credible, flexible, and affordable” for this research (Bagstad et al., 2013, 27).

Figure 3.6 highlights a wide variety of software tools which could be used in ecosystem services modelling, as compartmentalised into several different uses by Bagstad et al. (2013). However, some of these tools were discounted for this project. Firstly, the ecosystem services impact screening tools were not appropriate for this research as they are basic in nature and are only suitable for an initial understanding of ecosystem services valuations, with not a large focus on agriculture. Also, non-monetary valuation and monetary valuation tools were avoided, as these methodologies of valuation are controversial within academia, and present higher levels of uncertainty in the outputs obtained. Other tools at the landscape-scale, for example InVEST, had large data requirements, which would be costly and take a long time to gain access to. Whereas, LUCI required minimal data inputs and operated at a landscape-scale and site-scale, meaning that when engaging with farmers they were more interested in the outputs as they could recognise landmarks given the resolution.

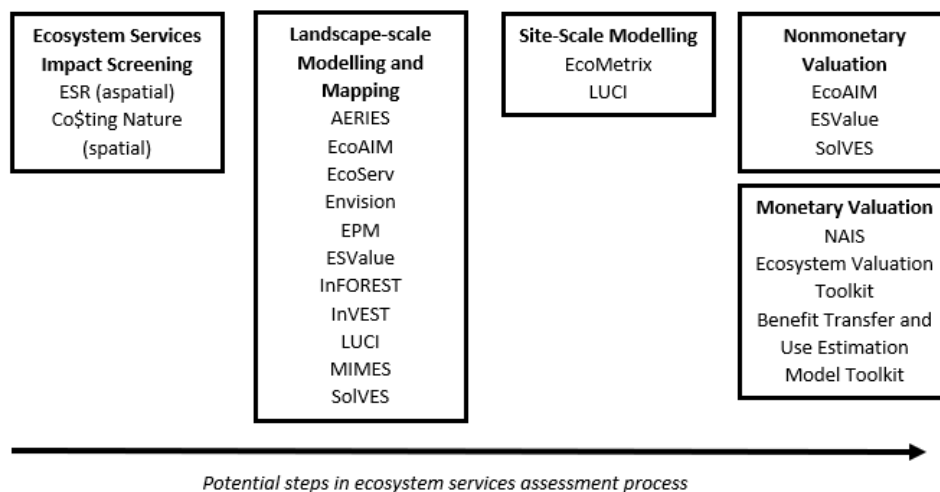


Figure 3.6: A diagram situating different Ecosystem Services models within their various uses
Adapted from: Bagstad et al. (2013)

As LUCI was chosen for the project, data was obtained from online databases, such as Edina, a database provided by the University of Edinburgh with numerous environmental and land use

datasets available to download. A table of data and software utilised is found below in Table 3.2. The inputs to the model included topographical digital elevation data, river networks data, precipitation and evapotranspiration statistics, land cover classifications and soils data for the Cumbria region.

Table 3.2: Data inputs needed to run the LUCI model and the Licenses for associated sources of data

Data/Software Needed	Source/Licensing
<p>ArcGIS</p> <p>A software package which enables the creation, analysis and manipulation of maps on computers using geoprocessing tools.</p>	University of Sheffield Licensing
<p>LUCI</p> <p>An ecosystem service plug-in tool for ArcGIS. This enables the user to input data and for several ecosystem services provision maps and trade-off maps to be run. The tools allow the mapping of ecosystem services from the national to sub-field level. Luci is a ‘process-based’ tool and incorporates latest scientific understanding to generate outputs beyond current data availability.</p>	University of Victoria, New Zealand, Student-Use License granted See: https://lucitools.org/
<p>CEH Landcover Map 2007</p> <p>This is a vector land cover map dataset, obtained for greater resolution and outputs in the results. It uses 23 classes to map land cover across the UK, which are based upon the UK’s Biodiversity Action Plan (BAP) broad habitats scheme. This aided the representation of different vegetation types and management of ecosystem services within Luci.</p>	Centre for Ecology and Hydrology, Bangor – accessed via Edina
<p>Digital Elevation Model 5x5m</p> <p>This is topographical data which enables Luci to understand the relief of the land.</p>	Edina
<p>NATMAP Soils Vector</p> <p>This is one of the most detailed soil sets, highlighting the effect of different soil types on ecosystem services. It is a 1:250,000 scale map of England and Wales, showing the locations of 297 distinct soil associations.</p>	Cranfield University
<p>River Networks</p> <p>This is an optional addition to the Luci model. However, allowed LUCI to more accurately simulate the flow of water through the landscape.</p>	Edina
<p>Precipitation and Evapotranspiration Data</p> <p>This is an optional dataset added to the Luci model. Again, helping to refine model values and increase reliability of the outputs</p>	Edina

Following the obtainment of these data and software, the datum was run in the LUCI model, following the addition of the LUCI toolbox into ArcGIS. LUCI (2019) offered a guidance document on how to use this ecosystem services modelling tool. Firstly, pre-processing ('hydtopo' and 'generate land cover scenario') tools had to be run, before any of the individual ecosystem service maps could be produced. The 'hydtopo' function generated the input hydrological and topographical information needed for LUCI ecosystem service quantification and classification tools. It filled depressions in digital elevation data, and added river networks into the elevation data. The second pre-processing tool 'generate land cover scenario', enabled the land management scenario information needed for LUCI ecosystem services tools to be generated. The tool linked spatial data on soil and land cover to LUCI data tables. All individual ecosystem service tools depended upon this information for map outputs to be produced.

The individual ecosystem services or ecosystem services related outputs obtainable from the LUCI model are described below in Table 3.3, each were run in turn, using the inputs saved from the pre-processing tools. Separate maps were then generated for several ecosystem services or biodiversity related processes.

Table 3.3: Map Outputs in LUCI

Source: LUCI (2019)

Map Output	What the map shows and how the map was calculated (LUCI, 2019)
<p>Agricultural Productivity</p>	<p>This tool evaluates the agricultural productivity of the land according to criteria related to slope, fertility, aspect and drainage data. The model calculates predicted optimal agricultural utilisation based on the soil type, using assigned values of fertility and waterlogging, and topographic data.</p> <p>Current agricultural utilisation was mapped according to the land cover data, where LUCI ranking land use from highest productivity to lowest: Arable; Improved grassland; Unimproved grassland; Woodland and heath; Bog sand and rock.</p> <p>The tool can be used to identify areas of more productive land, where farmers may be less willing to make changes, and areas of less productive land, which could be targeted for re-wilding or afforestation.</p>
<p>Erosion and Sediment</p>	<p>This tool identifies areas at risk of erosion and areas at risk of allowing high sediment loads to runoff into waterbodies. Areas of land that are vulnerable to erosion are</p>

Map Output	What the map shows and how the map was calculated (LUCI, 2019)
	identified in LUCI using the Compound Topographic Index (CTI) of Thorne and Zevenbergen (1990).
<p>Flood Mitigation</p>	<p>This tool maps areas where overland and near surface flow may accumulate as well as "mitigating features" with the capacity to help mitigate floods and high stream flow which may follow high intensity precipitation events. Areas with high water storage capacity and/or high infiltration capacity can help to mitigate downstream flood risk by acting as a sink for fast moving overland flow and near-surface subsurface flow.</p> <p>This tool takes information about high storage and/or permeability regions from land use data and corrects flow accumulation using a bespoke algorithm - any flow that accumulates into these mitigating areas is removed from the flow accumulation data and treated as of low priority (mitigation already exists).</p> <p>The tool also calculates the average flow delivery to all points in the river and lake networks, to estimate water supply services. All land use or types that provide flood mitigation are treated as having high existing values; these include woodland, wetland, bog, marsh, scrub and similar natural cover. Areas where a large amount of unmitigated flow may occur are treated as priority areas for change.</p> <p>This helps land managers to understand where flooding is likely to happen, and which areas would benefit from flood mitigating features. This is a particularly important focus of work for the Cumbria LNP, arising from Storm Desmond in 2015 and notable other flooding events.</p>
<p>Habitat Connectivity</p>	<p>The habitat connectivity tool can be applied for identification of suitable areas for habitat expansion and protection.</p> <p>The tool follows a cost-distance approach to evaluating habitat connectivity, following the approach outlined by Forest Research's Biological and Environmental Evaluation Tools for Landscape Ecology (BEETLE) project (Eycott et al., 2007; Watts et al. 2010).</p>
<p>Nitrogen</p>	<p>Nitrogen in LUCI is currently modelled using an export coefficient approach. The tool combined topographic data and precipitation to calculate the accumulation of water flow over the landscape and the accumulation of this in river networks.</p>
<p>Phosphorous</p>	<p>Phosphorous in LUCI is currently modelled using an export coefficient approach. The tool combined topographic data and precipitation to calculate the accumulation of water flow over the landscape and the accumulation in rivers and lakes.</p>

3.10.2 Mapping the Case Study Site: Greystoke

Greystoke, near Penrith, was chosen as the case study site for the ecosystem service mapping, as many of the interviews with farmers were conducted around this locality, given its large farming community, the CLNP had not mapped the area before, and that it was easily accessible. This offered an opportunity to triangulate some of the findings which were gathered from interviews (Valentine, 2005). Once the datum was inputted into the model, the various mapping tools could be run. Maps were then produced, using a traffic-light colour coding scheme (Sharps et al. 2017). From the maps, it was clearly identifiable which areas had room for improvement in the provision of a specific ecosystem service (red), which areas were negligible or where there was not much service provision improvement possible (orange), and which areas had a good level of existing service provision (green). An example of a map produced for habitat connectivity and the colour scheme is shown below in Figure 3.7.

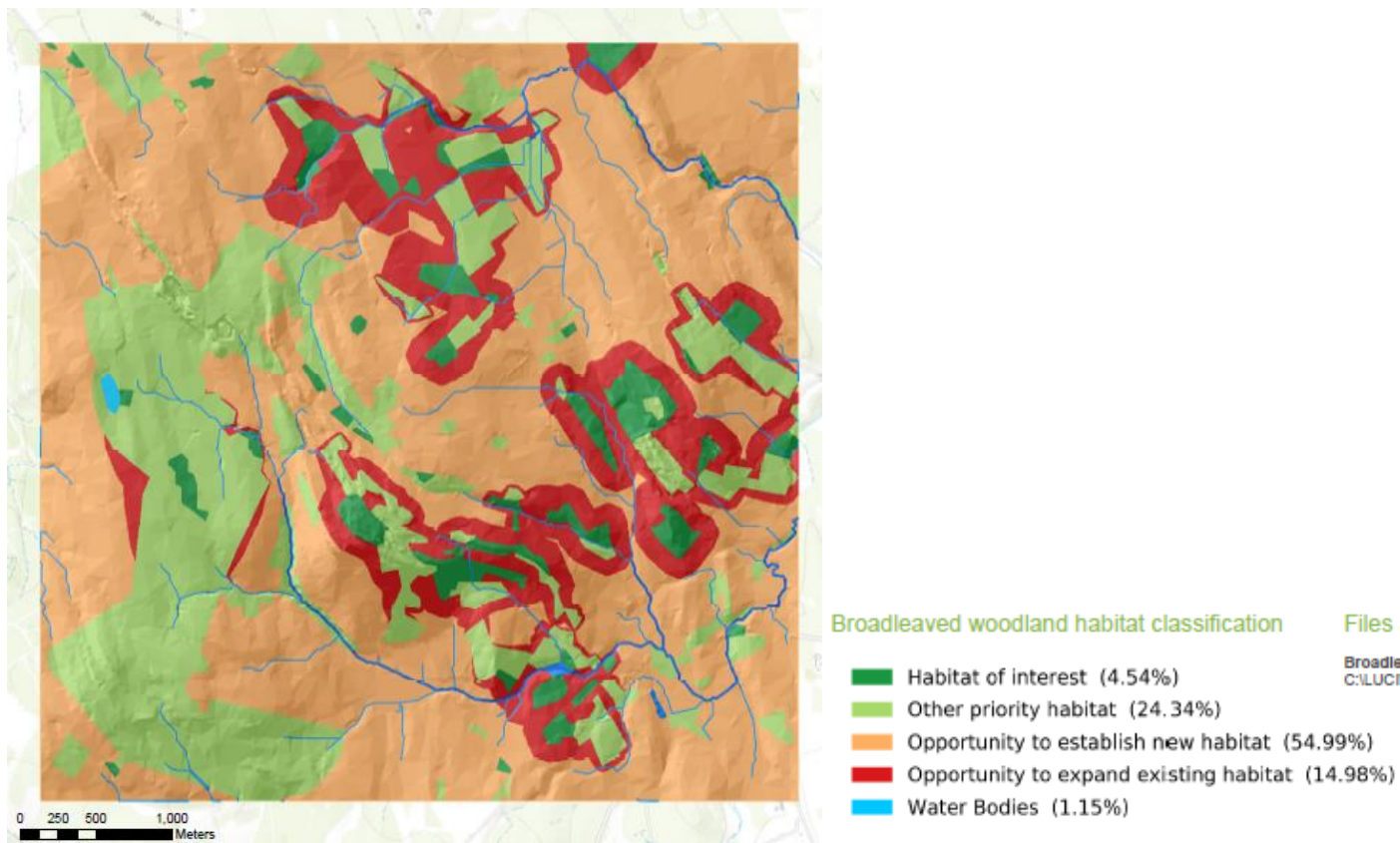


Figure 3.7: Habitat Connectivity Map produced using LUCI for the Greystoke Area

All these maps presented potential projects which Cumbria LNP could increasingly focus upon, and where there were opportunities for the LNP to further expand the provision of these ecosystem services. For instance, in Figure 3.7, the red shaded areas indicate areas across land where there are

opportunities to expand existing habitat, for instance, through the promotion of wildlife corridors. From interviews and these maps, it is possible to comprehend the successes and challenges that are currently ongoing in the delivery of ecosystem services in Cumbria and the role that the PPPs could be having within this. In order to support these maps, a consultancy report by Holt (2017) which was commissioned for the Cumbria LNP and pioneer partnership, was also consulted. Mapping in Holt's work was focused on three catchments: Braithwaite, Glenridding and Staveley, using a different ecosystem services model called EcoServ. EcoServ is more appropriate for use at a wider landscape scale and has a lower resolution. Therefore, it was useful to offer a comparison and contrast to the work the researcher had carried out and to be used as a resource during deliberative workshop discussions, particularly as the work Holt (2017) carried out will be used by the LNP and pioneer partnership to inform future projects which they are working upon.

3.10.3 Analysis

It was important when analysing these maps to carefully scrutinise the data, particularly how the data had been derived, the scale it has been mapped at and the model itself. For example, the land cover data can be inaccurate, as it is based upon remotely sensed data from Landsat (Holt, 2017). Therefore, within the data inputs, there are several inevitable inaccuracies that need to be accounted for. This was done by consulting individuals over their interpretation of the maps and by ground-truthing the landcover presented on the map with the researcher's own visual observations. Data was carefully visually analysed, through use of the colour coding scheme on output maps (LUCI, 2019). This was particularly important when considering flood mitigation maps, whereby hydrologically an effect in one area may have a negative consequence further downstream, which a model would not necessarily consider. Various suggestions for PPP focus and improvement on ecosystem services delivery could then be made alongside strengths, where projects may already be working effectively.

The maps produced were not meant to be left as standalone results. Rather, as a decision support tool, the maps act to start a conversation around landscape management. Therefore, these maps were also used as part of the deliberative workshops, where participants were able to discuss their use and examine the strengths and weaknesses to measure ecosystem services across Greystoke, within the boundary of the CLNP.

3.11 Phase V: Deliberative Workshops

The final phase of research involved bringing research participants together to discuss the initial findings of the research and help interrogate these findings. Deliberative Workshops are an

approach within research that “provides the opportunity to present people with new evidence and information as the day [workshop] progresses. A variety of deliberative techniques enable the participant to understand and scrutinise information” (Opinion Leader, 2008, 6). These forms of workshops are often used when devising policies and carrying out evaluative work and there are numerous examples available. For instance, Parkhill and Pigeon (2011) at Cardiff University carried out several deliberative workshops around the topic of geoengineering. They explored perceptions of generic geoengineering proposals around stratospheric aerosols in three different workshops across three cities in the UK. Each workshop contained between eight and twelve participants. Such workshops were guided by ‘upstream citizen engagement’ (Davies et al., 2009) and awareness around recent methodological and conceptual discussions of the approach. They used these workshops to gain wider insights into their research, validating results and seeing where their evidence base needed to be strengthened.

This final stage of research was reflexive of the whole research process and involved the running of two day-long deliberative workshops in January 2019 (Kendal) and February 2019 (Penrith). The different dates and locations ensured that as wide a sample of participants were able to attend as possible. Deliberative workshops enabled answers to all the main key research questions to be finalised and previous results from other methods to be scrutinised. Between eight and fifteen participants attended each workshop, with some attendees being past interviewees (totalling 6 participants) and others having not taken part in the research before (totalling 17 participants) (See Appendix 9 for a list of attendees and affiliations at each workshop). In total, this meant that 40 different participants were engaged throughout this research project.

Deliberative workshop participants were recruited via email initially sent to those previously involved in the interview phase, alongside emailing and posting letters (where some individuals may not have access to email) to potential participants who had not taken part in the research before. In emails and letters, recipients were also asked to forward the invite onto anyone who would be relevant to the study and interested in attending. This ensured as many participants as possible attended both deliberative workshops. This mix of individuals allowed unique insights into the research, allowing for people to critically evaluate the findings to date and contribute new and different opinions to help inform the research. A mix of policy makers, practitioners and farmers attended each workshop. Participatory methods were used in order to encourage discussions and data collection during the day, with various evidence and information presented to people at different stages over time. This all made sure that the nine principles of effective deliberative engagement (including involving the right number and types of people, gives priority to participants’

discussions etc.) were adhered to in the research as outlined by the National Consumer Council (2008).

Whilst reading other research studies which used deliberative workshops as a research method, such as Parkhill and Pigeon's (2011) study, the researcher devised practical and participatory activities to aid triangulation in the project alongside the generation of new knowledge. The day was split up into different sections, which offered attendees the chance to feed into the research both individually and through working as a group (see Appendix 10 for an indicative timeline of the workshops and activities within each part of the workshop and Appendix 11 for the researcher's presentation used on the day).

3.11.1 Structure of the Day

The day began with an overview of the research to date, introducing individuals to the research site and the key research questions. Individually, people then were asked to write down, before the term PPP was explained, what came to mind when they heard the term 'PPP', allowing for an understanding of how individual perceptions of a PPP may have changed throughout the day. The first whole group discussion followed, which focused upon environmental challenges in Cumbria. This allowed a debate around some of the ecosystem services most at threat and the current state of the environment, which helps introduce and feed into the third research question about ecosystem services. The next part of the day was a discussion around partnership approaches. The group was split into a world café setting (a smaller group discussion format which encourages meaningful conversations around research questions; see: Brown and Isaacs, 2005; Oortwijn et al., 2018), whereby smaller groups were asked to plot onto a PPP spectrum diagram provided where they thought different PPP examples sat (from having fully private stakeholders to becoming fully privatised). This specifically helped to sense-check the findings for the first research question, around the different PPP structures operating in the UK agricultural industry. Groups then discussed what resources partnerships need to function, the benefits of various partnerships and their weaknesses to date. Figure 3.8 shows some of these discussions, which helped support and contribute to research questions 2 and 4. At the end of each activity, the researcher brought the whole group back together to feedback on what was found and highlight any similarities and contrasts amongst the smaller groups. Following this, attendees were also presented with prompt material from past interviews to study and comment upon.

In the afternoon session, a discussion around ecosystem service measurements and rewards began, again following the world café structure, which helped feed into the findings for the third research question. Participants were shown prompt material, from the LUCI maps created by the researcher

and Holt's (2017) report. In small groups, individuals were asked to deliberate over the effectiveness of these maps, in terms of a) the area they believed the map was illustrating; b) the maps' strengths and weaknesses and c) the effectiveness of mapping ecosystem services as a measurement strategy. This then created the opportunity for another discussion around alternatives to mapping approaches and how best to reward farmers and land managers for the delivery of ecosystem services.

Finally, participants were asked to debate the future of partnerships and agriculture through two brainstorming activities on flipcharts in small groups, using different coloured pens to highlight different themes. This helped to answer all the research questions, but particularly an aspect of the fourth research question around the sustainability of these partnership approaches for the future. Firstly, participants were asked to consider the future farming landscape, considering opportunities and challenges, solutions to those challenges and the potential for agriculture to become better or worse as a mechanism through which to deliver ecosystem services. Secondly, participants were asked to visualise the ideal partnership of the future, considering the resources it would need, what partnerships should give or deliver to farmers, what partnerships should deliver in terms of ecosystem services, and how partnerships should be different in the future to how they are conceived today. A final synthesis of the day was then drawn together by the researcher and shared. Individuals then had an opportunity to leave anonymous last thoughts in an envelope and fill in a feedback evaluation form about the workshop.

3.11.2 Use of Scribes and Photography

At the first workshop, where eight participants were present, one external scribe was employed to aid facilitation of the day and note-taking, alongside the researcher. At the second workshop, where fifteen participants were present, two external scribes were employed to aid facilitation of the day and note-taking, alongside the researcher. One of the scribes was the same person across both workshops, having previously worked with the researcher at masters level, and so was well versed in geography methods and analysis. The second additional scribe, for the second workshop, was also known to the researcher, carrying out a PhD at Manchester University, having previously completed studies in geography. This meant that both scribes were well trained in being able to take notes and help facilitate at the workshops. Before each of the workshops, the researcher met with both scribes to establish what was expected on the day in terms of note taking and what discussions and events to expect throughout the day. As the day was split into multiple sessions, notes were made by both research participants and scribes to be used in the results. Research participants took notes using flipcharts and noting down key points at smaller world café sessions, as ideas were discussed. These flipchart sheets were kept by the researcher and photographed. Scribes took notes throughout the

whole day, which were later typed up and sent to the researcher. This ensured that important information was not missed throughout the day.

Photography was also taken throughout both workshop days, to illustrate the various workshop set-ups and activities as they occurred. Verbal consent was obtained for both photography, note taking and the use of these in the thesis on the day of each workshop.

3.11.3 Analysis

The notes were collated together and summarised by the researcher. The notes were then thematically coded, using the same analysis method adopted under semi-structured interviews, in Section 3.8 (see Appendix 12 for an extract of this coding). Coding terms included ‘financing’, ‘mapping’, ‘livestock’, ‘business’, ‘agenda’ among others. Similarities and differences between the two workshops were noted. Also, any differences or critiques to the data found by using earlier research methods was highlighted. The workshops helped to put into perspective earlier findings and finalise the overall thesis evaluation of PPPs in the delivery of ecosystem services within UK agriculture, through a process of reflection and additional opportunities for the creation of knowledge.



Figure 3.8: Group conversations at one of the Deliberative Workshops

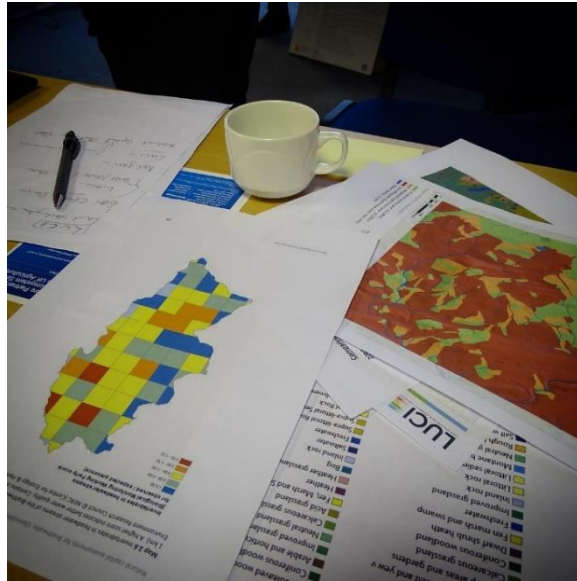


Figure 3.9: A chance for workshop participants to use and critique past research findings, to inform new discussions surrounding the Key Research Questions

3.12 Limitations

Whilst this study has tried to address as many of the shortcomings of these methodological approaches as possible, some inevitably remain. Indeed, the research project has not come without several challenges (see: Pollard, 2009). For example, snowball sampling is a necessary strategy to reach certain insular communities. However, at the same time this can bias data collection and the observations that have been made within a study (Atkinson and Flint, 2001). Therefore, future studies may want to carefully consider a researcher’s positionality when approaching a research topic beforehand and the ability to access a community. This may make research more reputable and eliminate the need for less reliable sampling strategies, like snowballing, if a researcher already has links with the research sample population and is trusted. A full discussion of the study limitations is provided in Section 7.3 of the conclusion.

3.13 Conclusion

This project adopted a critical realist philosophy, to enable the real-world phenomena of PPPs and governance structure to deliver ecosystem services to be critically evaluated, as advocated for use in such work by Archer et al. (2016). This work was also interdisciplinary and provided a mixed methodological approach, which utilised both quantitative and qualitative data in order devise an evaluation of PPP approaches in UK farming. This approach enabled the researcher to make better and more accurate inferences about the role of the CLNP to deliver ecosystem services, through the

rich data able to be elicited from qualitative approaches, for example semi-structured interviews, alongside the wider breadth of data possible from quantitative approaches, for instance ecosystem service mapping (Venkatesh et al., 2013). Such an interdisciplinary approach has been advocated by many studies in ecosystem services literature, as highlighted in Chapter 2 (NEAFO, 2014). A phased approach to research also enabled the research to have a logical and staged progression, enabling different results to inform various stages of the research throughout the four years of study. The CLNP enabled rich information to be gained from a PPP which is trying to engage with agricultural projects and deliver a wide range of ecosystem services. Findings from this research will enable the CLNP to further develop their strategy and build upon any areas that the thesis identifies for improvement. All in all, forty different participants in total took part in this research study. This approach and participation enabled all four research questions presented to be answered in turn.

The next chapters present the empirical findings of the research. Chapter 4 focuses on the first two research questions and Chapter 5 focuses on the final two. Chapter 6 offers a discussion of these results and an analysis and interpretation of the findings. This methodological chapter has helped to inform the robustness and validity of these results and analysis.

Chapter 4

The role of a PPP in delivering ecosystem services within UK agriculture

“PPPs increasingly have become the default solution to government problems and needs, most recently for infrastructure, and they are embraced by a wide range of constituencies, across political parties, and throughout the world”

Forrer et al. (2010, p.475)

4.1 Introduction

This chapter establishes what the role of Public Private Partnerships (PPPs) to deliver ecosystem services within agriculture should be. The outputs from this chapter will be used in Chapter 6, to assess the successfulness of these PPP approaches to deliver ecosystem services through the perspectives of stakeholders. This chapter reviews the different structures of PPPs currently operating in UK agriculture, outlining who should be involved and the proposed structure of how PPPs should function in practice, through desk-based research.

4.2 What different models of PPPs are currently in place to provide Payments for Ecosystem Services in UK Agriculture?

4.2.1 Generalisable PPP formats across the UK

Across the UK, there are several forms of PPPs operating in different sectors, most notably in industries such as health and education. Within Chapter 2, the various definitions of a PPP were discussed, and, in turn, this led to an understanding that the term is contested. This section outlines where the similarities in the form of PPPs exist and documents examples from sectors that have been widely studied in the UK, allowing a comparison to be made later in Section 4.2.4 agricultural PPPs operating in the UK.

In the context of this thesis, a PPP is taken to refer to a partnership approach which includes both public and private partners that aim to deliver public goods, such as ecosystem services. There is a consensus that the PPP model can be used to describe a range of private and public-sector arrangements that work together in partnership in its broadest sense. For example, Savas (2000, p.4) defines a PPP as “any arrangement between government and the private sector in which partially or traditionally public activities are performed by the private sector.” Yescombe (2007) alongside

Bärstig and Sandström (2017) outline four similar key elements that a partnership must satisfy in order to be considered a PPP:

1. The form it takes must be one of a long-term partnership between the public and private sector
2. The service/infrastructure must remain under public sector ownership or be passed back to the public sector after the contract has ended
3. Payments must be made to the private sector for the project through the public sector or civil society
4. The design of the project, construction, financing and its operation should be overseen by the private sector

Farquharson et al. (2011), building on what a PPP should be, discuss equally what does not comprise a PPP. They argue that the PPP model is often confused by individuals with that of privatisation. Rather than a direct transfer of an infrastructure or service to the private sector, the public sector still has a role to play. Additionally, Yescombe (2007) points out that to be a PPP there needs to be significant investment by the private entities involved in the partnership, alongside investment in fixed assets, as otherwise the project is simply one of outsourcing. In order to be considered a PPP, the partnership must be linked to a PPP contract, which further defines the role of the private and public sectors within the partnership. These contracts are dependent upon levels of risk sharing, investment and the desired outcomes. Service Works Global (2019) give several examples of PPP contract types that are summarised below in table 4.1.

Table 4.1: Types of PPP Contracts used across Industries

Adapted from: Service Works Global (2019)

PPP Contract Example	Contract Characteristics
Build – Operate – Transfer (BOT)	Simplified contract. Used for building one asset, e.g. a toll road. Public sector bears the equity risk but allows freedom for the private sector to build and manage.
Build – Own – Operate (BOO)	Private sector builds and owns the facility for the duration of the contract, e.g. water treatment, power plants.
Build – Own – Operate – Transfer (BOOT)	Private sector builds and owns the facility for the duration of the contract, with the goal of obtaining the construction costs in revenue

PPP Contract Example	Contract Characteristics
	during the operational phase. At the end of the contract the facility is handed back to the government. The equity and commercial risk stays with the private sector for the length of the contract. Suitable for when a government has a large infrastructure financing gap. e.g. school and hospital contracts.
Design - Build	Private partner designs and builds a facility or a piece of infrastructure. This can reduce time, save money and provide better reassurances (as work is carried out with a single partner rather than multiple partners). Project risk is also shared with the private sector.
Design – Build - Finance	Private sector constructs and asset and finances the cost only during the construction period.
Design – Construct – Maintain – Finance (DCMF)	The private partner/s construct the infrastructure based on specifications from the government body and lease it back to them. e.g. prisons.
Operation and Maintenance (O&M)	A private operator operates and maintains an asset for the public partner, to an agreed level with specific obligations. Work can be sub-contracted to specific maintenance companies. Private partner/s are rewarded where they over-perform and penalised with penalty payments where work has fallen short of the agreed standard.

4.2.2 Common PPP structures in UK Industries

Example sectors in which PPPs are prominent, as indicated through a desk-based study of PPP related articles and demi-regularities which were found, include health and education. This section explains the structural forms which these PPPs take, using the information in section 4.2.1 to classify them and outline the stakeholders involved. These UK based examples will then enable a comparison to be made with PPPs operating in the agricultural sector later within this chapter.

Kong Yung (2013) explains that the Private Finance Initiative (PFI) is responsible for most PPP projects in the UK, particularly in health and education. This scheme is a method of financing public infrastructural projects under a BOOT contractual arrangement. The contractual length typically exceeds twenty years and the private company is regularly paid a fee from the government, linked to the overall performance of the asset, which ensures efficient management of the resource. The private company takes most of the risk associated with the project, from raising the necessary

capital needed to build the infrastructure and look after the maintenance costs of the facility to the infrastructure's design. HM treasury (2019) totalled the number and value of PPPs operate under the PFI initiative within the UK from 1990 to 2019. It was found that healthcare represented the largest portfolio by capital value, being valued at £12.9 billion, whilst education held the largest number of projects in operation, at 173 contracts.

Within the health sector, PPPs were introduced from 1991 within the UK. Project examples vary in scope and size, with examples such as the St Bartholomew's and Royal London Hospitals project, which is the largest single PPP hospital contract in the UK at £1.1 billion, to a residential care home costing £2.8 million (Healthcare UK, 2013). The projects have usually involved construction of new hospitals or occasionally renovations of existing ones, together with the operation of non-medical services such as catering, maintenance and laundry. In 2010, it was reported that hospitals built under the PFI totalled a capital cost of £11.3 billion, whereas over the lifetime of a contract the public sector could be expected to make payments of £65.1 billion with the final payment to be made in 2048 (Triggle, 2010). The generic PPP structure of a partnership operating in healthcare is highlighted below (Figure 4.1).

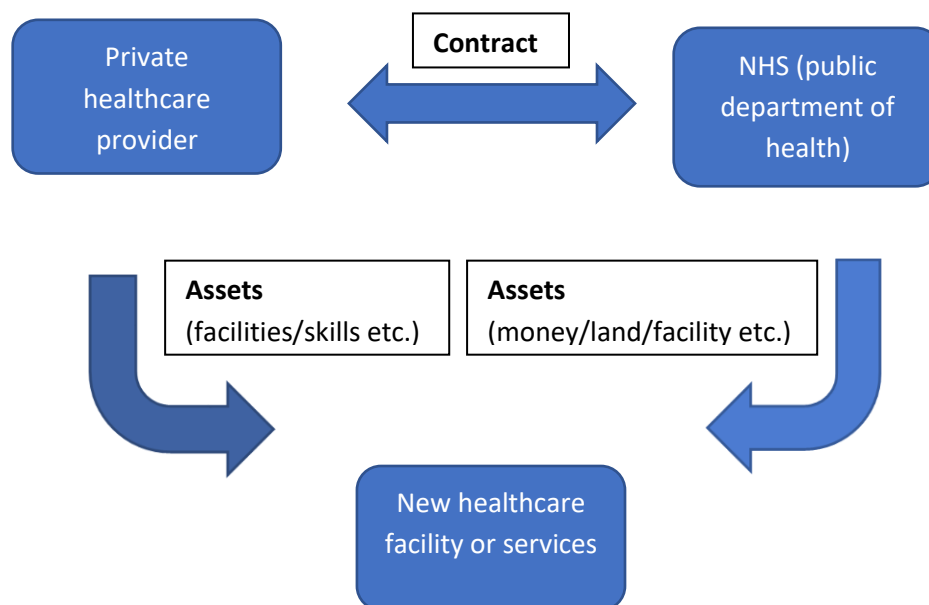


Figure 4.1: UK healthcare PPP example

Redrawn from: PWC (2010, 7)

Whereas, in education, PPPs are used within the UK to enable students in areas where there is a shortage of spaces in public schools to enrol in private schools, or to allow a wider capacity of space in public schools to be achieved (LaRoque, 2007). However, there are a diversity of education approaches which operate along a PPP spectrum, depending upon the amount of private or public sector involvement (see Figure 4.2). Batley and McLoughlin (2009) hypothesise different roles for the public and private sectors, which will help to define where PPP examples sit on this spectrum. For example, in one case the state could contract the private sector to provide a supporting role through inputs towards aiding state school provision, through support services or training (defined as a lower-end PPP example, with more public stakeholder involvement). Alternatively, the private sector may become the sole provider for the educational service provided, whilst still operating within a structure defined by the state (defined as a higher-end PPP example, with greater private stakeholder involvement). The educational PPP structure is very similar to the healthcare example in Figure 4.1, yet there is a greater diversity of PPPs in existence, with differing levels of involvement from the public and private sectors than is found in healthcare, which has a uniform PPP structure. When considering this from a critical realist perspective, however, educational PPPs (through allowing the private sector to become a sole provider of educational services) would not match the theory presented around the categorisation of PPPs put forth by Yescombe (2007). Hence, there may need to be a redefining of what PPPs entail from the empirical evidence presented, or arguably not all partnerships could be classified as a PPP by their nature, and instead can only be seen as an outsourcing operation on behalf of the government.

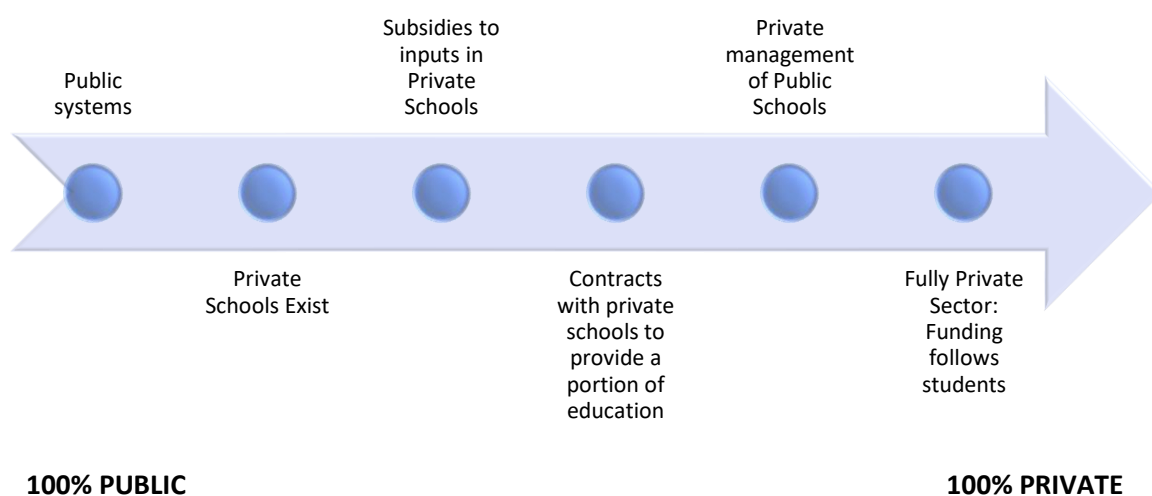


Figure 4.2: Spectrum of diversity amongst education PPPs

Adapted from: Verger and Moschetti (2016, 10)

4.2.3 The UK and Agricultural PPPs

Agricultural PPPs within the UK sector are now becoming more apparent. This section outlines the forms that these farming PPPs for the delivery of ecosystem services should take in theory based upon articles studied during desk-based research and the key stakeholders who need to be involved, and the demi-regularities which were found, enabling a comparison to be made with other PPP structures mentioned in earlier sections. Whilst UK based agricultural PPPs have not been as widespread as their counterparts in The Global South (see Table 4.2), many examples can now be evaluated, particularly for the delivery of ecosystem services, which include food productivity as a provisioning service alongside a multitude of other services. Table 4.2 illustrates that much academic literature has focused on countries in the Global South as opposed to the Global North, especially in the agricultural sector. Results in Table 4.2 have been formulated from Web of Science ‘extensive’ data searches using the specific phrase ‘public private partnership’ alongside other key phrases, such as ‘agriculture’ and ‘ecosystem services’. If one were to look beyond these words, for instance, by broadening searches to include the phrase ‘partnerships’ instead of ‘public private partnerships’ then more articles would be found, especially through examining grey literature. However, what the table highlights clearly is that much more research around partnerships to deliver ecosystem services has been carried out in the Global South, as more partnership examples exist. Ma et al. (2019) also show how the use of the term ‘public private partnership’ within project management literature, through SCOPUS searching, has increased significantly overtime between 2008 and 2018 (see figure 4.3), showing a noticeable growth in academic interest and PPP examples. This has made theoretical approaches to defining what a PPP is and what it entails harder, and more emphasis needs to be placed on empirical research, which then through abduction is contrasted with the existing theory, and a process of retroduction can be causally explained.

Table 4.2: The number of desk-based articles found using Web of Science in relation to PPP examples between the developing and developed world, as well as the UK

Key Words Search in Web of Science	Number of LIC examples found (using the key search term of ‘developing countries’)	Number of HIC examples found (using the key search term of ‘developed* countries’)	Number of UK based examples (using the key search term of ‘UK’)
‘Public Private Partnership’	2,648	1,322	529
‘Public Private Partnership’ ‘agriculture’ related	224	139	11

'Public Private Partnership' 'ecosystem services' related	29	17	6
'Public Private Partnership' 'ecosystem services' and 'agriculture' related	2	6	0

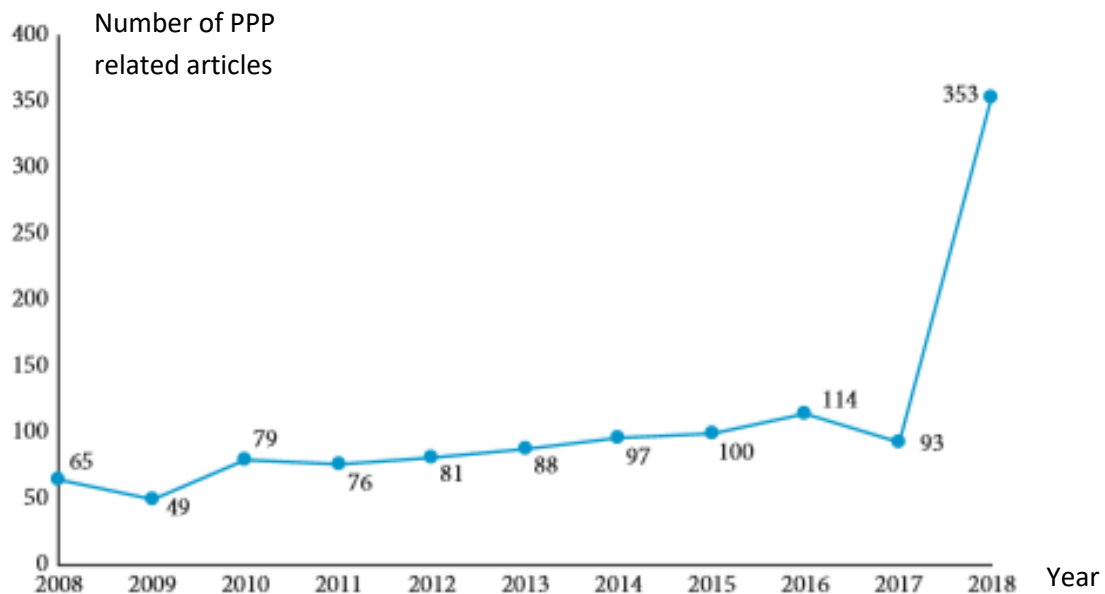


Figure 4.3: Number of PPP related Academic Articles published between 2008 and 2018

Source: Ma et al. (2019, 4)

The emergence of PPPs within UK agriculture can be traced to Article 208 of the Lisbon Treaty (2008) which sought to encourage a coherent, coordinated and complementary programme of activities across the EU. Such a programme of activities was devised by the EU to minimise the historical nature of resource extraction through public finance investments in ecosystem services delivery and an attempt to link smallholders to new markets enabling benefits in food security and rural development (Endres and Endres, 2017). This coincides with the empirical evidence provided by Marsden and Sonnaro (2008), who discussed the case of the Welsh Rural Development partnership and the Agri-food Partnership Review (2001), which explained a mode of governance through which multifunctionality could be achieved and diverse farmers, including smallholders, could work together to differentiate their products and access, as well as meet, the demands of an evolving consumer market. Thus, PPPs are one such way through which these goals can be achieved. There are several distinctive PPPs in operation relating to agriculture, namely LNPs, Catchment based approaches (CaBAs) and Pioneer projects, to which the chapter now turns.

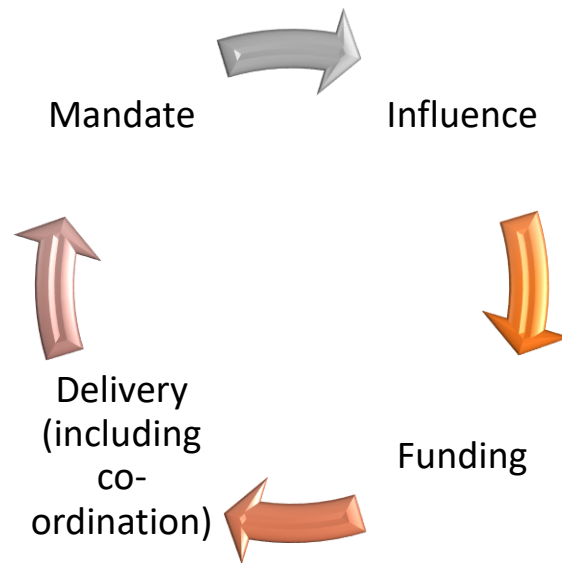
4.2.3.1 Local Nature Partnerships (LNPs)

As introduced in Chapter 3, one example of a farming PPP is that of the Local Nature Partnership (LNP). LNPs were created in the Natural Environment White Paper (2011) to assess and protect the natural environment, through using a landscape scale approach (Defra, 2013). One method that LNPs have been working on to deliver a range of ecosystem services is agriculture. Defra (2012b) published a range of advice on how LNPs might go about delivering ecosystem services, which is discussed earlier in Chapter 3.

Advice published by Defra (2012b) included helping to achieve a better range of outcomes through sustainable land management, linked to a partnership which considers SES perspectives alongside the institutional perspective (Short, 2015). This included working with local groups, such as those linked to the Campaign for the Farmed Environment (a scheme launched in 2009 as an industry-led initiative, as an alternative to regulation, which would retain and exceed the ecosystem services produced on agricultural land under the CAP single payment scheme). It also included opportunities around working with Payments for Ecosystem Services (PES) approaches and existing agri-environmental schemes (AES). Other advice included identifying and embedding local ecological networks, as the government wanted to restore nature at a landscape scale to create a resilient and coherent ecological network. The LNP arguably was ideally placed to do this at the local scale. Defra also stated in this document that advice would be offered through some of Defra's delivery bodies, including Natural England, the Environment Agency and the Forestry Commission, to support LNPs in their work. This advice would enable LNPs to then be able to generate an evidence-base for the local natural environment, understand as well as contribute to national policy objectives and undertake strategic planning alongside decision making about the targeting of resources. However, this document is not prescriptive, it is more advisory with terminology such as "could" being used. Thus, theoretically the representation of a LNP may look fairly straightforward. In reality, and when 'actual' and 'real' world scenarios are considered, it is evident that the form the partnership is most likely to take is one of co-management as network, a hybrid form of co-management, where the state is operating through multiple bodies and institutions, alongside private partners, making the partnership structure complex (Carlsson and Berkes, 2005).

It was intended that LNPs should work with "a broad range of local organisations, businesses and people who aim to help bring about improvements in their local natural environment" (Defra, 2015, p.1). Defra (2012b, 2) also emphasised that LNPs "need to be self-sustaining strategic partnerships ... [with stakeholders who have] the credibility to work with, and influence, other local strategic

decision makers". If LNPs do this, a clear cycle that will lead to project delivery outcomes being met should be achieved, as highlighted by figure 4.4 below.



*Figure 4.4: LNP Cycle for success in enhancing their influence to support their mandate
Redrawn from: ICF Consulting Services Limited (2014)*

Regarding funding, LNPs were assisted by Defra at the implementation stage. Defra made a total capacity fund of £1 million available to LNPs between the periods 2011 to 2012 and 2013 to 2014 to groups seeking LNP status. Natural England provided additional funding, with a "further £500,000 in small grant support over the last few years" (Environmental Audit Committee, 2015, 5). However, there was no long-term funding agreed for LNPs, with a view that LNPs should become self-sustaining and have private sector involvement which is able to provide financial support (Defra, 2012a). Figure 4.5 below illustrates, from desk-based research, and author inference, some of the stakeholders who may be involved in a generalised LNP approach.

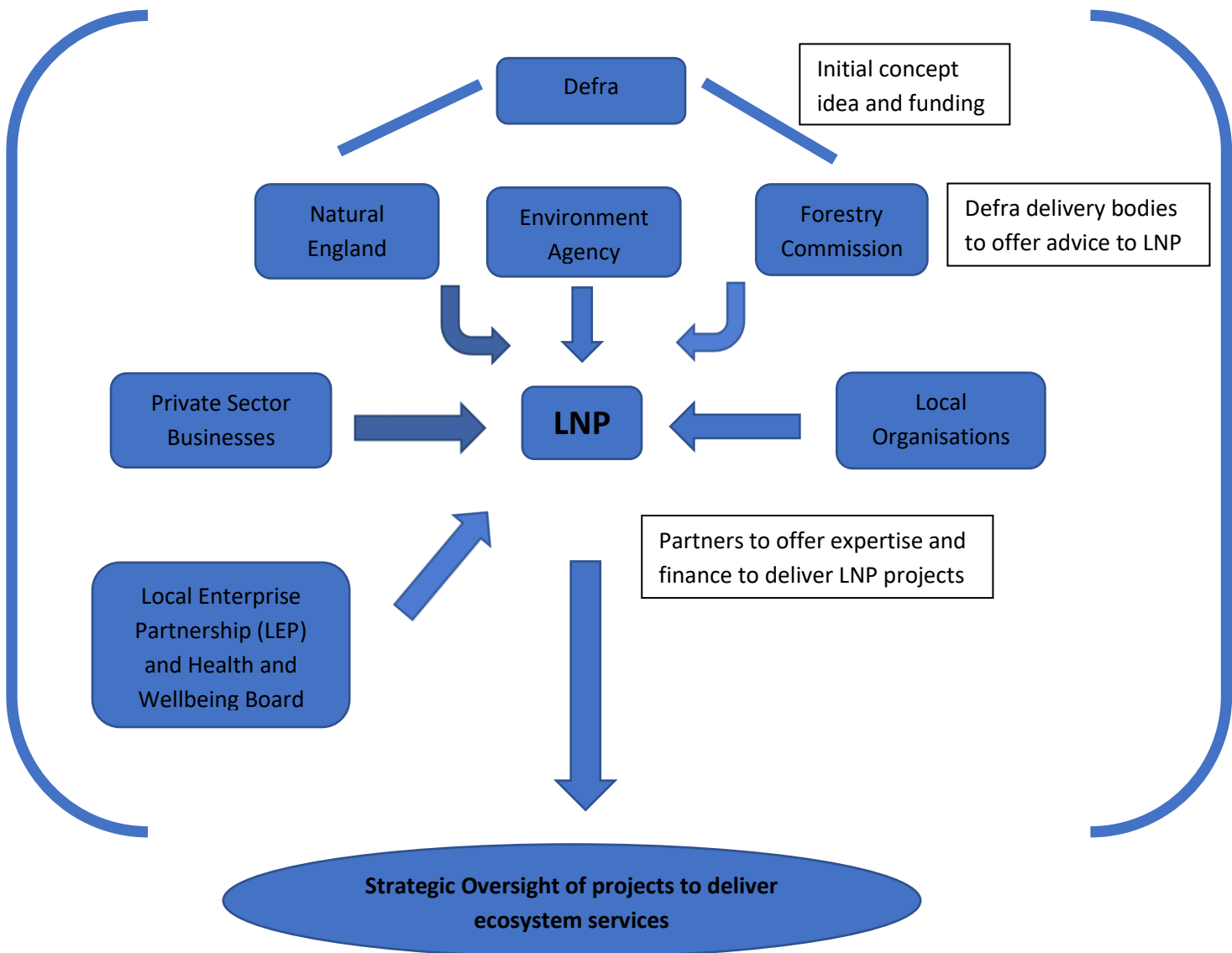


Figure 4.5: Summary of a generalised LNP Approach to delivering Ecosystem Services

4.2.3.2 Catchment Partnerships

Another example of a farming PPP is a catchment-based approach (CaBA), which has been in operation since 2006. These partnerships work at a river catchment scale to enable collaborative working which promotes the numerous ecosystem services that can be harnessed from river environments. Partnerships originated from the understanding that river environments can be heavily influenced by anthropogenic actions from the abstraction, return and use from water in

rivers. Through this partnership, and a Catchment Sensitive Farming (CSF) approach (partnerships to reduce water and air pollution from agricultural activity), farmers are encouraged to improve water and air quality in high priority areas (Defra, 2014). At the farm level, farmers are offered incentives and advice to address agricultural diffuse water pollution (Natural England, 2013). Such a partnership is more specifically targeted than the LNP approach. In England, 80 catchments were initially hypothesised by Defra, in comparison to 48 LNPs (Defra, 2013).

Similar to the LNP, the CaBA approach will have multiple stakeholders at the local level,

“the approach will help direct local decisions, made by Government, businesses, landowners and the community, to secure positive environmental improvements for rivers and catchments. Local decision-making processes will both help shape and be influenced by broader scale river basin management and planning”

(Defra, 2013, 4).

A work plan for the CaBA partnerships is illustrated by figure 4.6, highlighting the stages through which this PPP must progress in order to deliver its targets.

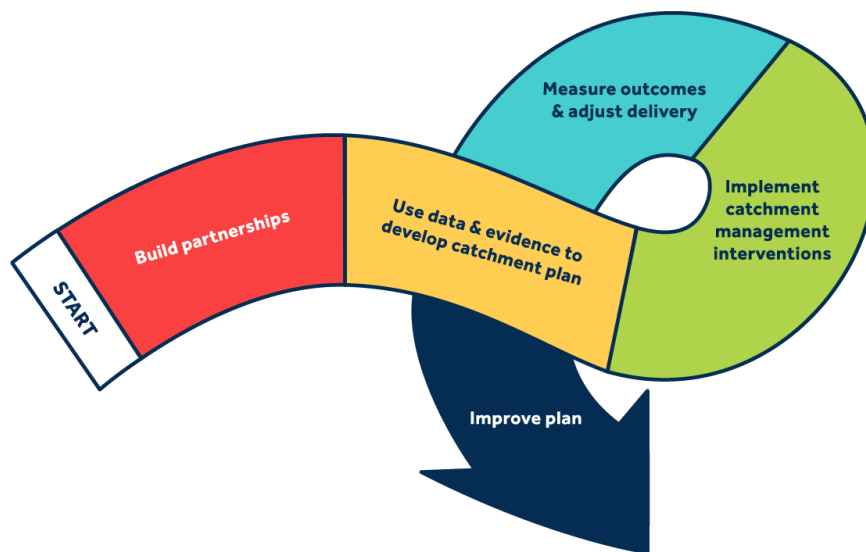


Figure 4.6: CaBA Workflow
Source: Catchment Based Approach (2019)

Whilst CaBA and CSF approaches within this are meant to eventually become self-sustaining in the long term, in the short-term Defra has set aside funding to support work under ‘transitional arrangements’ before this can happen. Defra also provide a list of potential sources of funding and

bid windows for partnerships to consider and fund a knowledge training package to help partnerships establish themselves (Defra, 2013). Thus, unlike the example of PPPs operating in Thompson's (2018) study, rather than the vast majority of financial power lying with the private sector organisations involved, the state still is funding certain aspects through the CaBA approach. This presents a unique dynamic. For instance, this may have led to inherent power structures and divisions of labour, which Burawoy (1998) speaks of, decreasing in importance. Furthermore, priorities, local knowledge exchange, and the delivery of ecosystem services may be more symmetrical, which Riley (2011) argues, is needed if partnerships are to work.

4.2.3.3 Pioneer Partnerships

Following the introduction of the CaBA approach and then the addition of LNPs, pioneer projects have become the most modern form of PPPs to emerge within agriculture, as set out in Defra's 25 Year Plan for Nature (2018). Pioneer projects began in 2016 and had four main objectives:

1. Applying a natural capital approach to decision making;
2. Developing innovative funding opportunities;
3. Demonstrate integrated approaches to planning and delivery;
4. Building our understanding of 'what works' in practice.

There are currently four pioneer projects in operation, including Cumbria, North Devon, Greater Manchester and Suffolk. Leaders of the partnerships include the Environment Agency, Natural England and the Marine Management Organisation. Stakeholders come from businesses, local organisations and people with the necessary expertise around each pioneer's key theme – be that urban, marine or catchment based.

4.2.3.4 Comparing UK based Agricultural PPPs

Table 4.3 highlights the similarities and differences between these three partnership approaches to deliver ecosystem services across the UK agricultural landscape, based upon the literature studied and demi-regularities identified in the desk-based research stage, including policy documents and academic articles. It is evident that PPP approaches began more narrowly with CaBA, before becoming broader to encompass ecosystem services across the entire landscape with LNPs, whilst the latest pioneer projects present the most targeted of partnership approaches. The CaBA has the largest number of partnerships in operation and has a well-established governance structure of groups and stakeholders. In contrast, the LNP has a more flexible structure, dependent on each separate local LNP to decide upon aims, objectives and stakeholder make-up. Within LNPs it was found that there was more diversity between partnerships as there in comparison to the CaBA

approach. Comparatively, the pioneer partnerships are the most modern and fewest in number of the PPPs. All 3 of these PPP examples are portrayed by Defra, in their *25 Year Plan for the Environment*, to be the epitome of partnership working to deliver ecosystem services.

Table 4.3: Comparisons between the identified three main PPP examples in UK Agriculture to deliver Ecosystem Services

	Catchment Based Approach (CaBA)	Local Nature Partnerships (LNPs)	Pioneer Partnerships
Year of Creation	2006	2012	2016
Number in operation	100+	47	4
Focus	Soil, water and air quality improvement across catchments	ES delivery across the UK's natural landscape	ES delivery and applying a natural capital-based approach in specific geographical regions (e.g. marine, urban, catchment)
Stakeholders	<p><i>Public sector</i> – government, councils, Natural England etc.</p> <p><i>Private Sector</i> – water companies, farmers etc.</p> <p><i>Third sector</i> – volunteers, citizen scientists, environmental NGOs</p>	<p><i>Public sector</i> – councils, Natural England etc. (but limited involvement from Defra as partnerships intended to be self-sustaining)</p> <p><i>Private sector</i> – limited involvement from businesses, increasing focus on working with them and LEPs</p> <p><i>Third sector</i> – most prominent within the LNP framework, mostly environmental NGOs e.g. Wildlife Trust, National Trust etc.</p>	Advancing inter and intra government alongside non-government working. Defra is heavily involved with the initial stages of these partnership's development.
Governance	<i>National Support Group</i> : representing many organisations involved in CaBA,	Highly variable and specific to each localised LNP example	Heavier public sector involvement but moving towards involving more private sector stakeholders. Not as much evaluative

	Catchment Based Approach (CaBA)	Local Nature Partnerships (LNPs)	Pioneer Partnerships
	<p>bridging the gap from community work to policy</p> <p><i>Technical Support Team:</i> build partnerships' expertise through a program of mentoring, updating the website, sending newsletters, and providing updated GIS data.</p> <p><i>Working Groups:</i> focus on particular issues, such as Urban Water Management</p> <p><i>Local teams:</i> Work to deliver specific CaBA based projects in the local areas</p>		<p>literature or outputs to date as the other partnership examples.</p>
Additional Comparisons	<p>An approach that is targeted at a local scale to specific ES delivery which improve soil, water and air quality.</p>	<p>A much wider landscape scale approach, with a great scope for the partnership to decide on objectives and ES themselves.</p>	<p>Narrowing the scale down to focus on localised regions and ES derived from specific environments. The largest public sector involvement of all three PPPs presently (given the 'pilot' nature of the partnerships)</p>

4.2.4 PPP Comparative Observations

The previous sections have highlighted the different sectors within which the PPP model operates. Within the UK, the two most common sectors are health and education (Section 4.2.2). These PPP structures involve both private and public sector partners, which should enable the efficient provision public goods, where private sector stakeholders are financially incentivised by the government and public sector to do so. Within the health sector the PPP model operates through the UK's PFI, which means that PPP models are uniform with very little differentiation, except from their size and the funding amount provided for the partnership to operate. Within education, the overall aim of PPPs remains similar, yet the structure PPPs can take becomes more diverse, with PPPs operating across a spectrum with those examples that have more private sector involvement than public sector involvement and vice versa. This spectrum approach is found to be akin to PPPs operating within agriculture, as witnessed through the introduction of the CaBA, LNP, and lastly, the Pioneer Projects.

Agricultural focused PPP formats were found to be even more diverse, with a variable number of stakeholders involved and differing partnership aims. Figure 4.7 is an author created diagram, based on desk-based research, which highlights, from literature and policy documents, what a PPP should look like. Yet, as different PPPs exist, involvement from the stakeholders involved can differ to notable extents. Most definitions only note the roles for the public and private sectors. Both may contribute to funding, though in most cases this is often dependent on private sector involvement. Whilst the public sector is meant to steer the aims and agenda for a partnership, the private sector, through its expertise, should often be able to deliver on partnership outcomes. In a minority of cases it was noted that individuals from outside the sectors, from local communities, may also be involved for their own local knowledge and interest. Due to several different relationships and actors involved, PPPs can be considered to be a form of co-management as network (Carlsson and Berke, 2005). This diversity of actors/stakeholders can give rise to differing power relations, the extent of local knowledge that can be used may differ, and alternate forms of partnership development across different types of PPP, which will be discussed further in Chapter 6. Figure 4.7 will be reshaped later into figure 6.1 to highlight what in actuality and the real world is happening through a critical realist lens. The Cumbria Local Nature Partnership (CLNP) offers a prime example of numerous stakeholders and various partnership aims, where its own vision is unique to the PPP.

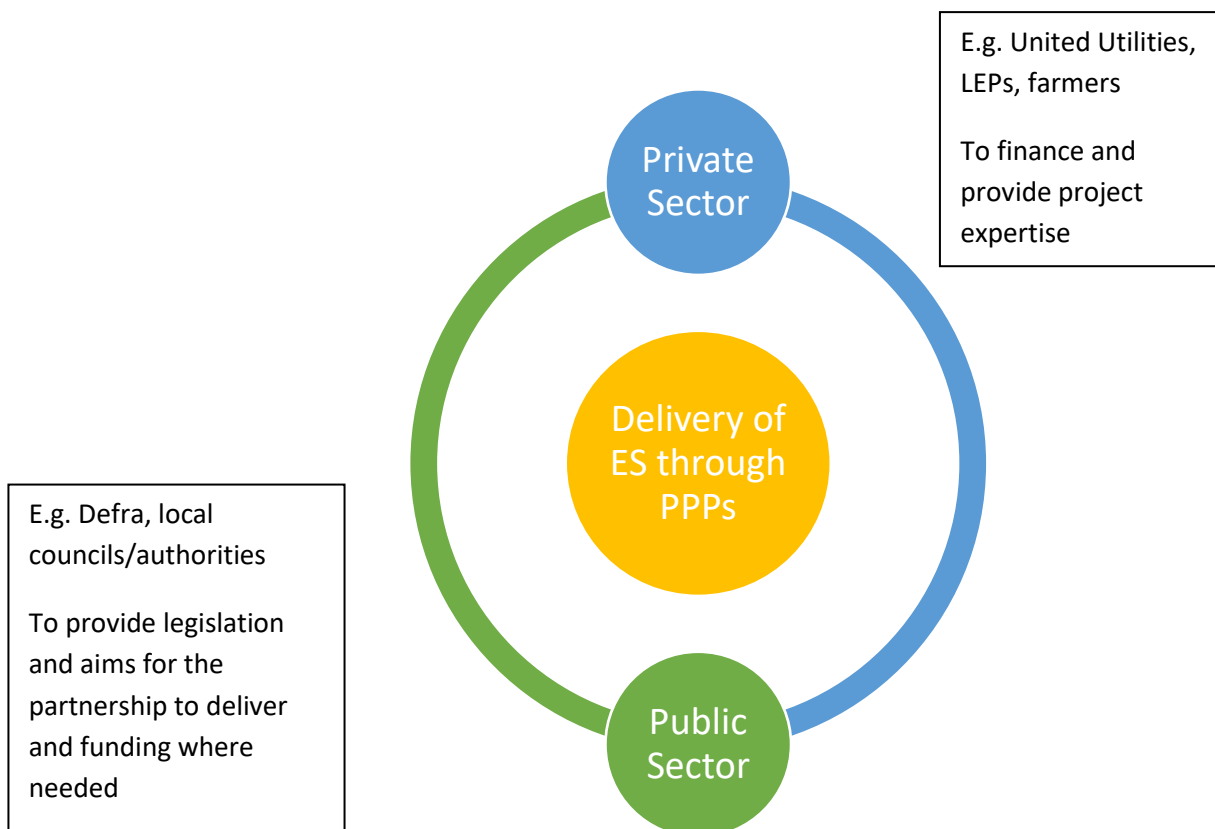


Figure 4.7: Theoretically and Empirically what a PPP should look like from desk-based research

4.3 Cumbria Local Nature Partnership (CLNP)

Through an assessment of examples encountered during desk-based research, Section 4.2 set out what a PPP should aim to do. In assessing the effectiveness of the CLNP to deliver ecosystem services within agriculture, it is necessary to understand what the CLNP should be doing theoretically and later what it is doing in reality. As Pratt (2014) discussed, the critical realist perspective offers a unique opportunity to do this through localised studies, which made it an ideal approach for this study to follow. Information on what the CLNP theoretically and empirically believe they should be doing can be found through the CLNP’s own vision statement and overall objectives, outlining who should be involved, the CLNP’s governance structure and ecosystem service delivery priority areas.

4.3.1 Vision Statement

The CLNP applied for LNP status to Defra, setting out its objectives and vision in 2011, in response to the *Natural Environment White Paper*. The CLNP saw the following as its vision during this time:

“A Cumbria where the natural environment provides the full range of benefits for nature, people and the economy. Cumbria’s natural environment and these benefits are understood and valued by all”

(Pitt and Bullard, 2011, 4).

In the following years, the CLNP’s vision was refined to read:

“Cumbria is a place where consideration for the environment informs every decision-making process and where the environment is managed to provide a wide range of benefits for nature, people and the economy. In Cumbria nature’s role within the landscape is understood and valued by all”.

(CLNP, 2015, 2).

The CLNP places a key emphasis on the delivery of ecosystem services alongside the education and valuation of these ecosystem services in the wider community. In order to achieve this vision, the CLNP set out nine main agenda targets to be reached (CLNP, 2015):

1. More people are engaged with the environment and nature through recreation, volunteering, and learning
2. The environment sector contributes more to improving the health and wellbeing of people
3. Greater awareness of and consideration for the natural environment especially amongst those that have the greatest potential impact on it
4. Cumbria is a national exemplar of best practice of how the environment underpins and contributes to economic growth
5. Ecosystem networks in Cumbria are coherent and resilient
6. Cumbria has bigger, better and joined up areas of Priority Habitat
7. Priority species in Cumbria will be in recovery
8. Cumbria’s Green Infrastructure and its associated benefits are strengthened
9. Good quality data about the environment will be more widely available in suitable formats

Farming is particularly important for agenda item 3, where farmers and large landowners have some of the greatest potential impacts on land management for the delivery of ecosystem services.

4.3.2 Stakeholder Involvement

In order to achieve these key agenda targets, which will lead to the CLNP’s vision being realised, the CLNP needs to ensure that the correct mix of stakeholders are involved with a clear division of roles and responsibilities. As discussed earlier in the LNP model devised by Defra, representatives should come from several public and private bodies whom have interest in looking after the natural environment. Appendix 4 of the CLNP (2011) application for funding highlighted the individuals who would need to be involved within this PPP approach for it to work effectively. Many private, public

and third sector organisations were listed. It was argued that funding would come purely from several private sources, bids to heritage lottery funds, and local payments associated with agri-environment schemes to deliver projects (CLNP, 2013).

4.3.3 Governance Structure

A clear governance structure is needed to enable the CLNP to involve these stakeholders in the correct way whilst also ensuring a strategic oversight of project delivery. In the CLNP's 2011 funding bid, the structure of the LNP was believed to follow a similar format to that of the previous Cumbria Biodiversity Partnership (CBP) in operation (Pitt and Bullard, 2011). A similar structure to the CBP was proposed because the development of the CLNP was led by CBP and the Lake District National Park Partnership (LDNPP). These partnerships involved a range of stakeholders consisting of statutory agencies, local authorities, representatives of farming and landowning interests, research and educational institutions, businesses, voluntary organisations and community groups which were believed would also make up the CLNP at the time (Pitt and Bullard, 2011).

However, the CLNP's structure changed when the LNP was implemented from that originally theorised above. CLNP (2013) explains that the three main elements of their current structure - the CLNP board, thematic groups and CLNP networks - are viewed as being of high importance to the overall governance structure. The CLNP Board consists of a maximum of nine members.

Representation on the board is split between organisational representatives and wider members. The role of the board is to set and review the strategic direction of the Partnership's work ensuring continuity and momentum with respect to the core functions of the CLNP. They provide guidance and make decisions regarding strategy, policy, objectives and expenditure.

Whereas, thematic groups are long term groups based around specific on-going themes or issues, as covered in more detail in section 4.3.4 (e.g. agricultural sustainability). The CLNP utilises the knowledge and expertise of these groups to inform decision making. Shorter term task groups are set up to cover specific tasks, initiatives or project development. The value of both these longer and shorter-term task groups is reviewed regularly to ensure that they contribute to the strategic direction of the CLNP. The membership of both types of group is drawn from all sectors of the CLNP network, according to the needs of the groups and the interests of the individual organisations.

The wider network of the CLNP is open to all interested parties. The CLNP board, thematic and task groups are drawn from it. This wider membership is brought together at least once a year at an annual conference. The wider membership was argued to have a key role in monitoring and evaluating the performance of the CLNP.

4.3.4 Projects and Ecosystem Service Delivery

In order to deliver projects, the CLNP postulated four key themes which help to meet their vision and nine agenda targets, under which work is delivered (CLNP, 2013):

- Putting people at the heart of environmental policy;
- Managing environmental impacts and growing the economy;
- Adopting an integrated landscape approach to conservation on both land and at sea;
- Improving knowledge and understanding of the environment

The CLNP, through their vision, seek to enhance the benefits obtained from the natural environment. One way of doing this is through devising projects which can target the delivery of ecosystem services effectively. The CLNP aimed to deliver ecosystem services at a landscape level, particularly around catchments (CLNP, 2011). In the CLNP's funding bid it was highlighted that "the CLNP will work with private businesses like United Utilities to ensure sustainable land management produces multiple benefits such as increased water quality, carbon storage and reduced costs" (Pitt and Bullard, 2011). The CLNP through this approach aimed to understand social, economic and environmental priorities for local areas and argued that they would consult local communities about this work as it went ahead.

The CLNP's strategy plan included collaboratively working with Morecambe Bay LNP and the Northern Upland Chain LNP to deliver projects, as all three LNPs share the same boundary, as highlighted in Chapter 3. Project ideas included: implementing new environmental volunteering projects to teach individuals about the environment; collaborative work between the environmental and health sectors, to improve health and wellbeing through increased access and connectedness to the local environment; more land and inland water, conserved through effective, integrated and joined up approaches to safeguard biodiversity and ecosystem services; and the completion of work which reduces gaps within existing environmental datasets amongst others (CLNP, 2015). Key ecosystem services mentioned within policy documents for the CLNP revolve around water quality and habitats (CLNP, 2013). The maps in Chapter 5 could help guide some of the work the CLNP *should* be doing and help to consider the beneficiaries of the different ecosystem services presented, which will be evaluated and discussed in more detail in Chapter 7.

4.4 Conclusion

This chapter has outlined what a PPP *should* be doing to deliver ecosystem services in UK agriculture. A PPP has many contrasting definitions, but there are some common governance features (or demi-regularities) of what a PPP should do, as explained in section 4.2.1. A PPP approach should involve

both public and private partners, where the public sector helps give advice and support, whilst the private sector aids financing and management of project delivery. The most common example of PPP structures in operation within the UK come from the health and education sectors, as in section 4.2.2, these PPPs aim to fill a funding gap and establish and manage these facilities on behalf of the public sector. Within these sectors, PPP structures are simplified and generic, operating usually with a single public and private entity to form a contract.

When compared with the agricultural sector, PPP forms can become a lot more diverse and complex. Section 4.2.3 introduces three PPP agricultural examples at operation within the UK to deliver ecosystem services, from LNPs through to CaBA partnerships. Each PPP is unique in form, but were also found to have similarities, particularly around the goal of delivering a landscape scale approach for the delivery of ecosystem services at a local level. Due to stakeholders having different roles, it also allows power dynamics potentially to emerge, as discussed by Thompson (2018) and Burawoy (1998). Such power dynamics would affect the ability of local knowledge to be understood and be symmetrical between stakeholders (Riley, 2011). This is further investigated in interviews and deliberative workshops in Chapter 6.

The large number of stakeholders involved, and project delivery objectives make the PPP structural diagrams and governance structures more complex than counterparts in other industries. A simplified version of roles and responsibilities, as well as the different sectors involved uncovered by desk-based research was depicted by figure 4.7. This represented that most definitions and structure forms only comprised public and private sector individuals as well as, occasionally, individuals with an interest from the local community. Given the diversity of many PPPs and the LNP, in particular, it is arguably a hybrid form of co-management as network (Carlsson and Berkes, 2005). The CLNP was then used as an example to show the aims and objectives of a UK based agricultural PPP. This allowed an appreciation of what the CLNP should be doing (empirically), alongside who should be involved, and the projects which the CLNP believed would enable ecosystem services to be delivered. Through Chapters 6 (abduction) and 7 (redescription) can then take place of how PPPs to deliver ecosystem services in UK agriculture work in practice.

Chapter 5

Mapping Approaches to delivering Ecosystem Services

5.1 Introduction

This chapter presents maps and other evidence prepared by the ecosystem services model, LUCI, on specific ecosystem services relating to agricultural productivity, habitat connectivity and flood regulation amongst others. Through an analysis of the ecosystem service maps produced for Greystoke, Cumbria, the possibilities for the Cumbria Local Nature Partnership (CLNP) to deliver ecosystem services and the associated trade-offs are examined. These maps were also used to facilitate discussion in the deliberative workshops. The chapter concludes by empirically assessing the ecosystem services and methods which the partnership should be using to deliver these.

5.2 What ecological (dis)benefits should occur from PPPs when managing Agricultural catchments for Ecosystem Services?

5.2.1. Outcomes from the PPP Approach

In all sectors where PPPs are adopted there are several beneficial outcomes which are proposed within various policy documentation. From Section 4.2 examples were given to highlight the factors which comprise a PPP in terms of stakeholders and the various forms of contracts that each PPP can be involved with. There were specific resource and stakeholder participation requirements for PPPs in all the previous examples; however, there are also generalisable benefits which can be noted from PPPs across multiple industries as summarised in policy documents and literature.

The PPP model is seen as a way of addressing three theoretical global governance deficits, as identified by Haas (2004). PPPs are meant to address a regulatory deficit, through encouraging co-operation and problem solving and an implementation deficit through managing regulations successfully. Finally, PPPs should involve participants from multiple sectors in societies, not just powerful state actors and elites. Through engaging with multiple stakeholders in these types of partnerships PPPs can improve the implementation of national agreements in terms of legitimacy, accountability and the democratic quality of governance systems (Mert and Pattberg, 2015). In terms of agriculture these aims would be through ensuring a range of individuals were involved in PPPs, including farmers, consumers, local authorities as well as the state and international actors. Ideally, ecosystem services delivery would then be able to fairly be distributed amongst several beneficiaries, which can be identified through mapping approaches (Crossman et al., 2013).

5.2.2 What Ecosystem Services could be delivered from a PPP Approach?

Within agriculture, PPPs are supposed to deliver several ecosystem services benefits to the local area in which they operate. Often an ecosystem services mapping approach is adopted within policy to highlight areas where implementation could deliver net gains for ecosystem services delivery. Martínez-Harms et al. (2012) advocate the mapping out of ecosystem services to develop strategies which can enhance their future delivery. However, Van Vooren et al. (2017) highlight that within agriculture, provisioning ecosystem services are often prioritised above other ecosystem services. As such, they argue that other ecosystem services also need to be delivered and the synergies between provisioning ecosystem services, such as food production, and additional ecosystem services, like regulating services need to be understood through mapping. In this section, results from ecosystem services mapping using the LUCI model will be presented. This will lead to a discussion around the ecosystem services currently provided through farming in the Cumbria area, by utilising the available maps, and the best methods for measuring these ecosystem services. The maps will also present possible implementation ideas for future CLNP work to engage with the agricultural industry and rectify an imbalance of a simple focus on provisioning ecosystem services, such as food production, as argued by Van Voreen et al. (2017).

5.2.2.1 Greystoke

Greystoke and the surrounding area was chosen for the mapping of these ecosystem services which agriculture could deliver. Figure 3.6 showed the area used within the LUCI model to map out services. This was because it was the area where most semi-structured interviews were held and it was situated within the CLNP boundaries, with the town and area surrounding Greystoke being used heavily for agriculture. Through choosing a smaller area located in the CLNP it also allowed site-based mapping at the farm level to be conducted, which allowed a finer resolution and the LUCI model to be used as a discussion tool in the deliberative workshops. Degroot et al. (2012) note how this approach is fundamental for understanding the spatial distribution of ecosystem services across a landscape, whilst Boyd and Banzhaf (2007) approve of a clearly defined approach and area like this for consistent and effective results to be obtained. This approach was one of the advantages of using LUCI, as discussed in Chapter 3. The following sections present the current state of several ecosystem services or ecosystem services related processes around Greystoke.

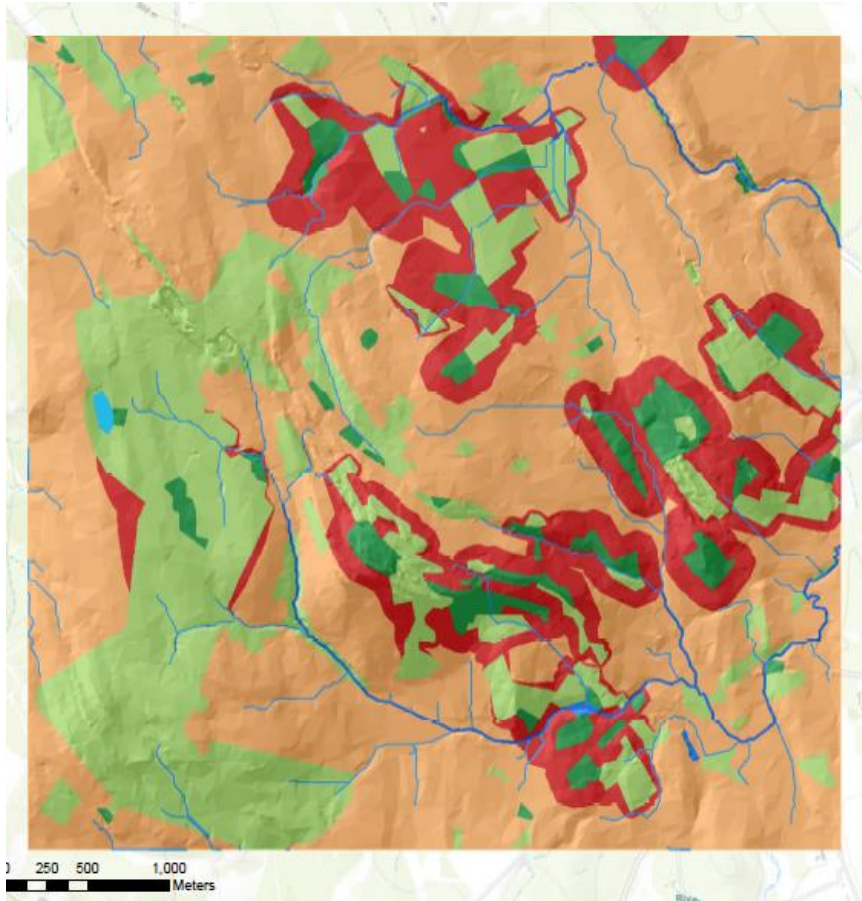
5.2.2.2 Habitat Connectivity

Map 4.1 below illustrates current levels of habitat connectivity for the Greystoke area. Connectivity is a measure of the size and distribution of patches of habitat and the relative ease with which

typical species can move through the landscape between the patches (Crain, 2015). Habitat loss and fragmentation can reduce the size of populations and hinder the movement of individuals between increasingly isolated populations, threatening their long-term viability (JNCC, 2018). This physical process, whilst not an ecosystem service, can have ramifications for other ecosystem services, as it is important for enhancing biodiversity within an area, enabling a landscape scale conservation approach to occur, alongside allowing different ecosystem services, such as pollination or carbon sequestration, to occur. Indeed, in Chapter 2 Pwyell et al. (2015) discuss the benefits of enhanced habitat and an improvement in agricultural yield, thanks to the creation and increased connectivity of habitats across the 900 hectares Buckinghamshire farm site studied.

The LUCI model focuses on focal species, which are species that support a wide range of biodiversity within the forest environment, where these species were highlighted as conservation priorities by Forest Research's BEETLE method (see Chapter 3) conceived through stakeholder engagement workshops with scientific experts. Dark green shaded areas (4.54% of land mapped) show the current extent of broadleaved native woodland in the region. The red shaded areas (14.98% of land mapped) are where focal species (e.g. oak and birch trees) from the dark green shaded areas currently have access to, where extending the habitat into this area would enable an extension of existing habitat. Through a targeted focus within these red shaded areas, habitat connectivity would improve, and broadleaved woodland species could be planted. In contrast, orange shaded areas (which cover most of the map) highlight areas of opportunity to establish new habitat; however, these areas are not connected to existing areas of habitat and so trying to connect habitat in such regions would not be worthwhile. Light green areas represent areas of habitat where other woodland exists, but it is not as worthwhile an opportunity to connect, or focus upon, as those habitats shaded in dark green.

MeadowLife was a previous CLNP initiative, run by the Wildlife Trust, where hedgerows were planted. If a similar program was run by the CLNP to focus on these broadleaved species of interest, biodiversity and habitat connectivity around existing habitat could be improved. This, in turn, would serve to promote ecosystem services such as pollination, with more species able to pollinate flora across a wider geographical area, and carbon sequestration, through more broadleaved woodland species acting as a carbon sink to regulate the environment.



Broadleaved woodland habitat classification

- Habitat of interest (4.54%)
- Other priority habitat (24.34%)
- Opportunity to establish new habitat (54.99%)
- Opportunity to expand existing habitat (14.98%)
- Water Bodies (1.15%)

Files and folders

Broadleaved woodland habitat classification
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Map 5.1: Habitat Connectivity Map for Greystoke Area, Cumbria

5.2.2.3 Agricultural Productivity

A provisioning ecosystem service, which the CLNP could additionally focus on, is agricultural productivity. Power (2010) and Boyd and Banzhaf (2005) explain how multiple ecosystem service provision can provide a few synergies which would enable agricultural productivity to improve, and so understanding agricultural productivity on maps is important for policy makers and those in partnerships. Map 5.2 below illustrates the current usage and productivity of the land around Greystoke, mapped using land classification data. Land is ranked on the map from the highest productivity to the lowest, based on the soil type and suitability of the soil for agricultural activity in the following order: arable, improved grassland, unimproved grassland, woodland and heath, bog

sand and rock. Most areas have a 'moderate productivity' rating, with this representative of 44.62% of the land area. Less productive land is also apparent, with some 5.97 % of land showing 'very marginal productivity'.

These results, where land is not as productive, could offer the CLNP opportunities to work on afforestation or rewilding work. This may be appropriate to foster the generation of alternative ecosystem services, such as carbon sequestration, as food productivity potential in these agricultural areas is lower than other sites. This will be discussed further in Chapter 6. Rather than providing a private good of food, farmland could then provide public goods through the ability to aid environmentally regulating ecosystem services and biodiversity, which could reduce the progression of climate change and offer greater aesthetic value, which multiple beneficiaries could experience the rewards from (Cornes and Sandler, 2003; Ostrom, 2005).



Current agricultural utilisation

- High productivity (8.39%)
- Moderate productivity (44.62%)
- Marginal productivity (22.91%)
- Very marginal productivity (5.97%)
- Negligible production value (16.96%)
- Water Bodies (1.15%)
- Urban Area (0.0%)

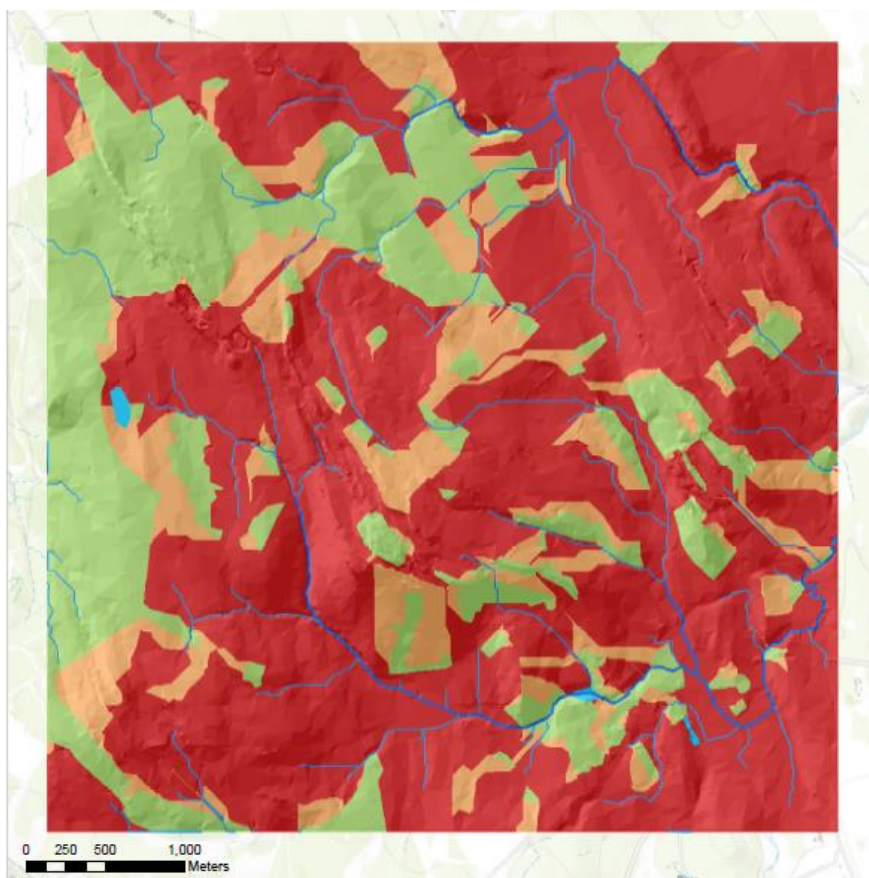
Files and folders

Current agricultural utilisation
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Map 5.2: Current Agricultural Utilisation Map for Greystoke Area, Cumbria

5.2.2.4 Flood Regulation

The regulating ecosystem service of flood regulation was mapped for the Greystoke area using LUCI. Map 5.3 illustrates current flood mitigation levels around Greystoke. Most of the land was shown to be at risk of flooding, shaded in red, with 64.34% of the area classed as 'non-mitigated flood prone land'. This offers potential project work for the CLNP surrounding land management projects which could be used to mitigate against the effects of flooding. Some of the land was seen to be flood mitigating land, in green (22.28%) whilst in orange mitigated flood prone land (12.28%) was also highlighted. Therefore, the total amount of flood prone land in the area, not considering mitigation measures, was 76.62%.



Flood mitigation classification

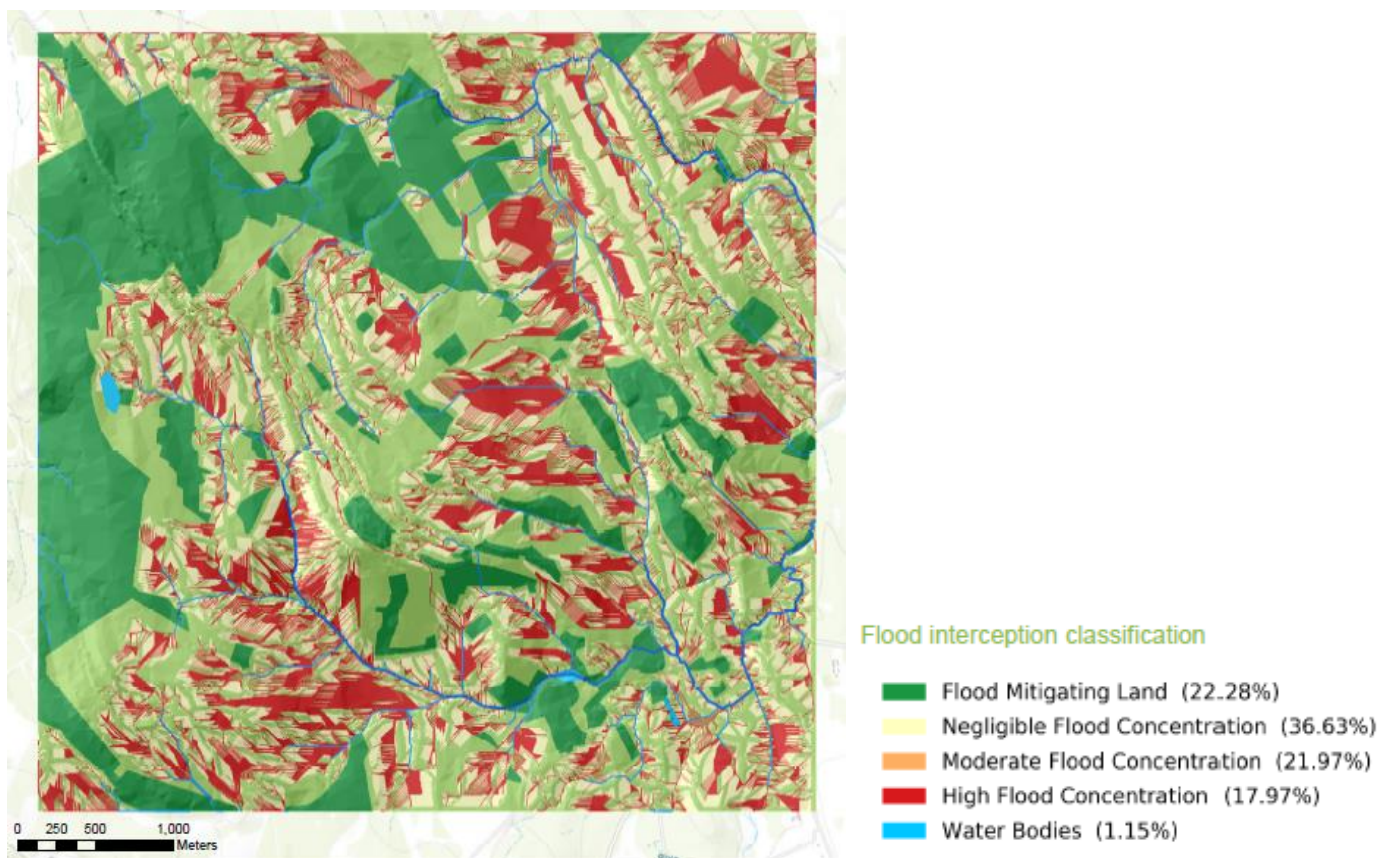
- Flood Mitigating Land (22.28%)
- Mitigated Flood Prone Land (12.28%)
- Non-Mitigated Flood Prone Land (64.34%)
- Water Bodies (1.1%)

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Flood mitigation classification
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Map 5.3: Current Flood Mitigation Map for Greystoke Area, Cumbria

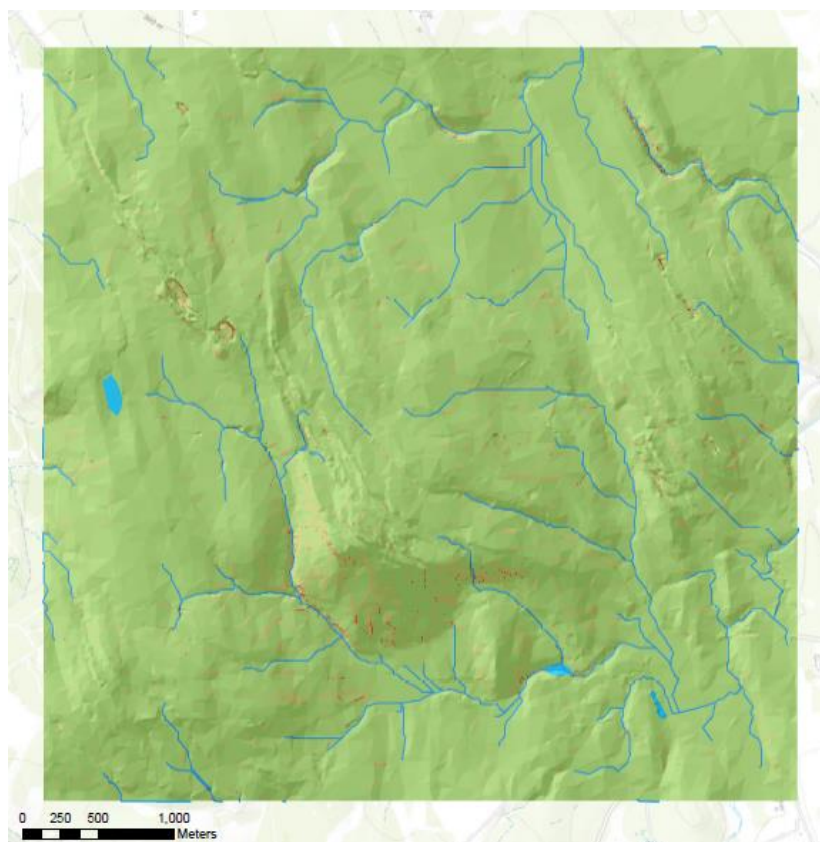
LUCI was also used to produce a flood interception map, which indicates which areas of land are more likely to flood and where overland and near surface flow are more likely to accumulate (Map 4.4). This further narrows down areas where PPPs, such as the CLNP, could focus attention by highlighting areas of land which have limited mitigation features but also high-water accumulation potential from flooding. Areas shaded in red, totalling 17.97%, represent ‘high flood concentration’ potential where more mitigation features should be considered, along with the physical geography of the water stream network further downstream. Land which has flood mitigating features and is unlikely to experience any flooding is shaded in dark green, accounting for 22.28% of the land mapped, meaning that any project work in such an area would probably be inefficient and unnecessary. 21.97% of the land has a ‘moderate flood concentration’, shaded in orange, with the remaining 36.63% being shaded in yellow and having a ‘negligible flood concentration’. A ‘negligible flood concentration’ means that the land is not as likely to flood as other areas and so would not benefit from the installation of mitigating features as much as red or orange shaded locations. Comprehension of this map could prove useful for the local community, who could benefit from this ecosystem service provision being improved, as it would protect them from flooding events, and the significant social and economic costs of weather events such as Storm Desmond (CLNP, 2015).



Map 5.4: Flood Interception Map for Greystoke Area, Cumbria

5.2.2.5 Erosion and Sediment

Another two ecosystem services are shown below in Map 5.5 and Map 5.6. Erosion and sediment can impact upon agricultural productivity and other ecosystem services like flood regulation, as it can lead to soil erosion and cause reduced agricultural yields or increased sediment loads entering water bodies, which could result in flooding and impact water quality. Map 5.5 illustrates the erosive potential of overland flow, as derived from water flow magnitude and concentration, slope, and landscape concavity. Map 4.5 indicates that 96.17% of the land mapped does not present an erosion risk, whilst a minimal 0.13% does. The areas where some erosion risk is present occurs near streams and some areas which are topographically steep.



Erosion vulnerability

- Negligible Erosion Risk (96.17%)
- Moderate Erosion Risk (2.59%)
- High Erosion Risk (0.13%)
- Water Bodies (1.11%)

Map 5.5: Erosion Vulnerability Map for Greystoke Area, Cumbria

Map 5.6, stemming from Map 5.5, highlights areas where sediment mitigation efforts could be targeted to reduce the erosive potential of overland flow, for example, by creating buffer zones in these areas. The map highlights that the locality already had a substantial amount of land which mitigates sediment delivery (22.28%), this means that protection has already been provided by stopping sediment sources reaching stream networks. There are some minimal areas that would benefit from sediment delivery mitigation (0.08%). However, overall erosion and sedimentation are shown to be regulated well within the locality and efforts to target the delivery of ecosystem services could be better utilised elsewhere within agriculture.



Sediment delivery mitigation

- Sediment Reducing Land (22.28%)
- Negligible Risk of Sediment Delivery (75.07%)
- Moderate Risk of Sediment Delivery (1.47%)
- High Risk of Sediment Delivery (0.08%)
- Water Bodies (1.11%)

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Sediment delivery mitigation
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Map 5.6: Sediment Delivery Mitigation Map for Greystoke Area, Cumbria

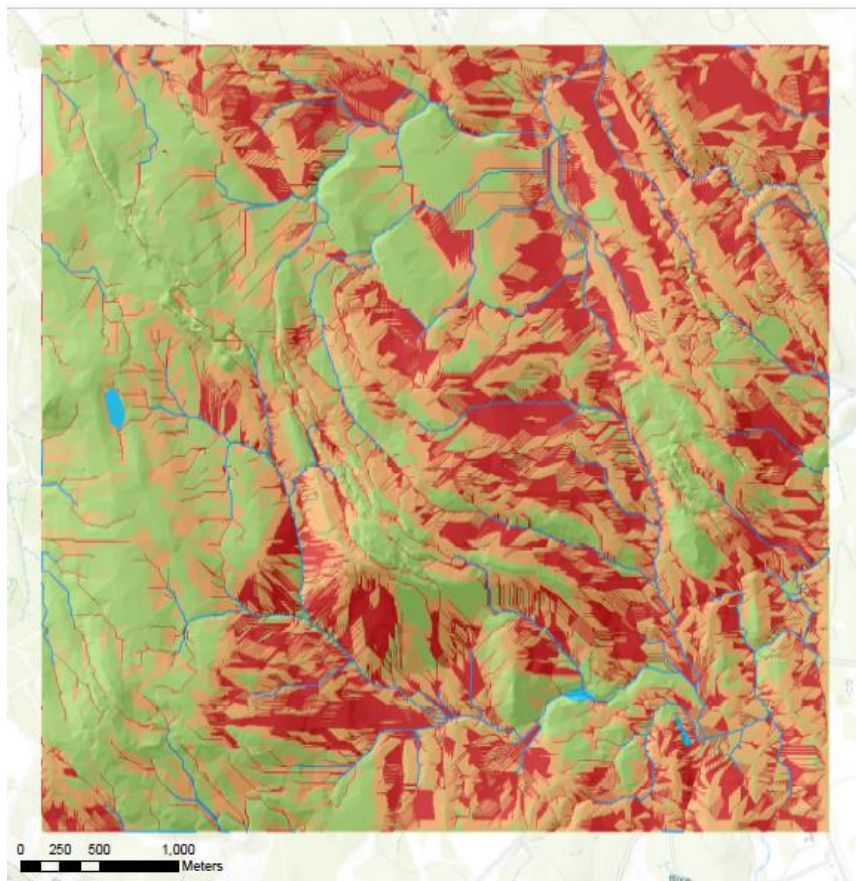
5.2.2.6 Nitrogen

As mentioned in Chapter 2, agriculture had previously been critiqued for its overuse of nitrogen-based fertilisers (Libal, 2017). If too much nitrogen enters water streams, it would cause water quality issues, which could lead to a loss of biodiversity and eutrophication (ibid). Maps were produced by combining topographic routing and precipitation data to measure the accumulation of water flow over the land to river and lake networks. The maps 5.7-5.9 illustrate areas where nitrogen run-off into water sources is unsustainable and where there are potentially high loads of nitrogen being deposited. Map 5.7 shows the total nitrogen load across the landscape, there are several areas of high load (categorised as approximately 50kg per hectares per year of total nitrogen), particularly towards the eastern side of Map 5.7. Parts of Map 5.7 show high nitrogen loads which can be inferred from agricultural activities. Comparing Map 5.2 to Map 5.7 it is evident in the north east, where there is high agricultural productivity found, there is also high nitrogen loads in the same area. This implies that agricultural activity in this part of Map 5.7 is using too much nitrogen which could have negative externalities for the delivery of other ecosystem services. This map would help policy makers and practitioners to identify sources of high nitrogen loads and curtail the causes for this.



Map 5.7: Nitrogen Load Map for Greystoke Area, Cumbria

Map 5.8 aids an understanding of where this nitrogen load runs off to and collects across the landscape, considering nitrogen from uphill sources as well. There is a large area of land (24.18%) which could be targeted for mitigation and interception opportunities. Much of the nitrogen load is running off to water bodies which could lead to a reduction in water quality and biodiversity in these areas, having a multiplier effect on other ecosystem services.



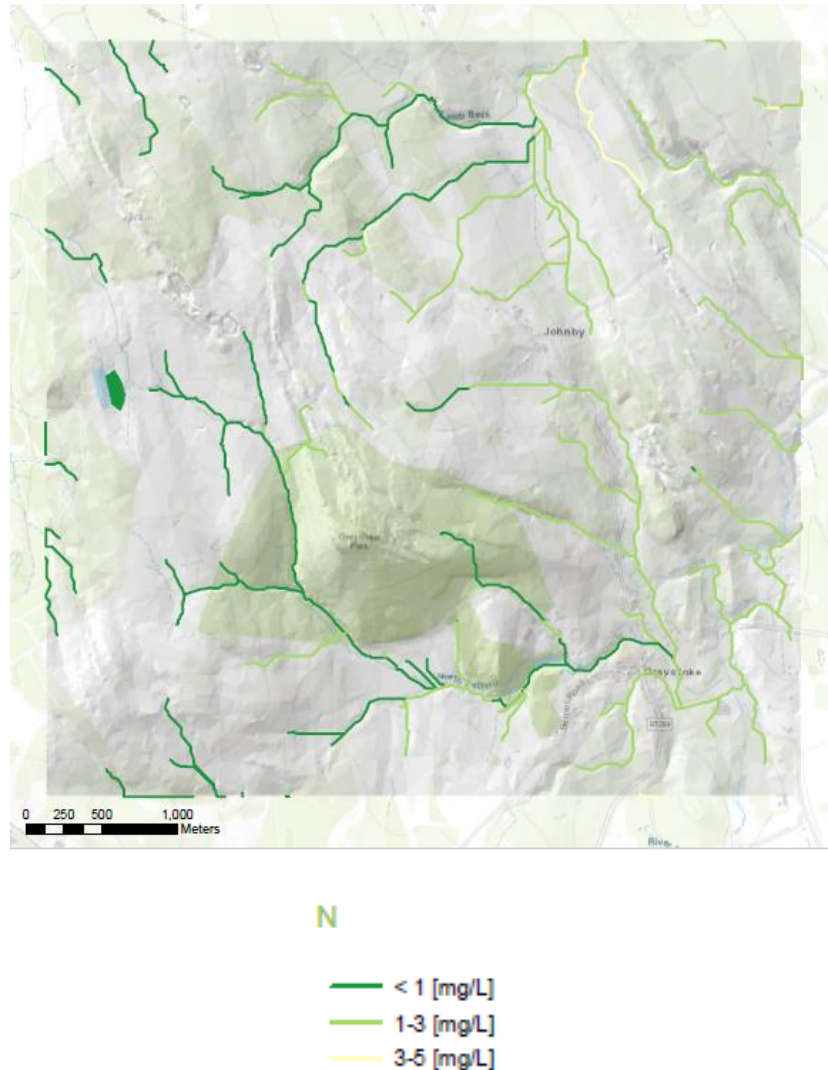
Nitrogen accumulated load (classified)

- Low to moderate load (36.24%)
- Accumulated load > 0.1 kg N (38.43%)
- Accumulated load > 1.0 kg N (24.18%)
- Water Bodies (1.15%)

Map 5.8: Nitrogen Accumulated Load Map for Greystoke Area, Cumbria

Finally, Map 5.9 highlights where this nitrogen accumulation becomes concentrated along the water sources. The highest levels of accumulation (represented by the lightest green colours) occur near

the source of where the nitrogen is accumulating in Map 5.8. However, it is also visible that nitrogen is still travelling further downstream, as there are also lower nitrogen traces further along rivers (as shown by dark green concentrations). Therefore, nitrogen loads have become widely dispersed across the landscape, which will require management of agricultural products and fertilisers at the source of the highest nitrogen loads in Map 5.7 to regulate nitrogen's run-off into the environment.

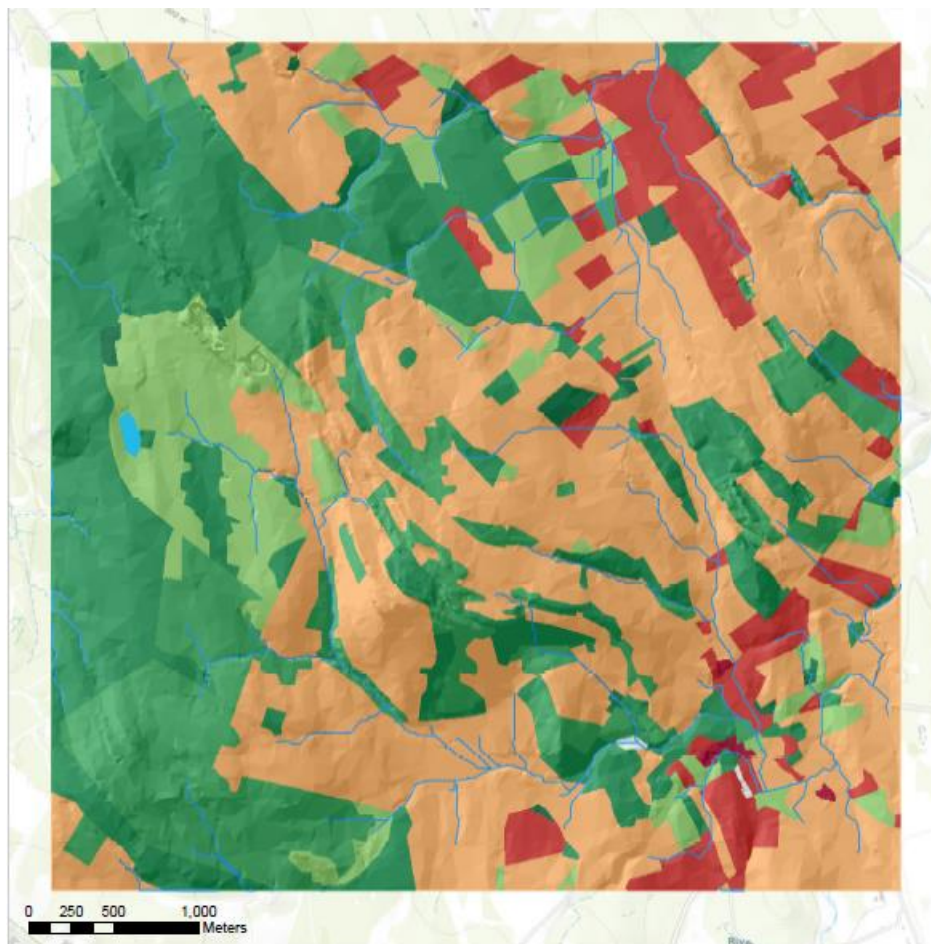


Map 5.9: Nitrogen Concentration in Water Map for Greystoke Area, Cumbria

5.2.2.7 Phosphorus

Another chemical which is important to consider for sustainable environmental management is phosphorus. As for nitrogen, maps were produced by combining topography and precipitation data to predict the accumulation of water flow across the landscape and, hence, the accumulation of phosphorus within water bodies. Map 5.10 shows the total phosphorus load across Greystoke. It

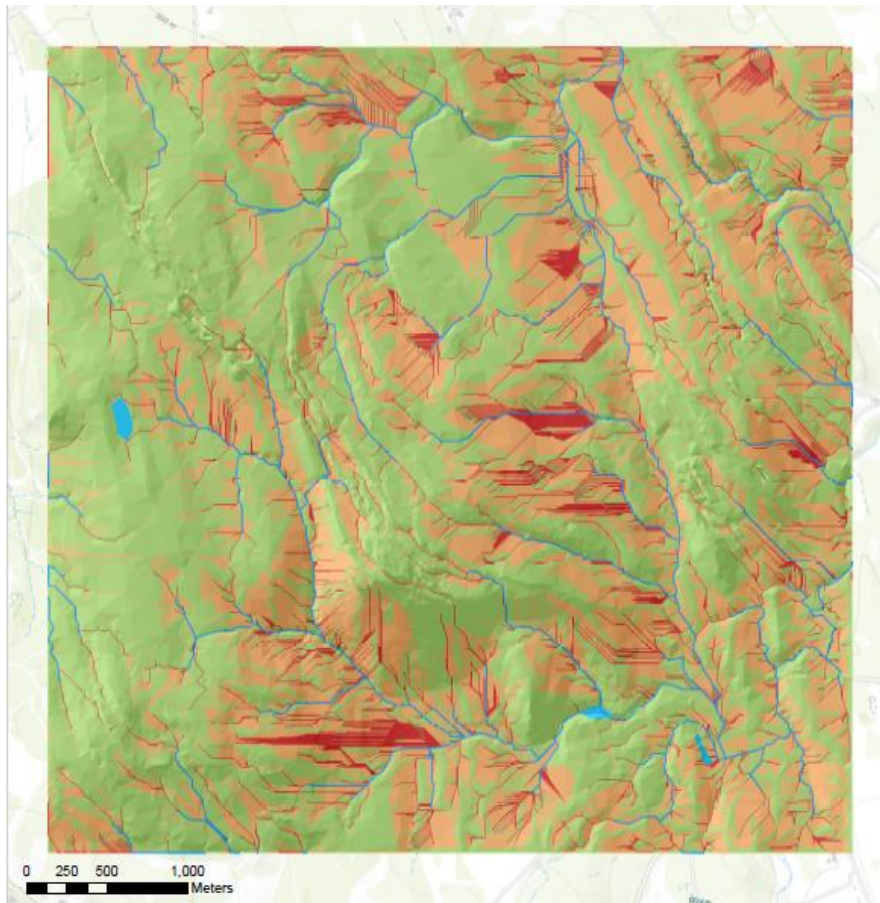
highlights a very similar pattern to that shown in Map 5.7, whereby high levels of phosphorus loads are produced towards the south east and north east of Map 5.7. Some phosphorus production towards the south east could be a result of septic tanks or sewage treatment works in the Greystoke region. However, there are areas where this heightened phosphorus load may be linked to agricultural activity, resulting from agriculturally managed soils and livestock. This, like nitrogen, would have negative consequences for water quality.



Map 5.10: Phosphorus Load Map for Greystoke Area, Cumbria

Map 5.11 shows the phosphorus accumulation across the landscape. Phosphorus has spread from east to west across the landscape, accumulating in some notable places highlighted in red (totalling

5.58%). Therefore, there are significant opportunities for project work to mitigate and intercept phosphorus pollution which can harm the environment.

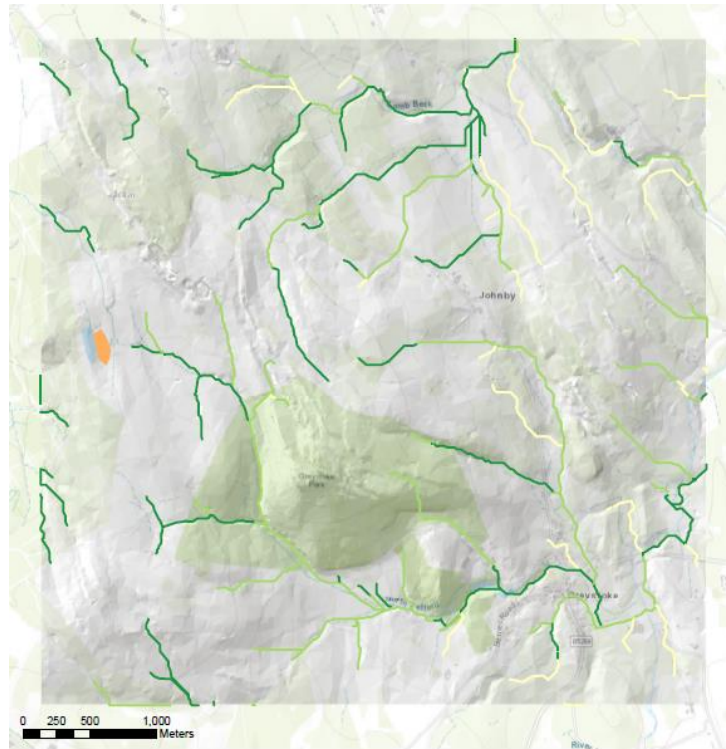


Phosphorus accumulated load (classified)

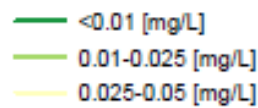
- Low to moderate load (58.29%)
- Accumulated load > 10.0 g P (34.98%)
- Accumulated load > 100.0 g P (5.58%)
- Water Bodies (1.15%)

Map 5.11: Phosphorus Accumulated Load Map for Greystoke Area, Cumbria

Map 5.12 indicates where this phosphorus is concentrated in the water network, a similar pattern is seen in Map 5.9, with phosphorus heavily concentrated in many eastern water sections of the map and dispersing to the west. There is also some evidence of heavy phosphorus concentration towards the centre of the map as well.



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Map 5.12: Phosphorus Concentration in Water Map for Greystoke Area, Cumbria

5.2.3 Ecosystem Services Trade-Offs

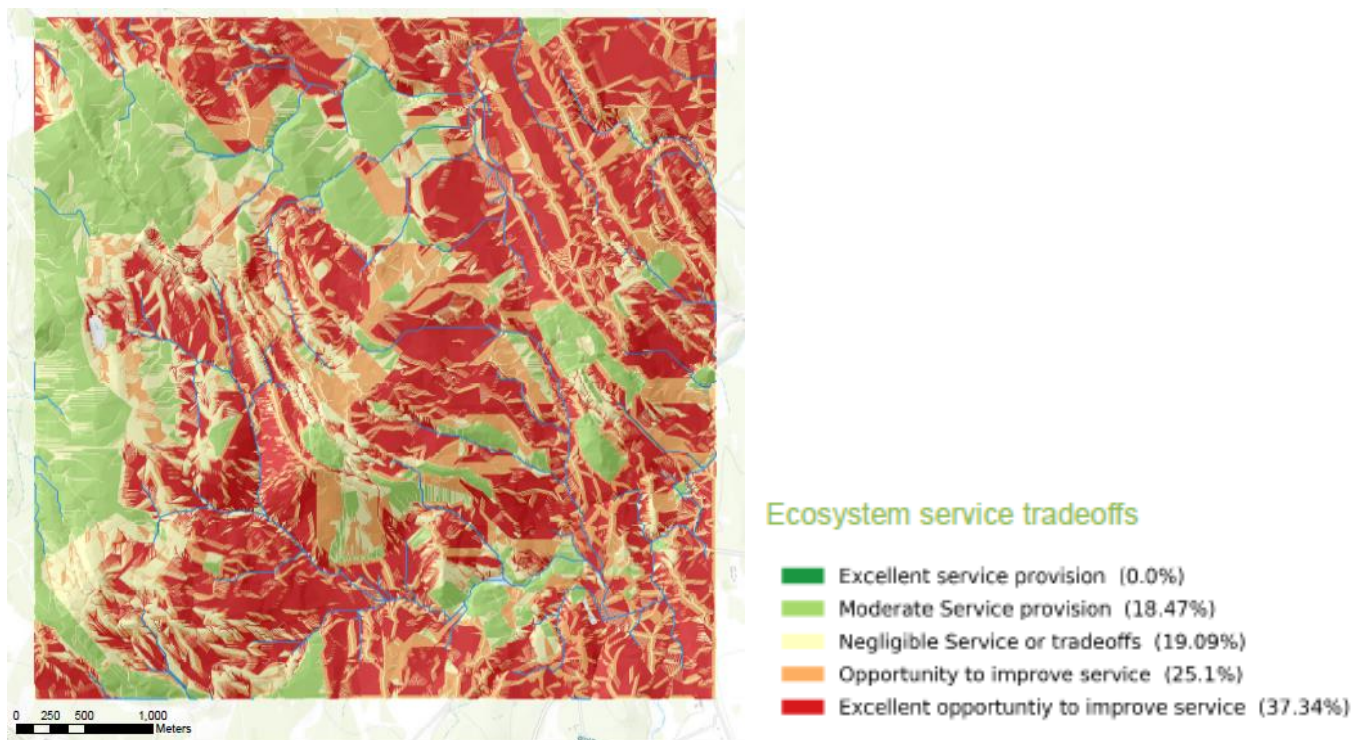
From these maps it is clear to see that through devising a project to improve one ecosystem service notable benefits can be seen for the delivery of others. For example, where agricultural productivity is seen as being low in Map 5.2, under ‘marginal’ or ‘very marginal productivity’ if land was utilised for other purposes, such as afforestation or rewilding, the land could become more efficient at delivering a wider suite of ecosystem services, like carbon sequestration or flood mitigation.

However, it is clear through desk-based research, that when one ecosystem service is prioritised above another, through only examining maps separately, that trade-offs are likely to occur (Sandhu et al., 2016; FAO, 2019). Boyd and Banzhaf (2007) and Degroot et al. (2012) discuss the need for such mapping to be used in policy decision making, to account for trade-offs and the values of ecosystem services which are not often considered in decision making. Lee and Lautenbach (2016)

highlight through their work that a synergistic relationship was common between different regulating services and between different cultural services, whereas the relationship between regulating and provisioning services was trade-off dominated. The scholars provide notable examples of this. For instance, when soil formation regulating service increases, habitat regulating is likely to increase (a synergistic relationship). However, when crop provisioning service increases, habitat and gene pool regulating services are likely to decrease (a trade-off relationship). In the case of PPPs, such ecosystem maps need to be used effectively to understand where ecosystem services delivery could improve. However, caution needs to also be applied to understand trade-offs as identified above. Some examples of ecosystem service trade-offs are discussed below.

5.2.3.1 Flood Mitigation vs Nitrogen

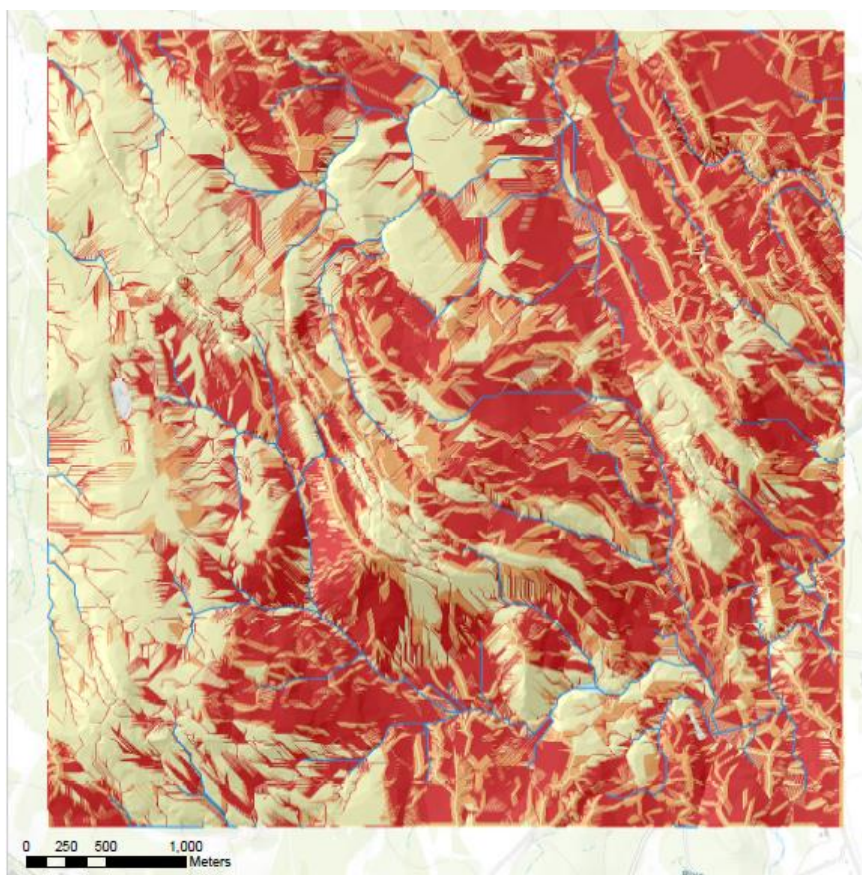
Map 5.13 shows trade-offs and synergies when considering the two regulating ecosystem services of flooding and nitrogen. In some areas there is some ecosystem services provision for both, across 18.47% of the landscape, where synergies between the ecosystem services are happening. However, the map indicates that there is a lot of opportunity to promote both ecosystem services across 37.34% of the landscape. For instance, if a buffer zone or mitigation was put in place along some stream areas it could help to not only intercept flood water and stop flooding but also help to intercept nitrogen run-off before it enters the water bodies.



Map 5.13: Flood Mitigation Vs Nitrogen Ecosystem Services Trade-off Map for Greystoke Area, Cumbria

5.2.3.2 Nitrogen Vs Phosphorus

The second trade-off map considers both nitrogen and phosphorus (Map 5.14). In this case both ecosystem services are not working well together, with 41.02% of the area mapped presenting an 'excellent' opportunity for ecosystem services provision to be improved. If mitigation efforts were made to intercept nitrogen or phosphorous before they reached waterbodies and accumulated further across the landscape this would also be likely to help intercept the other pollutant. This is even more likely as the source pollution for both phosphorus and nitrogen occur in very similar localities on Map 5.14. Therefore, there are opportunities here for the synergies of both ecosystem services to be developed and worked towards, through developing buffer zones to intercept both pollutants.



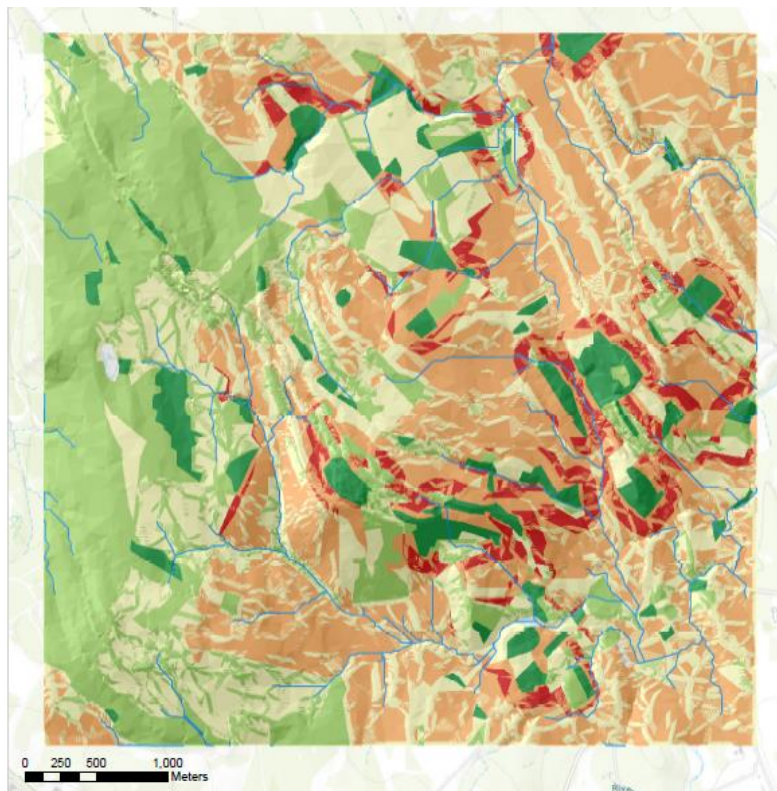
Ecosystem service tradeoffs

- Excellent service provision (0.0%)
- Moderate Service provision (0.0%)
- Negligible Service or tradeoffs (36.66%)
- Opportunity to improve service (22.32%)
- Excellent opportunity to improve service (41.02%)

Map 5.14: Nitrogen Vs Phosphorus Ecosystem Services Trade-off Map for Greystoke Area, Cumbria

5.2.3.3 Flood Mitigation Vs Habitat Connectivity

Map 5.15 presents some of the strongest synergies between two factors seen across any of the Luci models ran. 6.04% of the landscape suggests that 'excellent' synergies have already been realised between flood mitigation and habitat connectivity. This often happens where existing habitat is found near water bodies, as this broadleaved woodland habitat will help to absorb some water from the initial impact of flooding, and overland flow before it reaches water bodies. However, there are opportunities also found where ecosystem services provision could be improved (as shown by orange and red shaded areas). This coincides with some of the pattern seen in Map 5.1 for opportunities to expand the existing habitat, but more so in this map where water bodies are present and located close to woodlands.



Ecosystem service tradeoffs

- Excellent service provision (6.04%)
- Moderate Service provision (25.36%)
- Negligible Service or tradeoffs (31.79%)
- Opportunity to improve service (32.28%)
- Excellent opportunity to improve service (4.53%)

Map 5.15: Flood Mitigation Vs Habitat Connectivity Ecosystem Services Trade-off Map for Greystoke Area, Cumbria

5.2.3.4 Erosion and Sediment Vs Phosphorus Vs Habitat Connectivity

Map 5.16 uses LUCI to compare the trade-offs that could occur from more than two factors, in this case erosion and sediment, phosphorus and habitat connectivity. There are some examples, especially towards the central and western region of Map 5.16 where synergies between the three factors are working well. However, there are noted opportunities to further improve the ecosystem services being delivered, particularly around where there are opportunities to expand habitat where this could help to act as a buffer zone and intercept phosphorus pollution before it reaches water bodies, acting to regulate phosphorus levels.



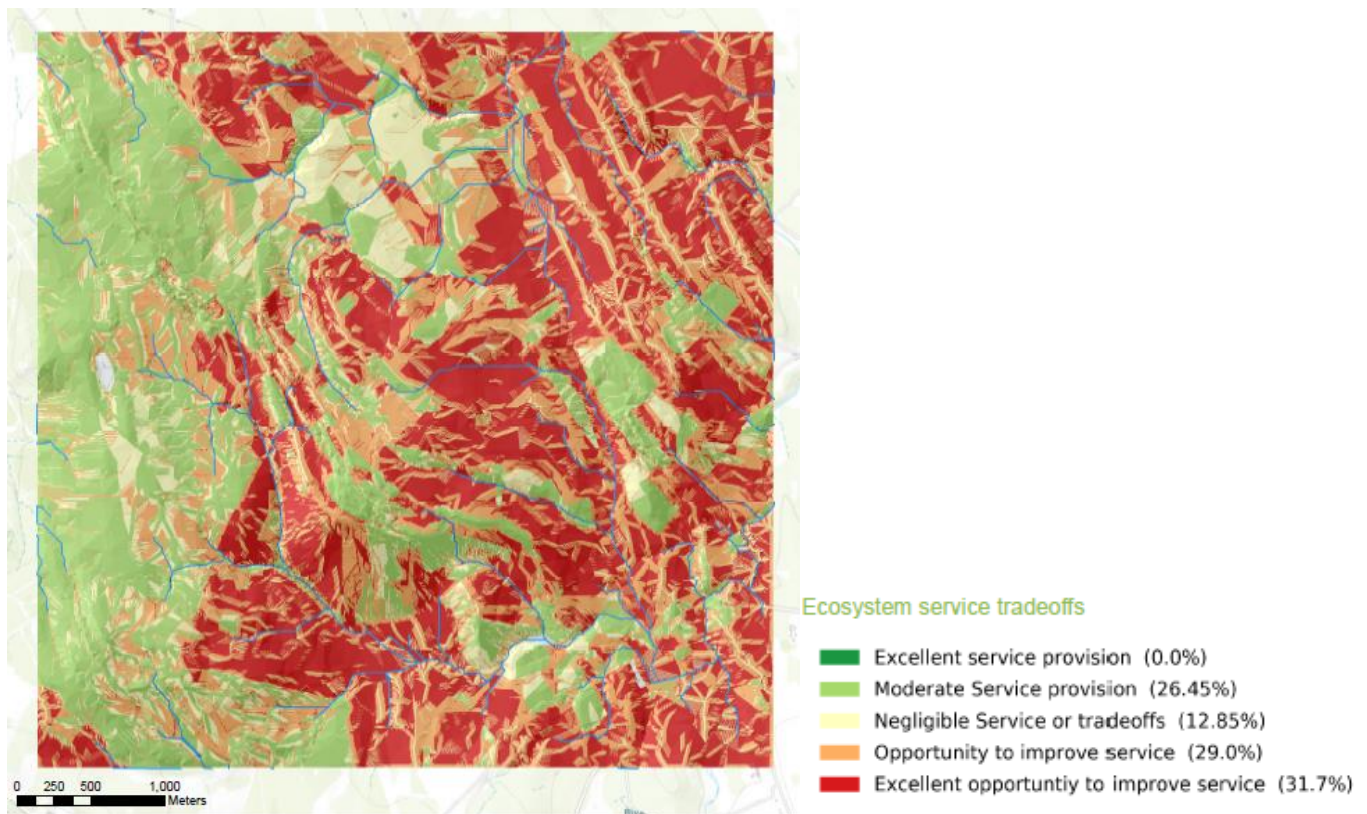
Ecosystem service tradeoffs

- Excellent service provision (0.0%)
- Moderate Service provision (21.72%)
- Negligible Service or tradeoffs (34.43%)
- Opportunity to improve service (36.59%)
- Excellent opportunity to improve service (7.26%)

Map 5.16: Erosion and Sediment Vs Phosphorus Vs Habitat Connectivity Ecosystem Services Trade-off Map for Greystoke Area, Cumbria

5.2.3.5 Erosion and Sediment Vs Phosphorus Vs Habitat Connectivity Vs Nitrogen Vs Flood Regulation

Finally, Map 5.17, looks at many trade-offs between five different ecosystem services and supporting factors. This is a useful map to consider when planning land management strategies, as it helps to show where most synergies could best be delivered to deliver multiple ecosystem services, rather than only examining one or two alone. The eastern part of Map 5.17 is highlighted as an area which could benefit from project work to deliver ecosystem services, particularly as this is where high levels of phosphorus and nitrogen pollution is diffused from, where certain parts of habitat connectivity could be improved and in places where there is also opportunity to improve flood mitigation strategies. Through adopting work which benefits all five factors, synergies between these could be realised, and ecosystem services would be delivered more meaningfully. However, this is clearly at odds with agricultural productivity, as shown in Map 5.2, where the highest levels of productive land will need to be traded in favour of providing this wider suite of ecosystem services presented below. This will lead to a dis-benefit for agricultural productivity but benefits for phosphorus and nitrogen regulation, habitat connectivity, and flooding regulation.



Map 5.17: Erosion and Sediment Vs Phosphorus Vs Habitat Connectivity Vs Nitrogen Vs Flood Regulation Ecosystem Services Trade-off Map for Greystoke Area, Cumbria

5.3 Mapping and its role in Participatory Settings

Participatory mapping enables individuals to contribute towards the creation of a map (Burkhard and Maes, 2017). As discussed in Chapter 3, LUCI's purpose is to be used as a decision-making tool. Therefore, in Chapter 6, the participatory discussions in deliberative workshops surrounding these maps are considered. Participatory mapping and discussions around maps allow mapping processes to be refined further and stakeholders themselves to indicate to researchers where they benefit from ecosystem services, how they value different ecosystem services, and any tensions which can emerge between stakeholders (Reilly et al., 2018). This is particularly useful for encouraging local knowledge exchange, not only in research, but also the partnership approach itself. Farmers will be able to put forth their views alongside other stakeholders, enabling a sense of social capital and trust to be strengthened (Dwyer, 2014). This also, through the critical realist approach, enables abduction to occur, and for the researcher to appreciate the empirical evidence whilst also understanding what is actually happening at the time (Fletcher, 2017).

For instance, Burdon et al.'s (2019) project used this approach in the UK to assess ecosystem services in coastal environments. The study encompassed four sites which represented different landscapes and human involvement within them along the North Sea east coast in England and Scotland. The scholars delivered co-designed and co-delivered workshops in collaboration with local partnerships (namely the Wash and North Norfolk Marine Partnership, and the Humber Nature Partnership through their Natural Capital Vision for the Humber) to ensure that the aims and objectives of the local area were met by the mapping, and relevant stakeholders were identified. The paper goes on to report that stakeholders had interesting discussions around ecosystem services of key interest to them, the benefits that these ecosystem services provide, and a conversation around satellite imagery and the potential of participatory mapping to help shape the agenda of the partnership. This resulted in a number of key similarities to emerge, alongside contrasting opinions, which the partnerships could use to develop their work going forward.

Through the use of maps in deliberative workshops, and a participatory discussion and consideration of opinions from different stakeholders, the empirical evidence in this Chapter can be discussed, enabling key strengths of local knowledge to be incorporated and a more robust methodology to be advanced and triangulated. This will enable trade-offs to be better understood and the CLNP to consider how they can better work towards their vision of promoting several ecosystem services.

5.4 Conclusion

PPPs, like the CLNP, should be able to deliver several benefits for delivering ecosystem services, enabling a reduction in deficits surrounding regulatory, implementation and participation in project development (Haas, 2004). For these PPPs to deliver these benefits they first need to understand what specific interventions can be targeted where to enable the largest benefits from ecosystem services delivery to occur (Verhagen et al., 2016). One approach through which current ecosystem services supply can be understood is through an ecosystem services mapping approach, as detailed within this chapter. Within the CLNP boundary, Greystoke was used as a localised example for mapping work with the model LUCI, to further understand some of what the CLNP *should* be doing to deliver ecosystem services across the landscape. Maps were produced on habitat connectivity, agricultural productivity, flood regulation, erosion and sediment, nitrogen, and phosphorus, to highlight where project interventions could target specific areas of land to gain benefits for the delivery of ecosystem services. Trade-off maps between these ecosystem services and factors which influence ecosystem services were then created to highlight areas where synergies between ecosystem services could be targeted in project work to create the most meaningful impact for the delivery of ecosystem services, whilst also considering in some of these maps the beneficiaries of the ecosystem services, an important part of the blueprint for mapping which Cornell et al. (2013) advanced. In the case of these maps, most areas of targeted delivery were needed across agricultural land to the east of the map which was found to also be highly agriculturally productive.

The next chapter will present the empirical and abductive findings from the interviews and deliberative workshops, setting out an analysis of what happens in practice within LNPs, through a participatory discussion around the mapping in this chapter. It will again draw upon the case study example of the CLNP to highlight key themes around stakeholder involvement (e.g. power relations and local knowledge), governance (e.g. partnership development) and the response of participants to the issues raised by the ecosystem services mapping and ecosystem services trade-offs.

Chapter 6

Partnership Approaches in Practice

“In theory, a win-win!”

Participant, Deliberative Workshop 2

6.1 Introduction

Chapters 4 and 5 highlighted how PPPs *should* work in practice from findings associated with desk-based research and ecosystem service mapping. This chapter outlines the results from the qualitative research phases which aimed to investigate stakeholder perceptions around how PPPs *actually* work. Through a series of interviews and deliberative workshops with policy makers, LNP representatives and farmers, this chapter documents what partnerships need to work. Whilst outlining the prerequisites for a successful partnership approach, the chapter will also present critical findings, through a process of abduction, suggesting that current partnerships do not always function in the way that they should. This chapter is constructed around the key themes of: who needs to be involved (linking to partnership development); the roles and responsibilities assigned to different stakeholders (which can influence power relationships); the risk distribution amongst partnerships, management and governance within the partnership (which can also determine what benefits and challenges PPPs face, including whether local knowledge is utilised or not in partnership approaches). These themes are then drawn together and viewed through the lens of the specific case study example of the Cumbria Local Nature Partnership (CLNP). Summary characteristics of a well-functioning PPP approach are presented in the conclusion.

6.2 Appraising the Public Private Partnership (PPP) Approach

This section presents findings from the qualitative research from both interviews and deliberative workshops. As discussed in Chapter 3, the individuals involved in the research were policy makers, farmers, and those involved in the running of LNP approaches. A total of 23 interviews were transcribed and coded, whilst two whole day length deliberative workshops had notes scribed, summarised, and coded. From these codes key themes emerged, such as ‘financial’ or ‘nature’, which are discussed in the following sections. Policy maker interviews are denoted by a P, with farmers a F, and those involved with LNPs a L. Deliberative workshops are sometimes denoted with ‘DW’ followed by the workshop number.

6.2.1 Factors associated with the phrase PPP in Deliberative Workshops

At the beginning of the deliberative workshops, participants were also asked to share their thoughts on the meaning of the phrase PPP using post-it notes on a brainstorming sheet (see figure 6.1). Some workshop attendees mentioned the vagueness of the term, and that they were not sure of what it meant. Others spoke of the mix of interests involved within a PPP under an agenda of cooperation. For example, the government, local authorities and government bodies were often seen as the 'public' sector within a PPP approach, with businesses representing the 'private' sector. The exact stakeholder composition of who should make up a PPP will be explored in greater depth in Section 6.3.

Some workshop participants also went beyond outlining the purposes of a PPP and strengths to also highlight several challenges with a PPP approach, around governance and management within the PPP approach, where collaboration can be both good and bad. In deliberative workshops some participants highlighted that the causes behind these challenges may include competing objectives, disinterest from certain stakeholders when considering the partnership's agenda, and a lack of funding. Words such as "secrecy", and "conspiracy" were also noted on the post-it notes in the first deliberative workshop around what PPPs are and involve. These challenges and the governance of PPPs will be explored in more detail in Section 6.6.

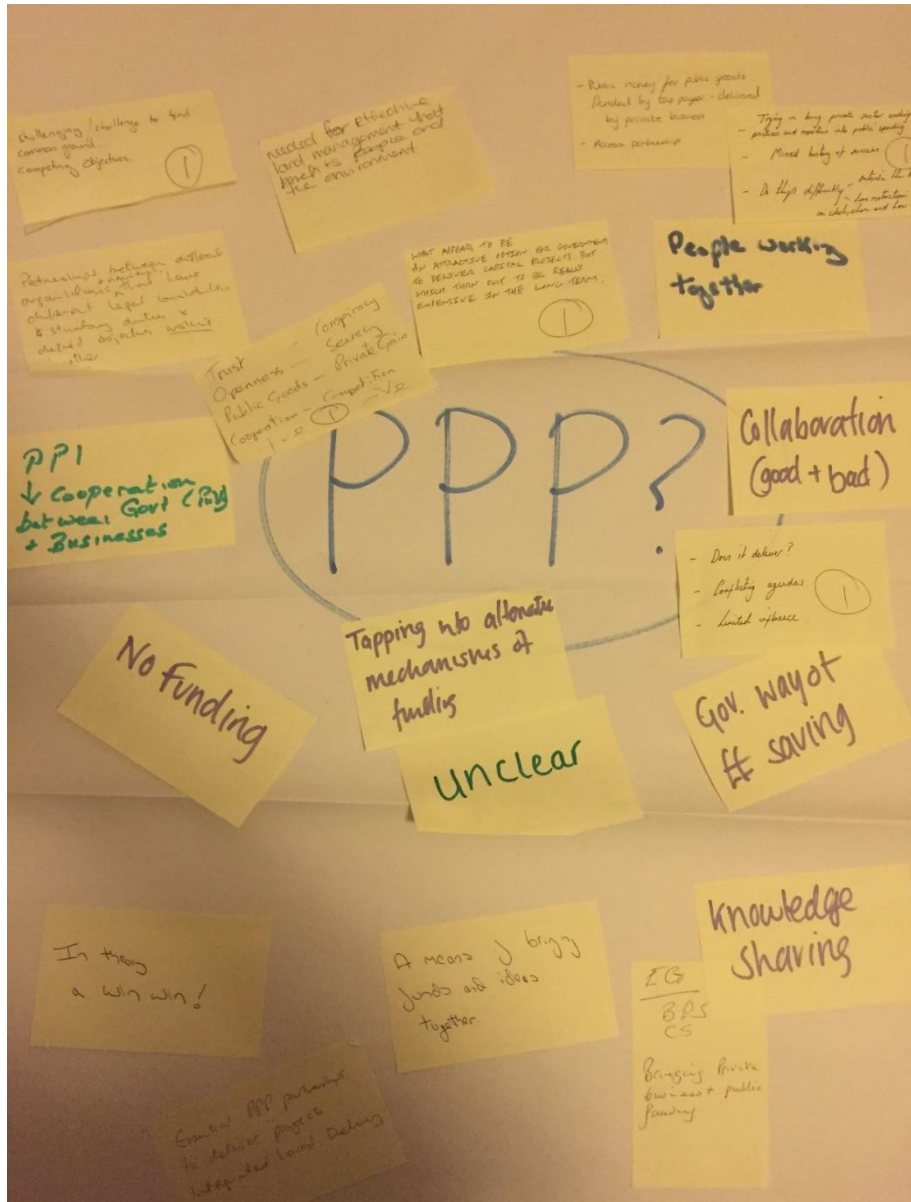


Figure 6.1: Opening Deliberative Workshop post-it note activity on the meaning of the term 'PPP'

6.2.2 Collating Common Themes

Figure 6.2 below collates the key words from definitions and thinking around PPPs from interviews and deliberative workshops. The most common words to be used multiple times are highlighted in a larger text size than those used the least. It is clear from the diagram that both the public and private sectors were mentioned as key stakeholders many times, with the government being highlighted within the public sector as important in directing the PPP approach. Common themes also emerged around PPPs collaborating and sharing resources, such as funding. However, confusion surrounding the term, was also noted. This led to some research participants drawing upon some of the challenges associated with the approach, around financing and unequal power dynamics

individual partnership. Therefore, a wide variety of stakeholders from different sectors were argued by interviewees and workshop participants to be needed within a PPP approach.

6.3.1 Why partnerships include Multiple Stakeholders

The LNP model has 47 different partnerships across the UK (Defra, 2014). Each LNP has different individuals involved, from across the public and private sector, who were found to work together for several reasons. During interviews, questions were asked around why it was important for multiple stakeholders to work together in partnership approaches. One interviewee involved with a LNP stated that these individuals, often aim to work towards a shared vision. As the LNP landscape is so diverse, each LNP contains several stakeholders with different skills and expertise that can contribute to project delivery. Whilst one partnership may have “a strong focus on the health and wellbeing agenda” (Interviewee L3), others may have objectives which align more closely to providing ecosystem services within “farming and tourism” (Interviewee L5). Such differences in partnership objectives signify the complexity of using PPPs as a phrase, as each PPP can have different agendas and involve different stakeholders, which research participants noted in section 6.2. LNPs would, therefore, need different stakeholders who have the “expertise to advance individual projects, as individual project delivery is often carried out by individual members of the board who specialise in that field, for example, the National Trust” (Interviewee L5).

6.3.2 Role of the Private Sector

The criticality of private sector involvement was a key theme throughout the research, highlighting that what the theory and extensive desk-based research suggested may not be the same in practice. This would lead critical theorists to question the initial theories proposed around PPPs and consider alternative realities. In terms of the LNP board makeup, many stakeholders involved in the implementation of such partnerships felt that the LNP “need[ed] to definitely engage more private investors” (Interviewee L4). Many interviewees spoke of the need to encourage private sector involvement in LNPs, particularly as the LNP is “viewed as a self-sustaining partnership” (Interviewee P3), which financing and a combination of voluntary labour to make the partnership approach work. Interviewee L1 described how by working “with private stakeholders and not against them” Gloucestershire LNP was able to successfully implement a number of proposals to enhance certain ecosystem services along a new planned stretch of motorway to run through the Cotswolds, including carbon sequestration and other factors which can promote ecosystem services, like biodiversity. They did this by

“working with private business involved with the LEP ... [and saying that they] were happy for the motorway to go ahead but only if there were some environmental features, like wildflower plantations, and wildlife corridors across the motorway installed”.

(Interviewee L1)

LEPs are partnership approaches that comprise several businesses and private sector organisations, that work together to promote economic development in local areas. As discussed in earlier chapters, the LNP was created to work alongside the LEP, to share knowledge and resources to promote the natural environment. Such examples highlight that private sector involvement is key, especially for certain roles, such as financing the delivery of ecosystem services, and shared responsibilities amongst stakeholders within the PPP approach, as discussed in section 6.4. Without private sector involvement it was argued that the financial viability of partnership approaches was undermined.

Reasons were elicited during the interviews which indicated why the private sector may not be involved in such PPP approaches. The difficulty in attracting private partners into partnerships within the environmental sector comes from a perceived “inability of individuals to speak in business language” (Interviewee L9). Indeed, one interviewee in a senior position on an LNP board stated that their LNP “tried to call the LEP and explain what we were doing, but we had the phone hung up on us multiple times” (Interviewee L6). This interviewee felt that they were not initially listened to by the LEP, as the LEP did not know who the LNP were and did not understand the environmental concepts which the LNP was trying to put forward. The use of language was considered important by research participants because “if [across sectors and between partnership partners] we are unable to speak and understand one another then there will be no progress on looking after the environment” (Interviewee L5).

Where there is a lack of private sector involvement, it was discovered that several consequences for the PPP approach can arise. Where LNPs have become ‘silent partnerships’ (i.e. a partnership in name, but one where stakeholders or partnerships are not actively involved in delivering projects), it is often related to a factor associated with “limited private involvement ... with more and more people dropping off and not attending meetings, when they couldn’t see a direct benefit to them attending” (Interviewee L7). A policy maker, who was a stakeholder involved with an LNP board, stated that “there wasn’t much point” to them attending meetings “if other key influential people, from businesses and so on, don’t make the effort then the progress the partnership is going to make is not going to be as good” (Interviewee P6). Hence, more work needs to be done to communicate the potential of a PPP approach in the environment to potential private sector partners, especially as

interviewees indicated the threat to the functioning and viability of the PPP approach if relevant private stakeholders are not involved.

6.3.3 Role of the Public Sector

Public sector involvement was also important, according to interviewees. When asked about why the public sector should be involved, one interviewee involved in policy making stated that “the public sector should ensure the partnership is able to provide the public goods which society wants”. Other interviewees shared this sentiment, with policy makers and other LNP implementers sharing thoughts around the need for the public sector to provide direction on setting the agenda towards which the LNPs should be working. Interviewee P4 stated that

“the original direction for the LNPs came from the Natural Environment White Paper, which the government produced, this helped set the agenda for the public sector to engage in partnerships to deliver ecosystem services and help guide the direction the partnerships should be taking”

Other interviewees also outlined the importance of public sector involvement in PPP approaches. This importance was in regard to the skills and expertise public sector organisations could offer, not only the direction they provide, with one policy maker saying that

“many of these organisations have key individuals with specialist expertise in science or policy delivery, not only with experience in one geographical region, but across the country ... such technical skills can help with the delivery of ecosystem services which farmers or niche businesses may not be aware of”.

(Interviewee P3)

The majority of the LNPs consulted for the research have been disappointed by the public and governmental support they have received. Interviewee L7, explained that the whole idea of the LNP could be compared to, “being a bit of a Jekyll and Hyde ... as there’s not been much real direction from Defra [government]”. Where LNPs have been able to do well, is when they have “narrowed our [their] own agendas down into one or two main themes” (Interviewee L5). This enabled LNPs to focus more specifically on their strengths and targets as opposed to trying to cover as many ecosystem services as possible. Although, examples such as Lincolnshire LNP seem to imply otherwise, “we have local authority funding and four full-time council staff employed, with key priorities for the work we need to do clearly defined” (Interviewee L8), suggesting that this partnership has had a good level of involvement from the public sector and direction from local authorities which other LNP examples may not have benefitted from. This indicates that there is differing levels of guidance and support from government and local authorities between LNPs.

As a result, Lincolnshire LNP is one of the best performing LNPs across the UK (as judged by the Environmental Audit Committee, 2014), with deliverable outputs and a functioning partnership. Thus, public sector partners should be involved to ensure that the public goods and ecosystem services being delivered by these partnerships are directed in such a way to ensure that the desired outcomes of partnership approaches are met and that multiple stakeholders are able to work together effectively, as interviewees have presented the case for. Currently, a lot of this role is taken on by representatives from the third sector, such as the Wildlife Trust, as will be discussed in the next section.

6.3.4 Role of the Third Sector

According to interviewees, representatives from third sector organisations, such as the Wildlife Trusts, take on a lot of the direction and organisation of LNPs. When asking different LNPs about who they felt provided the most resources and/or time to the partnership many spoke of third sector organisations. Whilst third sector organisations were argued to be not considered clearly within PPP structures and the models already in existence, “they [the third sector] have perhaps one of the largest roles to play in the running of LNPs at the moment” (Interviewee L2). Third sector organisations are often able to offer “the time, expertise and enthusiasm to deliver on projects” (Interviewee L2) within partnerships. Interviewee L3 explained that “organisations, like the Wildlife Trust and National Trust, often work in the LNP helping to provide rooms, act as a secretariat for many LNPs and bring people together to discuss partnership agendas”. Time and interest in ecosystem services were given as key reasons behind why the third sector should be involved in PPPs. Some participants within an LNP considered these organisations to be the most active and that without the involvement of these organisations that many partnerships would not be able to function as effectively as they have been able to.

6.3.5 Role of Practitioners

Finally, a multitude of practitioners who can deliver these ecosystem services must be involved in these PPPs, i.e. the farmers and landowners themselves, as indicated by several interviewees, such as Interviewee F2, who argued that

“if farmers are not included in decision making, they are likely to not want to be involved with project work. Given that farmland covers most of the area [of Cumbria] it is important that farmers are onboard with the aims of partnerships, otherwise progress to deliver the ecosystem services needed won’t be as great”.

Farmers also alluded to their deep connection to the environment and their willingness to deliver ecosystem services, “for us farmers, nature’s in our blood” (Interviewee F6). Local knowledge exchange was also a key theme that emerged as a reason for their inclusion, as it was argued by farmers that they knew the landscape better than anyone else, with historical knowledge being passed down through several generations.

Yet, a policy maker, who represented a farming body, suggested that these LNPs are not as relevant for farmers as other PPP examples, “I stopped showing up, I couldn’t see the direct value to my time of being there, it didn’t seem like there was much of a focus on farming”. Similarly, many farmers during interviews and the deliberative workshops had never heard of the LNP before. Therefore, whilst boards have farmer members, it could be inferred that farming is an objective in name but not in practice. One person involved with an LNP, Interviewee L9, stated that they felt “there ha[d] not been as much involvement with farmers as there could have been ... farmers need to be involved as these are the private landowners who deliver ecosystem services, yet many won’t be aware of the LNP”. Whilst LNPs do feel “committed to working with farmers and expanding this area of work” (Interviewee L3), some LNPs “do not know how to without being interfering with other partnerships’ objectives” (Interviewee L8). This is one reason why some LNPs wanted more direction from the public sector and government, to guide this relationship with the agricultural sector, as discussed in section 6.3.3.

6.3.6 Key Stakeholders to be involved in PPP Approaches

In this section, the findings from deliberative workshops are discussed. Interviews indicated that both public and private individuals and organisations are needed for PPPs to effectively function in delivering ecosystem services, alongside the third sector. Partners need to have expertise relevant to the partnership aims and be committed to achieving the same goals as others, as well as being able to speak a common language. These issues were highlighted in both the interviews and deliberative workshops, with participants citing specific issues around organisations sitting apart from one another - in separate silos - particularly regarding the division between conservation groups and farmers, with no individuals to bridge the divide (DW1). It is important that there is a mechanism to bridge this divide and bring the correct partners together. This issue was addressed within the deliberative workshops and the data collected during these events provided insight into the key stakeholders that participants felt should be included in PPPs, as shown in Figure 6.3.

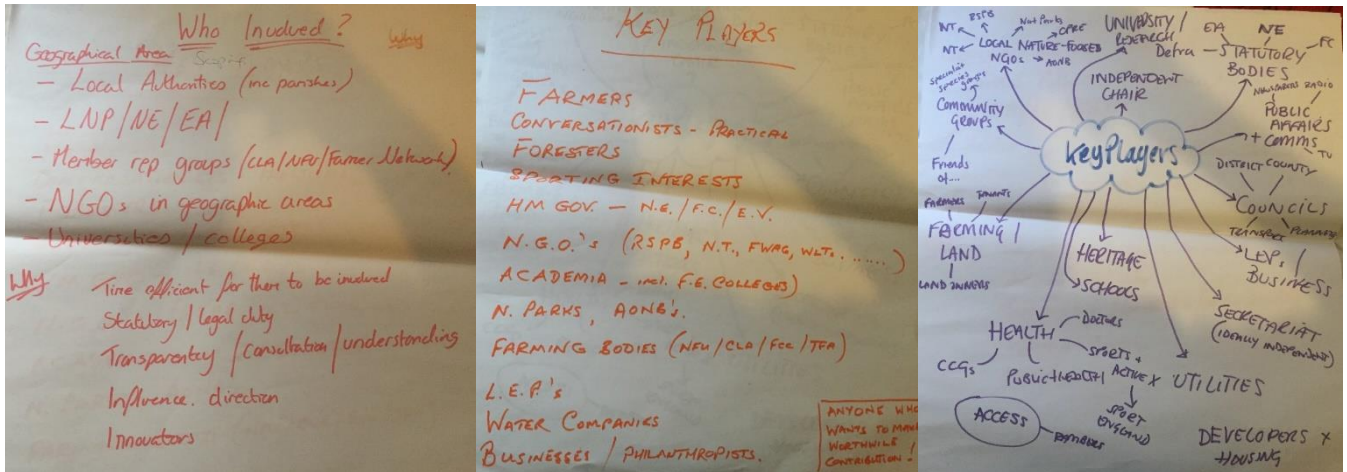


Figure 6.3: Deliberative Workshop discussions around the Stakeholders needed within a PPP

Key public sector organisations highlighted by the participants included local authorities or councils, universities and colleges, the healthcare sector, and public affairs organisations, as each of these organisations had expertise related to different ecosystem services. Private sector organisations were identified as water companies, philanthropists and relevant businesses, developers and housing companies. A large third sector participation was also suggested, with local Non-Governmental Organisations (NGOs) being involved, for instance the Wildlife Trust, National Trust, and the Royal Society for the Protection of Birds (RSPB). Each of the three sectors could also contain stakeholders from other partnership approaches, such as the Local Enterprise Partnership. Finally, the agricultural community themselves and agricultural bodies were noted down as the practitioners to carry out such ecosystem services delivery projects, including the need for farmers and farmland, farming interest representative groups such as the National Farmers Union (NFU), Farmer Networks, and The Country Land and Business Association (CLA).

Reasons given for this included the time that these organisations have available to be involved, the understanding that these stakeholders have around the delivery of ecosystem services, their ability to be able to influence the direction of the partnership and the creativity and innovative potential of stakeholders to assist with project design to deliver ecosystem services. In some cases, it was argued that stakeholders have a legal duty to be involved, and that these stakeholder groups would work well together and enable PPP goals to be met. These reasons were similar to those raised within the interviews.

Deliberative workshop participants were also asked to map out these various organisations onto a PPP spectrum diagram, designed to reflect and interrogate the diagram presented in Figure 2.6. Participants positioned each organisation as to the sector - public or private - stakeholders' interests

most aligned with. The results of this exercise are shown in Appendix 13. Many organisations and stakeholders were named. These included those from the private sector, including the Cumbria Farmers' Network (CFN), which comprises "multiple farmers from around Cumbria representing the farmers' interests and private landowners in the local area" (Interviewee F1). Furthermore, some third sector organisations were named, including national parks and the National Trust, who were viewed by some to have aims that benefit the entirety of the UK and offer open accessibility to nature and the environment for the public to enjoy (DW1). However, a policy maker in DW2, noted that it was very difficult to position third sector organisations on this spectrum, as the PPP model does not seem to consider the third sector at all. Whilst individuals did note down many third sector organisations, such as the Wildlife Trust, RSPB and the Rivers Trust amongst others, there was no clear place on the spectrum for these stakeholders to be positioned.

6.4 Power Relationships between Stakeholders

Different stakeholders take on several contrasting roles and responsibilities within a partnership approach. Roles and responsibilities need to be defined clearly, given the number of competing interests and diversity of sectors that may make up a PPP, as evidenced through literature and interviews. For instance, Burawoy (1998) spoke about how inherent within institutional structures, various individuals will take on different roles and responsibilities which will create a division of labour, in turn, causing a series of power differentials to emerge between different stakeholders. Thus, whilst the entire partnership must be responsible for preparing a development strategy and the selection and co-funding of projects initiated by local stakeholders that will deliver the strategic objectives (Goldman et al. 2007; Reed et al., 2014; DeWalle et al. 2015) the critical realist perspective, through abduction, needs to understand whether this is actually happening in practice. This will then allow for retrodiction in regard to power relationships in Chapter 7 to be discussed.

6.4.1 Addressing the Ecosystem Services Local Nature Partnerships (LNPs) are to deliver

It was argued by interviewees, that before assigning roles and responsibilities, partnerships should carefully consider the aims and specific ecosystem services they seek to deliver. This may be undertaken by a consultancy or be considered by academics or universities, if these stakeholders are involved with the partnership. For example, the CLNP "commissioned an independent mapping report into three river catchments, in order to further understand the current state of ecosystem services and where our [the LNP's] actions should be targeted" (Interviewee L5; see Holt (2017)). This enabled the LNP to "decide on a number of projects related to the flooding agenda in Cumbria, with several of our [the LNP's] members spearheading individual programmes" (Interviewee L5). Using evidence-based data collection and analysis it was possible for the LNP to establish a clear set

of objectives alongside roles and responsibilities for its different stakeholders. This reinforces the importance of mapping approaches for decision making put forth in numerous academic studies (Boyd and Barawal, 2007; de Groot et al. 2012; Collinson et al. 2013). The responsibilities these different sectors have in relation to the running and structure of the partnership are discussed in the following sections.

6.4.2 Private Sector

The private sector was understood to have most responsibility for “financing projects” (Interviewee P1) as discussed in section 6.3.2. This could lead to nested hierarchies of power differences (Ostrom, 2005), whereby private sector organisations can “direct an agenda whereby economic concerns are also considered against environmental and social concerns in projects” (Interviewee P5). The argument from research participants was that, in theory and empirically, this “should lead to greater efficiency and effectiveness at the project delivery level” (Interviewee P3). However, this is not always the case, as Interviewee P7 stated that in actuality “often both sides are not in discussion with one another due to a lack of understanding of priorities and responsibilities on both sides”. In relation to power, deliberative workshop participants argued that this could lead one stakeholder group to direct an agenda and alienate the other sector/s. Interviewee P6 continued to say that “as businesses are concerned with economics, as are farmers, whereas environmental and public organisations are more concerned with the environment and at the moment there is no middle ground”. This means that “business involvement in the LNP remains limited”, as a lack of consensus on aims and objectives is reached (Interviewee L8). For some LNPs and PPPs this has meant that they have become “sleeping partnerships” (Interviewee L7).

6.4.3 Public Sector

Public sector organisations were found instead to be important for providing direction and guidance for the partnership (DW1, DW2), as discussed in section 6.3.3. However, in the case of LNPs, many partnerships have felt that this role is not being adhered to. For example, Interviewee L7 described the LNP as a “bit of a Jekyll and Hyde ... as there’s no real direction from the government on what we should be doing”. It has often been “left up to the LNP ourselves to decide what to do” (Interviewee L9).

Many LNPs feel that they would like “local authorities and the government to become more involved in the work which we [the LNP] are doing” (Interviewee L6). Local authorities and government are argued to be important for direction, as LNPs argued that they had “no real sense of whether what [they were] doing [was] right or wrong” (Interviewee L7). Often, it was argued in deliberative

workshops, that the third sector take on the most responsibility and power in relation to the setting of an agenda in actuality, going against what some empirical studies would suggest.

Although, it is important to note that in other LNPs the public sector is heavily involved in directing and leading partnership approaches. For instance, Interviewee L5 described their LNP as “being spearheaded by the local council, who have four full-time officers to take on the majority of work involved in the running of the LNP”. This has meant for the LNP that they “don’t have to worry so much about funding or direction, as people are employed to work for the partnership, rather than working on a voluntary basis, and much more work can be done”. Where this does not happen, one LNP found themselves

“not functioning very well anymore due to the local (conservative) government not taking an interest in the environmental work at the time, which led to more and more members not attending meetings, as they thought well if the local council can’t be bothered to turn up why should we?”
(Interviewee L7).

Interestingly, this raises questions about the effectiveness of PPPs for the delivery of ecosystem services and whether or not farmers’ (or indeed other stakeholders’) engagement, trust, and interest in LNPs can be encouraged from communication with government officials and the scientific community. This is a similar concern to those raised by Wynne (1996) in the Lake District, and McCracken et al. (2015) regarding failures observed within AES schemes where farmers are not engaged.

6.4.4 Farmers and the Third Sector: Incorporating Local Knowledge

Interviewees argued that farmers should have the primary role of responsibility for looking after nature and delivering ecosystem services. In the deliberative workshops, farmers were also seen as being the key to knowledge, with particularly strong views expressed about this at the second workshop where a greater number of farmers were represented. There was unanimous agreement within the workshops that farmers need to be consulted before ecosystem service mapping is carried out, as farmers were argued to have more knowledge than any dataset, at the farm-site level, passed down through the generations. Therefore, farmers were considered to have two key responsibilities as (i) knowledge holders to be consulted within a partnership and (ii) stewards of the environment. The farmers interviewed for this study were found to have a close relationship with the environment, as can be seen in the following quotes: “Aye, I think the environment is important” (Interviewee F1); “the majority of farmers (you do get the odd bad one mind) really do look after their land and work hard to look after the environment” (Interviewee F5); “the environment is

probably the most important thing and part of work that we [farmers] do these days” (Interviewee F7). Thus, farmers recognise that they an important role to play in delivering and carrying out the practical work needed to deliver the ecosystem services to be provided (Yoshida, 2018).

However, farmers and policy makers believed that there were conflicts emerging, placing the role of the farmer in PPPs at odds with the third sector, “the input of organisations [within the third sector] ... could be working to put businesses and farmers off from participating in them” (Interviewee P6). This interviewee, involved in natural capital policy, explained that “with so many voices in a partnership, the challenge comes from conflicts over agendas ... if one party is more vocal than another it can lead to some groups of people, e.g. farmers, feeling alienated”. This was echoed by interviewees from the farming community, stating that there was “disenchantment with environmental organisations” (Interviewee F3) amongst many farmers. Another interviewee explained that “all the time, we [farmers] are not listened to, we know our land the best, we [farmers] have been farming here for generations ... in the past, we’ve told X organisation that what they’re asking us to do wouldn’t work, but do X listen? No!” (Interviewee F5). There is a clear mismatch between what farmers should be doing in a partnership and the role of environmental organisations, with these competing agendas and viewpoints meaning that some views are prioritised above those of others (Ostrom, 2005; Thompson, 2018). This was raised as an issue by both interviewees and at the first deliberative workshop. This causes what one policy maker termed a “mismatch of power” (Interviewee P1), which can place an individual’s subjective own agendas above those of most importance, and create a division of labour within the partnership (Burawoy, 1998). For instance, one LNP was found to focus “more on health as opposed to other ecosystem services due to [their] chair’s own interests” (Interviewee L3). This mismatch of power is not easily found in empirical studies, it is only through abduction and more intensive research methods, through the use of critical realism, that this can be understood in greater depth.

6.4.5 Overcoming Responsibility Sharing Dilemmas

The perceptions of what each sector and organisation should be doing within the partnership and power dynamics meant that in actuality such perceptions did not always equate to the perception some stakeholders had of what they should be doing. For instance, one member of an LNP board stated, when responding to a request to take part in the research, “I’m not sure how I can be of help, as I don’t know what the LNP is”, despite them being named on the LNP board. Furthermore, as another interviewee stated, “some members on the [LNP] board are doing more work than others, some people don’t turn up to the meetings and so on as much ...” (Interviewee L6). This indicates an “imbalance in what some do compared to others” on the LNP board (Interviewee L5). Whilst

previous results from Chapter 4 indicate clear, distinctive roles for various sectors to play in the workings of a PPP approach, there is some confusion amongst individuals within an operating and real-world partnership as to their roles and responsibilities and not all the sectors do always perform tasks to as great an extent as another. An individual who acts as secretariat on an LNP board referred to “a lack of direction from the government”, which could explain this mismatch between LNPs. Some potential solutions to these issues (drawing upon participant perspectives from the deliberative workshops) are presented in section 6.6.

6.5 Proportion of Risk applied to different Stakeholders

Risk sharing is one of the principles identified as being important to the functioning of the PPP approach. With the division of roles and responsibilities also comes a proportion of risk which is shared between individual partners. It was argued by a policy maker that this risk should be shared equally between the public, private, and third sectors under the concept of a PPP. This point was furthered by an individual working on a LNP board, who argued that risk is shared, but that this was done in relation to the responsibilities each stakeholder had. Within the LNP approach,

“individual partners take on the responsibility for leading specific projects relevant to their own area of interest and as such take on the full risk for that work ... for example, the Wildlife Trust in Cumbria led a project called ‘Meadow Life’ under the banner of the LNP, fully securing funding for this and running the project with farmers”

(Interviewee L6)

Despite risk ideally being shared equally, occasionally it was found that certain partners take on more risk than others. In interviews, farmers argued that they take on some of the largest risks delivering ecosystem services, as they depend on delivering ecosystem successfully for their livelihoods. One farmer argued that “farmers get rewarded very little for the work that they do, particularly if they are a smallholder farmer” (Interviewee F4). Thus, the risk associated with farmers carrying out these activities is critical, as they economically depend on being able to deliver ecosystem services. It would, farmers argued, potentially lead some to become disenfranchised from engaging with PPP work if they could not observe a financial benefit to doing so (see: Yoshida, 2018).

Besides farmers, some people involved in the LNP approach argued through interviews that this means that “an investment of time, energy, resources” could be “risky for a specific organisation or person if they invest over and above other partners” (Interviewee P8). In some LNP examples, certain partners “simply aren’t interested in working on the board” (Interviewee L7). This could result in “some sectors being disproportionately represented above others and thus, some sectors

also taking on more risk” (Interviewee P8). Rather than an equal sharing of risk, it seems that partnerships work often on an unequal division of roles and responsibilities which is reflected in the risk which each individual partner takes on, corroborating the results presented in sections 6.3 and 6.4, and leading to further power differences between stakeholders. This may be related to “the government’s agenda of devolution of powers, which gives more policy making control back to local areas, and steers risk away from the public sector onto the private sector” (Interviewee P5). However, this risk “is not as equally spread as it may seem” (Interviewee L9). This led to words such as “unfairness” and “conspiracy” being used by participants at the second deliberative workshop (as evidenced in Figure 6.1), resulting from what one participant described as “unequal project outcomes, agendas and those who hold the most risk”.

6.6 Governance and Management of PPPs

6.6.1 Considerations for the good Management of PPPs

If a PPP is well managed, with roles, responsibilities and risk being shared equitably, there can be several strengths which can accompany the model. Several strengths of the PPP approach discussed in deliberative workshops are illustrated by Figure 6.4. For example, strengths as discussed in deliberative workshops, included the sharing of ideas, which can lead to new creative and innovative ideas for projects. Additionally, the ability to distribute responsibility effectively amongst stakeholders, have a clear focus, and make sure that time and resources are used well.

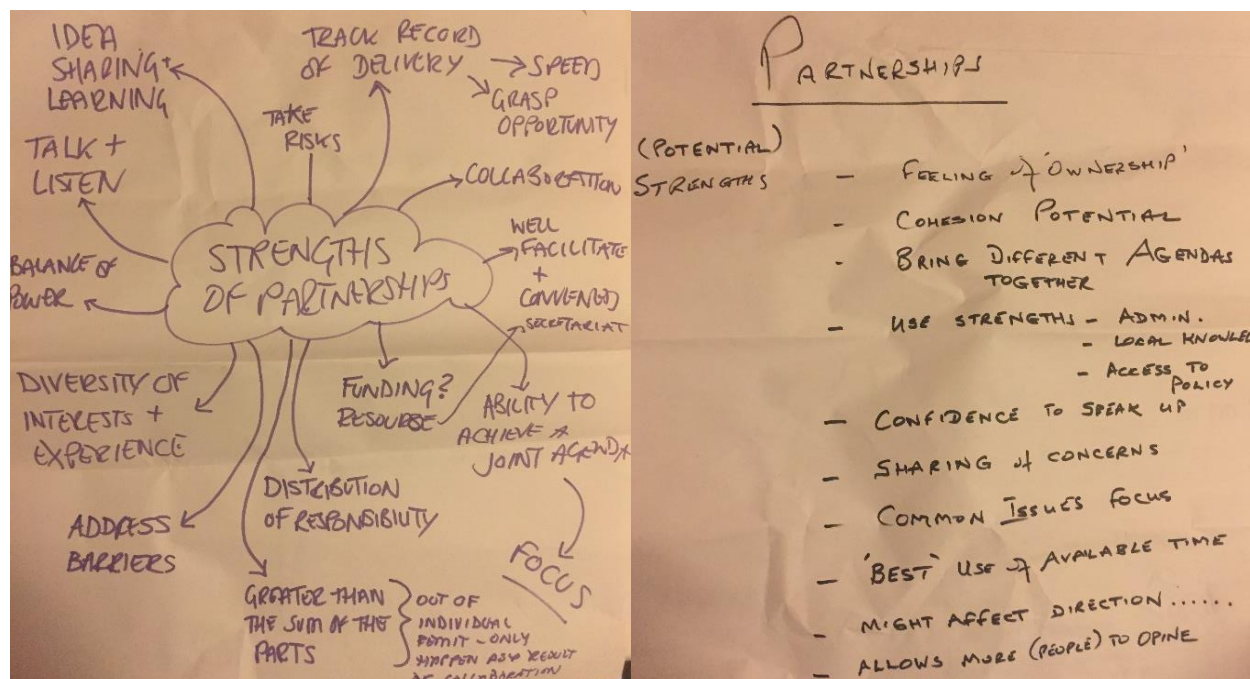


Figure 6.4: Strengths of Partnership Working

6.6.1.1 Independent Chair

In both interviews and deliberative workshops, it was discussed that the best way for partnerships to develop would be to appoint an independent chair who would be able to encourage debate, listen and not introduce preconceived agendas to enable a fair and accurate appraisal of what the partnership should be doing. This could enable much work to be done, including a “systematic and comprehensive ecosystem services mapping across the partnership area” (Interviewee L4). In both workshops, it was also argued that an accurate appraisal of partnership work from an independent chair would also enable projects that have better solutions, and provide alternative opportunities than partnerships which have no clear agenda or that do not build on multiple expertise alongside the potential for cohesion amongst partners. Participants argued that if an independent chair is then installed, it makes the partnership approach more likely to work, as power differences could be overcome, and an independent individual would not bring any agenda or preconceptions to the partnership.

6.6.1.2 Geography of an area

Through interviews and deliberative workshops, it was argued that the local geography of an area also needs to be considered for partnerships to deliver ecosystem services effectively, through understanding who needs to be involved, and what resources are needed. The local geography of an area was defined by participants to refer to the needs assessment of a specific area, i.e. what resources are available, the specific ecosystem services to be targeted, which key players need to be involved, and the feasibility of various projects in different areas. Once the local geography is considered PPPs should be able to work with farmers and other key stakeholders to carefully manage the current and future ecosystem services within an area and govern their delivery successfully, as outlined in the first deliberative workshop, to enable local knowledge to be exchanged effectively. It was argued that the local geography should be put above the political interests and agendas of any particular partners on the board, particularly if some agendas, for instance, flooding or pollination, are not going to be overly beneficial to the local area.

6.6.1.3 PPP board size

Finally, research participants spoke about the specific size of a board, especially around the maximum number of stakeholders who should be involved in decision making processes. Interviewee L6 stated that

“there comes a time when you have to say enough is enough, too many cooks spoil the broth as they say. It’s good to get a lot of voices into the mix but if there is too many, the chance for collaboration and a unified agenda gets smaller”.

Furthermore, in the first deliberative workshop the question was raised of whether everyone must know about the LNP and what it does. In this workshop, it was argued that, although many farmers do not know about the LNP, that this was a good thing. Individuals involved with the LNP argued that if too many people were involved in setting the partnership’s agenda it would be harder to reach a consensus on the PPP’s objectives. Despite this assertion no ‘good’ number of individuals on a partnership board was suggested. The participants went on to agree that a smaller executive board followed by a larger number of network partners is beneficial for sharing news and disseminating ideas around those interested in the partnership.

6.6.2 Challenges associated with Management and the Governance of PPPs

Alongside the benefits there are still many challenges associated with the PPP approach, which requires “partnerships to make solutions and adaptations to the governance model for them to be successful” (Interviewee L4). Such challenges are highlighted in figure 6.5, around the issues of power dynamics (not all stakeholders having equal opinion weighting within partnerships), conflicts between stakeholders (which can lead to the polarisation of certain groups and, again, alter power dynamics). Additionally, the language used in the approach can be considered off-putting for some groups, especially farmers (making exchanges of information and local knowledge more difficult), and it was argued that a lack of direction (or boundaries) can lead to limited progress as partnerships focus on doing too much or delivering too many ecosystem services. Some of these challenges associated with governance and partnership working have already been highlighted within this chapter including problems with resources and stakeholder engagement. Two further challenges were raised within the interviews and workshops around the meaningfulness of PPP meetings and progress as well as the willingness of PPPs to take risk when delivering ecosystem services projects. These challenges are presented in the sections below.

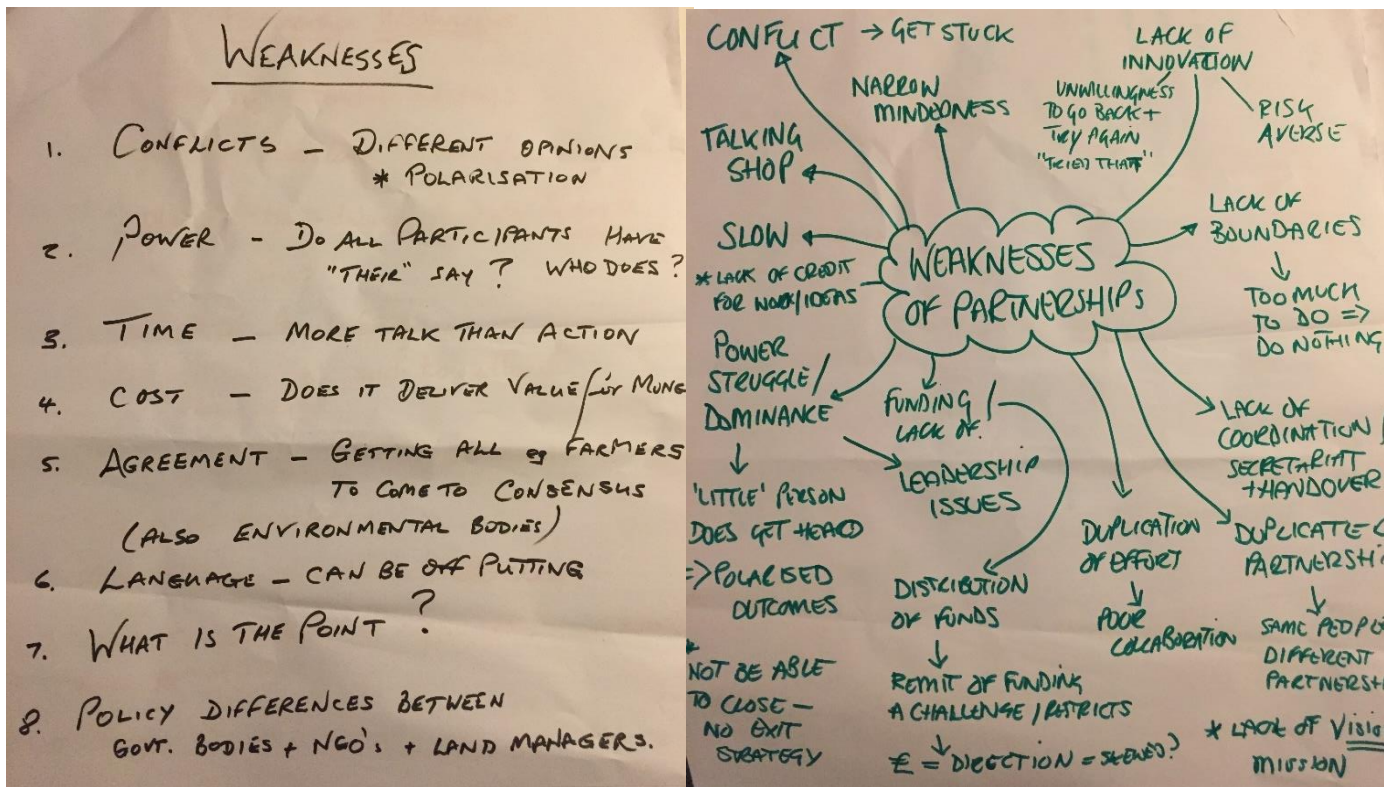


Figure 6.5: Weaknesses of Partnership Working

6.6.2.1 Engagement with LNP Meetings and Encouraging Local Knowledge Exchange

A challenge raised in both interviews and deliberative workshops was the idea of the LNP being a “talking shop”, where progress from meetings is not always meaningful and farmers cannot find the time to attend. As such, trying to attend meetings like this is not feasible if progress is not going to be meaningful. As one farmer stated, some farmers have to prioritise what meetings are going to be most meaningful for them. This means that for some farmers, “these partnerships are not active enough and don’t offer the farmer enough benefits in order for them to consider attending”, as explained by a policy maker involved with a farming group. One key issue is that, as one farming participant, commented “time to a farmer is money” (Interviewee F1) and as farmers do not receive financial incentives to attend meetings some farmers are discouraged from attending. However, it was argued by another policy maker that ways need to be found to engage farmers, as without them, the success of delivering ecosystem services is likely to be limited. It was argued by one farmer in the first deliberative workshop that farmers’ opinions and views are the most important thing for the delivery of ecosystem services. This point echoes opinions expressed during the interview phase, with x participant stating that, it is necessary to “gain farmers’ trust and knowledge

to ensure the wider delivery of projects to enhance ecosystem services” (Interviewee L8). Without this, knowledge exchange is unlikely to happen, as discussed in deliberative workshops.

6.6.2.2 Risk Aversity

Moreover, in the second deliberative workshop, another challenge was suggested, around the idea that some LNPs are “risk averse”. As a LNP board member explained, some LNPs try not to take risks due to the limited funding they receive and the unwillingness to try new and creative solutions to delivering ecosystem services. This conflicts with the perspective of a policy maker in the interview phase, who argued that “the purpose of PPPs is to diversify risk and try new solutions to increasingly pressing challenges in the environment” (Interviewee P4). If LNPs do not take risks, the benefits to ecosystem service delivery may be limited in scope. Therefore, governance within the partnership need to take more risks and try novel methods of ecosystem service delivery, to enhance the potential ecosystem service net gains.

6.6.3 Solutions to Challenges to ensure a Sustainable Governance Approach

Research participants in deliberative workshops offered several solutions to the challenges currently faced by PPPs. These are shown below in Figure 6.6. Solutions included education, where the public became more aware of agriculture and nature, helping to generate positive imagery of the agricultural industry. Moreover, farming champions were argued to be a clear opportunity to instil knowledge and good environmental practices within the future generation of farmers, engendering further knowledge exchange among different generational groups. Most participants were optimistic about the future potential of LNPs, if the right solutions are put in place, suggesting that farming and partnership objective delivery would improve, particularly in the long-term but felt there were many challenges which would make this difficult for the short-term. A policy maker shared this sentiment at the end of their interview, adding that “partnerships are the future”.

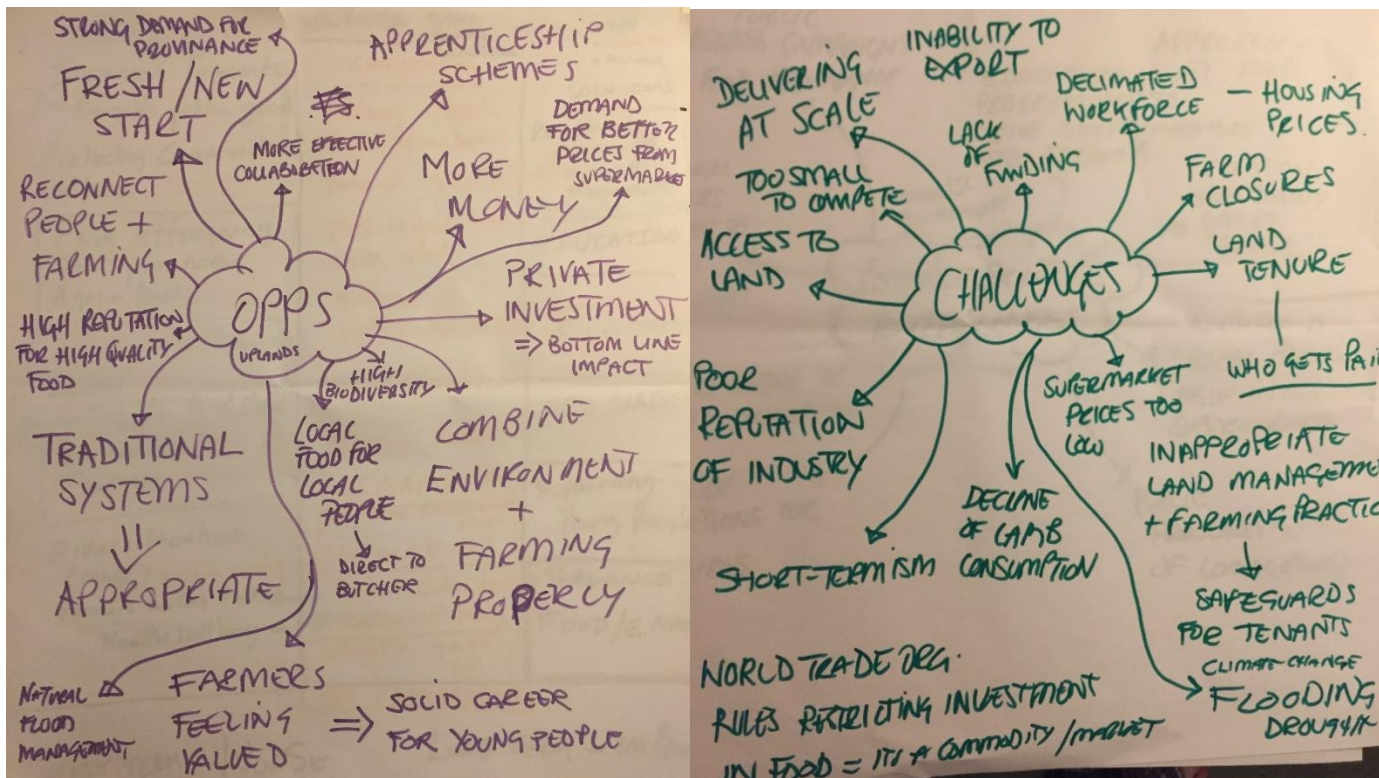


Figure 6.6: The Future of Partnerships in Agriculture

6.6.3.1 Generational Farming Champions

To solve the perceived issue around gaining farmers’ trust and engagement, workshop participants suggested that farming champions within the community could be chosen. These farming champions could act as role models for the younger generation of future farmers, who could learn from the experience of ‘good’ farmers who can pass on practices to them. These champions could also help to build bridges between the partnerships and farmers in the area, benefitting future generations and partnership approaches. Farmers would then be able to contribute more effectively to partnerships and younger farmers could learn from good environmental practices. This is especially pertinent as some individuals at both deliberative workshops raised concerns surrounding education and what colleges, like Newton Rigg (where the event was hosted), are teaching students. It was suggested that agricultural theory and education is beneficial to farmers delivering ecosystem services but practical experience is more important, with future farmers needing to be concerned with the environment and good practice as soon as possible.

6.6.3.2 Designing a post-Brexit Agricultural Payments System

Brexit was cited by most interviewees and workshop participants as a major concern for the farming landscape in the UK going forward, which will likely have an impact on PPPs, particularly in regards

to funding the delivery of ecosystem services, and the ability of farms to economically survive. Whilst such concerns were raised, there was also optimism shown by research participants. For example, one policy maker involved with a government delivery body spoke of “the opportunity to redevelop a fairer and equitable farming system, which takes into account the needs of smallholder farmers, as well as larger landowners”. This would enable power dynamics within agriculture to be reduced and smallholder farmers to become more empowered. This was because the EU-led CAP policy had “led to bad farming practices being rewarded, simply because private landowners had a large hectareage of land, whereas good farming practices on smaller plots of land are not”, as explained by a farmer. This could offer opportunities for partnerships to monitor the delivery of ecosystem services and provide advice to farmers which, in turn, could lead to further ecosystem service delivery and increased trust between environmental partnerships and the farming community due to a more equitable system, as discussed in the first deliberative workshop.

6.6.3.3 Business Training for Farmers

Another large challenge for the farming industry is what one policy maker termed, “having a business mind-set” (Interviewee P5). A farmer, involved in hill-sheep farming, suggested that “many farmers have no idea of how to manage the books, they have really bad record keeping, and that’s why some farms begin to struggle and stay afloat”. In both deliberative workshops, it was highlighted that partnerships could play a role in offering farm business advice and running a number of training workshops for farmers to attend. This would then lead to more farmers engaging with the partnership, as they are also receiving useful tools to use in their own businesses, which could mean that farmers are able to deliver more outputs in terms of increased ecosystem services delivery. This echoes the sentiments expressed in the interview phase where interviewees advocated for a clearer focus for partnership approaches that work to also benefit farmers, “which is not always available to the average farmer at the moment” (Interviewee F6). With such solutions, participants believed that farming could improve into the future and partnerships “could grow to become a lifeline for farmers who are marginalised and impacted significantly by Brexit, becoming even more important than they are today” (Interviewee P7).

6.7 Case-Study: Cumbria Local Nature Partnership

6.7.1 Overview

The case study of the CLNP enables a localised study and further depth regarding specific details and exemplars to be drawn out from the wider demi-regularities that have been raised earlier in the chapter. Such themes include: the stakeholders involved (the structure of partnerships); the roles

and responsibilities these stakeholders have; risk sharing between stakeholders (both feeding into power dynamics); and management and governance within the partnership (which can affect the extent to which ecosystem service delivery objectives are met and local knowledge is exchanged). Furthermore, Chapter 5, introduced several ecosystem service maps which outlined the types of ecosystem services that the CLNP should be focusing on. These maps will provide the basis for a discussion in this section on the utility of these approaches and the value of the concept of ecosystem services within Cumbria, evaluating the wider role of environmental benefits and the PPP as a delivery mechanism.

6.7.2 Cumbria Local Nature Partnership (CLNP) Aims

The CLNP was established to provide a strategic oversight of project work, to look after the environment and inspire learning about nature and the Cumbrian environment”, as explained by a CLNP member. Research participants considered the CLNP to be functioning well and to be making better progress than it had been when it initially began, as explained by someone involved on the CLNP board. Interviewee L6, who is part of the LNP board, explained that tourism and farming are the two main activities of the Cumbrian economy, stating that the CLNP has “several workstreams, which seek to look after some of these aspects, especially at the moment focusing upon the flooding agenda, given Storm Desmond (flooding event) and the havoc it wreaked on Cumbria back in 2015”.

The main ecosystem services which the CLNP is currently seeking to provide, based on these workstreams are surround habitat provision, flooding and farming, as identified by a landowner involved on the CLNP board. A CLNP board member explained that this focus has stemmed from ecosystem service mapping work carried out by a consultancy, where maps outlined several priorities for ecosystem service delivery in the Cumbria area. The CLNP’s vision statement outlines what the partnership is strategically attempting to do and aims to achieve as its goal. Over time, however, this has had to change, “to accommodate for local needs and the resources at [the CLNP’s] disposal” (Interviewee L9, a landowner involved with the CLNP board). Therefore, “some areas of the agenda have not been focused upon as much, whilst others have been focused upon, to balance the trade-offs inherent with ecosystem service delivery” (Interviewee L5, a CLNP board member). Some of these potential trade-offs were discussed earlier in Chapter 5. This indicates that there is a mismatch between what empirically should be happening and through abduction what is happening, for several causal reasons which will be discussed in more depth in the next chapter.

6.7.3 Partnership Development and Stakeholder Involvement

For a PPP to function effectively it was argued in interviews and deliberative workshops that the right stakeholders need to be involved from the public, private, and third sectors. The board recently gained a new chairperson in 2018 who is an independent candidate, taking over from Lord Inglewood, who began working more closely with the Local Enterprise Partnership (LEP). This has meant that greater LEP involvement with the LNP has happened, resulting in more economic expertise and private business participation within the CLNP, as mentioned in the first deliberative workshop. LEPs are useful for LNPs to work alongside “as they have a large network of private businesses and partners involved in enterprise across the local area”, as a policy maker explained in an interview. Previously, interviewees involved with the CLNP board were less enthusiastic about the LEP’s involvement with the LNP, as it had “taken a long time for conversations to start” (Interviewee L9). Interviewee L5 explained that, “the [C]LNP had been struggling from a lack of investment opportunities and business partners who understood how to use economic language effectively and come up with proposals which would appeal to more stakeholders and funders [outside of the environmental realm]. Now, with the LEP involved there’s a real sense of momentum within the partnership going forward”.

The LNP also has “private interests from the farming community represented by two individuals, the chairperson for Cumbria Farmers’ Network and an estate owner these two individuals guide [the CLNP’s] work on projects involving farmers and private landowners”, as explained by the secretariat of the CLNP board. However, this farmer and private landowner, involved with the CLNP board had differing views on their involvement with the CLNP. Interviewee L9, involved as a landowner on the CLNP board, suggested that “not much work on farming has been done at all through the LNP ... I guess a little on the flooding side of things ... but it doesn’t seem to be a focus. Yes, I go to meetings, but I have the time for a cup of tea and a chat, others wouldn’t”. Whereas, one of the interviewees from the farming community in the study area saw the partnership as offering “a step on the right path to getting farmers more engaged with the environment and environmental organisations ... overall, I think it’s a good thing”. This disconnect between both farmer responses is useful to consider in relation to which other stakeholders are involved in the partnership and to what extent other objectives may be being pursued, as this could be indicative of power differences and nested hierarchies (Ostrom, 2005) in the partnership.

Regarding the public sector, it was noted in a CLNP member interview, that the CLNP has many notable councils and local authority representatives involved with their work. They went onto argue that the public sector were able to provide the CLNP with what constituents and local people want in

their area, helping the CLNP with the delivery of ecosystem services in the area. However, a landowner involved on the CLNP board, suggested that participation from this sector differs, as not all members are as engaged with meetings or project work as others are.

A CLNP board member also stated that the third sector were very important within the CLNP. The interviewee argued that the Wildlife Trust were very important for the running of the CLNP, through helping to organise meetings, to hosting space for the meetings, and helping to plan the agenda. This interviewee also went on to explain that the third sector partners and NGOs who lead on CLNP projects, for example *MeadowLife* (a hedgerow creation project) which was spearheaded by the Wildlife Trust, are best placed given their expertise and rapport with the communities, such as farmers. The third sector was also viewed as being “important for setting the environmental agenda within Cumbria and the LNP”, due to the “notable network of professionals and resources reach that these organisations have” (Interviewee L9).

Whilst these sectors are argued to be involved and representative of the ecosystem services delivery needs of the CLNP, concerns were raised by some interviewees and deliberative workshop participants about how members are elected to the board, and whether the make-up of the board is truly representative of all the views in the Cumbria region. It was argued that the board “has some very influential people on it” (Interviewee F1); however, as workshop participants noted, this may mean that the voice of other individuals may not be heard as effectively, indicative of differences in power relations between stakeholders. Therefore, it was suggested that elections to the board become better publicised and more transparent in order to ensure that the CLNP is accountable and recognised in the community for the work which it is doing.

6.7.4 Power Relationships and Roles and Responsibilities

Within the CLNP example, work is also divided depending upon who is considered best placed to lead on that project. A farmer involved with the CLNP board, explained that the LNP board members “all go to meetings ... there’s about four a year ... and get to share our ideas, have our say on what we think the priorities for the area should be”. Interviewees explained that this was useful for setting an agenda and gathering feedback on past projects, as well as planning projects moving forward. However, as pointed out by a CLNP board member, “not everyone attends or is interested in every project ... at times individuals can have heated conversations ... but on the whole everyone gets on very well”.

Without the businesses in the private sector being involved in the CLNP to any great extent, who were argued to be “a key source of funding for the partnership” by a policy maker, other avenues of

funding need to be found. Indeed, a CLNP board member said that “many LNPs, like the CLNP, thought there would be an opportunity for permanent funding [from the government/Defra] when we were applying for LNP status, and we’d never turn that down ... but it hasn’t worked out that way”. A different person involved on the CLNP board explained in an interview that this application for funding often happens through tender applications and funding bids being led on a joint basis through the partnership. One example of a funding bid being a Heritage Lottery Fund and Highways England application which the CLNP successfully won. The interviewee continued, by explaining that the total funding won was £87,100. Moreover, other sources of funding have been secured, including £4,500 from the Lake District Foundation and £5,000 from Defra to put towards pollinator projects. However, these funding bids were described by interviewees as resource intensive and time consuming, for relatively small pots of money. A CLNP board member explained that “if businesses were more involved, [the CLNP] would have been able to have made a lot more progress”. Currently, in the view of a private landowner involved on the CLNP board, the “private sector takes on very little risk, due to stakeholders’ reluctance to be involved with the partnership”.

The third sector is particularly important for delivering and overseeing project delivery. A CLNP board member explained how the funding secured by the CLNP enabled a new project to be devised called *Coastlines: The Cumbria Coast Pollinator Project*. The interviewee continued, “... the project is overseen by Cumbria’s Wildlife Trust, whilst being devised by the CLNP, in order to create and restore pollinator havens in greenspace along Cumbria’s coast in areas such as Whitehaven, Maryport and Workington”. Highways England are also involved, due to “work on the verges along the A66 and A595 to establish pollinator habitats”. Cumbria Wildlife Trust were seen as the key stakeholder to lead this project, given “the key focus on biodiversity and expertise which the trust can bring with them to the project ... whilst other partners and partnership will also work alongside them to deliver the project” (Interviewee L5). A LNP board member explained how the project allowed the CLNP to have a strategic oversight of the work, whilst individual board members, from the Wildlife Trust, would work to implement individual projects. As third sector organisations hold the greatest responsibility within the partnership and this project, they also take on the most risk, and indeed have the most oversight and power in relation to the running of the project.

The public sector was considered important for ascertaining local opinions from different areas in Cumbria on the environment as well as aiding learning within communities about nature and the environment within the CLNP and advising on local legislation and planning applications. However, whilst the councils and other public representatives had this role, research participants also spoke about other public sector bodies, “... there’s been no real advice from the government on what we should be doing ... we were doing too much, so now we’ve decided to focus on less ... we’re getting

there [making progress] eventually by ourselves” (Interviewee L5). It was also recorded that “the public sector is paramount for the success of the LNP, as the public sector can help get other stakeholders on side, given their influence and knowledge of UK governance” (Interviewee L9). Thus, “public sector bodies are important for presenting advice and guidance to the partnership ... more public representatives, especially from bodies such as Natural England and Defra would always be welcome to join the CLNP board” (Interviewee L6).

Finally, the CLNP aims to work with the Morecambe Bay LNP and Northern Uplands Chain LNP as well as other partnerships, like the LEP. Thus, forming a type of co-management as network arrangement (Carlosson and Berkes, 2005). These two LNPs work together with the CLNP to deliver ecosystem services, as they can “pool resources, knowledge and ensure that [the partnerships] are not stepping on each other’s toes, as [the partnerships] overlap LNP boundaries” (Interviewee L6). This interviewee went on to explain that through consulting with different partnerships “projects are able to be delivered more effectively” as a result of being able to work across larger sites and deliver a wider range of ecosystem services across a landscape scale.

6.7.5 Modes of Governance and Management within the CLNP to mitigate Challenges

It was argued by an interviewee involved with the CLNP board that, as stakeholders comes from diverse backgrounds and different sectors, conflicts are likely to occur. It is how these conflicts are governed and managed which is important. The CLNP has an independent chair who oversees meetings and ensures that targets are met by the LNP, by checking progress against the meeting minutes from previous meetings. One participant felt that “the independent chair is good, as she doesn’t bring as much baggage with her to the table ... this means that she doesn’t have as much of an agenda or motive as opposed to if she was affiliated with another organisation” (Interviewee L9). This enables “everyone to attend meetings and have a say to formulate the agenda” (Interviewee L5). However, it was found that some members play more of an active role than others in participating in and directing the partnership, with NGOs being more central to the CLNP and farmers, businesses and even councils being more peripheral.

This unequal power dynamic was found as not all stakeholders attend every meeting, as well as some stakeholders, particularly within the agricultural community, feeling that their opinions are not understood. Therefore, an interviewee involved with the CLNP explained that many farmers spend their time focusing on other activities which are more worthwhile for them, as opposed to working with PPPs. Nevertheless, one farmer explained how it was still “important for farmers to be involved in these partnerships, to see the future potential for these partnerships to work, and to make sure their opinions were heard. Otherwise, if [farmers] give up no one [partnerships, policy makers] will

listen anyway” (Interviewee F1). Especially as “even if the work does not directly refer to agriculture, it probably involves farmers in one way or another as large landowners across the Cumbria region” (Interviewee L6). Therefore, work is ongoing within the CLNP to ensure more projects are implemented, with farmers to be consulted and involved, in line with funding and other resources as they become available.

However, prior to any projects being designed, a CLNP board member in an interview, argued that it was important to be able to understand which ecosystem services need to be prioritised in the area. One way of being able to decide this is through an ecosystem services mapping approach.

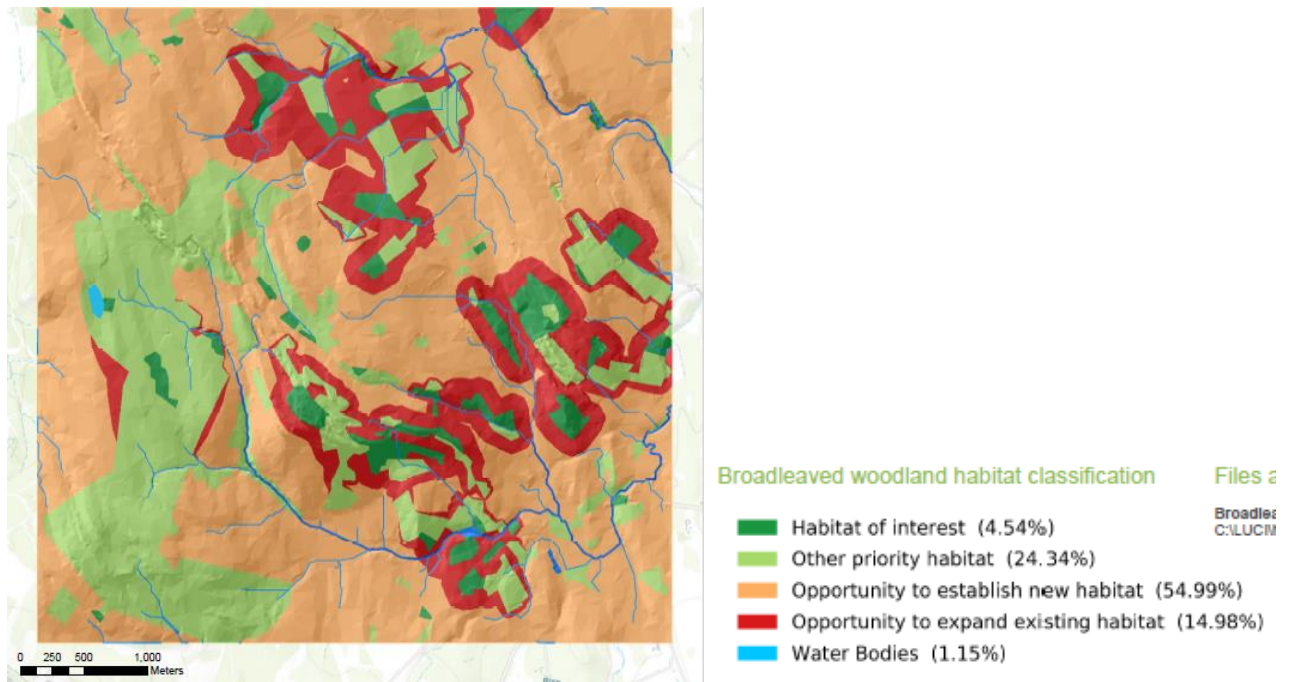
6.7.5.1 Ways of Measuring Ecosystem Services: Mapping

An interviewee involved in policy development explained that ecosystem service mapping is a very useful tool in order to allow policy makers and those involved in partnerships to understand the benefits and trade-offs involved with ecosystem services delivery, as well as being able to show the potential outputs of project work. Ecosystem services mapping work has already been carried out by an independent consultancy firm for the CLNP (see Holt, 2017). A CLNP representative explained how maps enabled them to greater understand the current ecosystem services provision in the region, allowing them to prioritise which ecosystem services to deliver in different areas. However, the usefulness of this approach was questioned by a landowner involved with the CLNP. This interviewee explained that the language used, and technicality of mapping approaches proves difficult to understand. Similarly, interviewees also pointed to uncertainties in the approach surrounding data availability, applicability and ease of use within the models; for a CLNP board member this leads to “gaps and poor resolution in the current models which we have”.

Nevertheless, mapping approaches remain one of the main ways through which to understand current ecosystem service provision in areas, with maps being used to inform the creation of ecosystem services delivery projects (see de Groot et al. 2012). Maps were created as part of this thesis to test the utility of maps to understand ecosystem services provision and how ecosystem services could best be delivered. The maps were introduced to participants who attended deliberative workshops. In line with other participatory mapping projects, such as Burdon et al. (2019), at group discussions, participants were asked to comment on what they believed maps to be showing and how useful they felt the maps were in understanding ecosystem services. One participant at the second deliberative workshop explained how they were confused by what the maps were trying to show, despite the easy to recognise colour scheme. After looking more closely at the maps, some participants started to interrogate them more carefully and enquire about things, to do with what the key meant and certain principles behind how the maps were created.

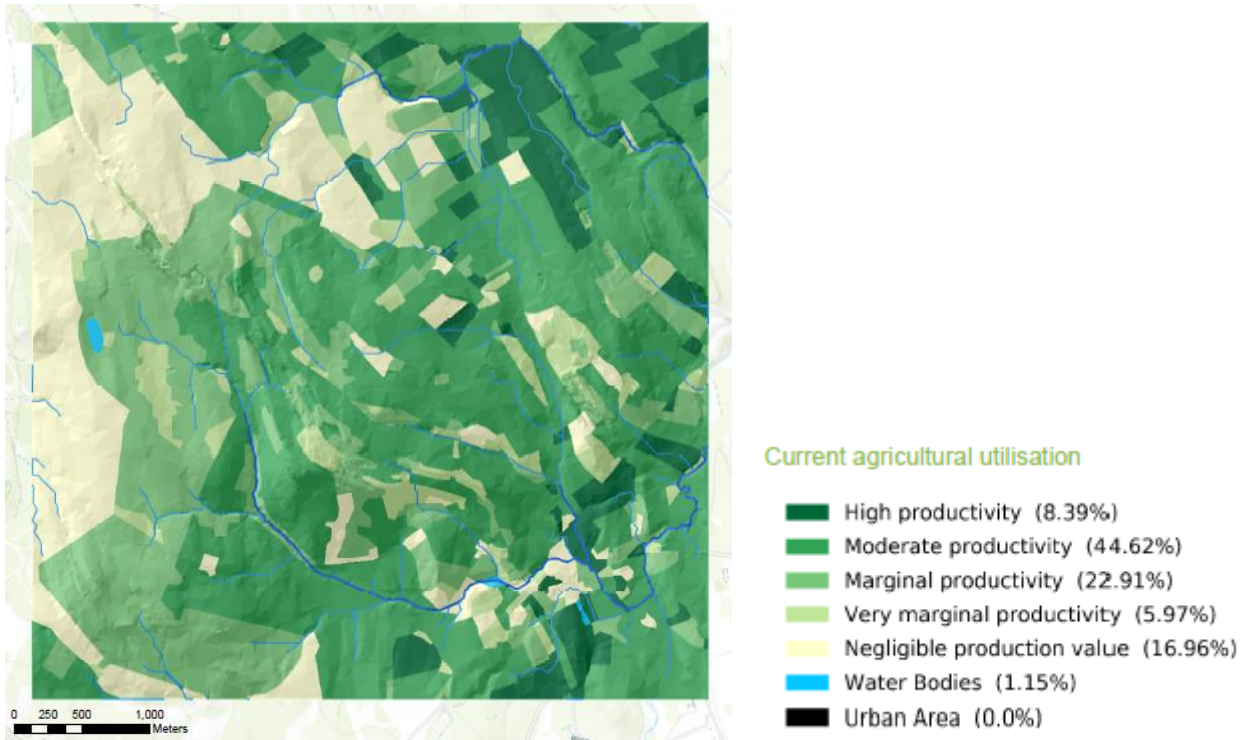
When presented with Map 6.1 on habitat connectivity, most deliberative workshop participants felt the map was the simplest shown to them of the three. The map was relatively straightforward for them to understand, and participants understood the purpose of the map to highlight areas where wildlife corridors could be extended from existing broadleaved woodland habitat. The resolution was argued by participants to also be useful, as they could understand what is going on at the farm-site level, which would enable a discussion with farmers to take place more easily by identifying their own farm on the map. This spatial resolution was argued to be a benefit, especially as other models do not offer this site-based detail, and ecosystem services or their associated features, could be more clearly understood at a localised scale, where many PPPs operate (see Boyd and Banzhaf, 2007). Therefore, this map can be useful to think about new areas where this project work could be delivered, and could be used as an opportunity to engage farmers around decision making processes, given the site-based detail which could be used to highlight ecosystem services on their own farms.

The feasibility of this map was, however, called into question, as habitat connectivity may not be able to be improved across all areas that the map suggests, as one of the 'opportunity to expand existing habitat' sites lies across the Greystoke Estate. In the second deliberative workshop, it was highlighted that permission would, therefore, need to be sought from the owners of the land before implementing any projects. Hence, participants shared thoughts that maps cannot be used alone to make decisions, as local knowledge and interpretive analysis of the maps are also required to ensure that ecosystem service delivery is going to be effective.



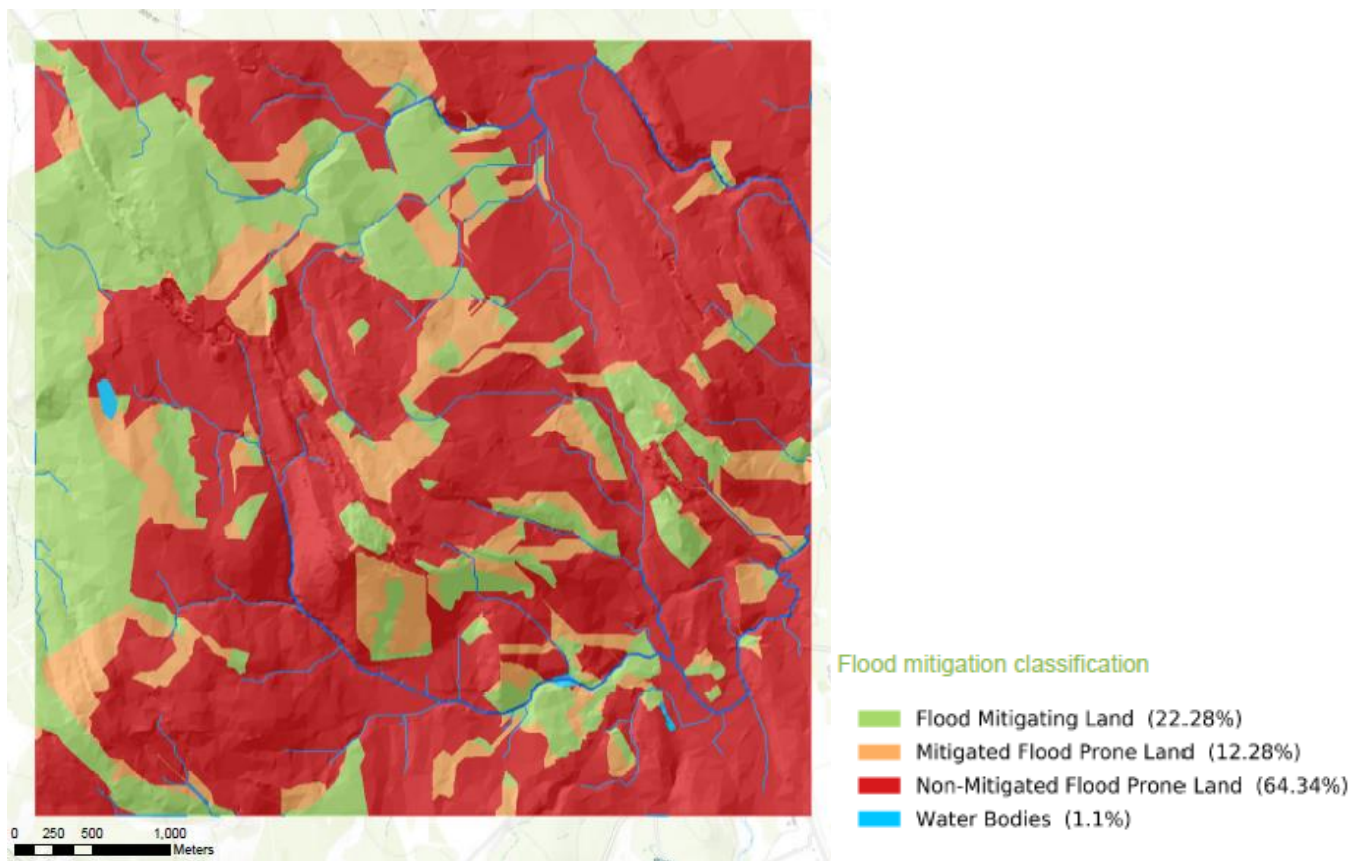
Map 6.1: Habitat Connectivity Map produced using LUCI

The second ecosystem services map was based upon current agricultural utilisation. One of the immediate comments within the first deliberative workshop was that the map was very green and that it did not show much variation. However, when participants started to look more closely, they did manage to see particular parcels of land which were there was ‘high productivity’ and participants began to ask questions connected to this observation, such as the suitability of soil for agriculture, and whether the land was being overgrazed. It was considered that this map would be useful for starting a discussion with farmers around the types of activity they are doing on their land and whether they are doing too much or too little. It could also help farmers to think more about the environment, their farm as a business and its own profitability and potential diversification strategies. This was raised as a point in deliberative workshops, as farms are going through a rapid period of evolution associated with Brexit, which is causing greater uncertainty for farmers. It could also present a potential avenue for the CLNP to think about future projects, and how it could get farmers involved. Although, out of the three maps presented, this map was found by research participants to be the least helpful due to the meaning of the categories not being clear, and difficulties in distinguishing the colour scheme easily. A question around what the map is taking into account and whether urban areas are accounted for in the model was also raised in deliberative workshops.



Map 6.2: Map of Current Agricultural Productivity

The final map presented current flood mitigation potential of the land. Participants were particularly interested in this map, given the flood events of Storm Desmond in 2015. Participants noted that there was a large amount of land that was not flood mitigated and flood prone, whilst others did not take much notice of this assumption, given that the land in those areas of non-mitigated flood prone land is surrounded by a more mountainous topography where water will flow downhill. A participant involved on the CLNP board argued that this map could be very helpful in relation to flooding work which the partnership is trying to achieve. However, it was noted that the map presents a complex picture and that if you stop an area of land from flooding in one area, this could have unintended consequences for other areas of land further downstream. Therefore, participants whilst finding the map interesting were cautious about its application in real life. This led participants to further interrogate and discuss the maps presented and to question the usefulness of this type of mapping overall and its applicability to the CLNP's work.



Map 6.3: Flood Mitigation Map

Deliberative workshop participants drew several disadvantages from these maps. In both workshops, participants referred to uncertainties in the dataset used, with some data needed for the maps to be run being more than ten years old. Moreover, participants argued that the maps are still highly technical and that in order to fully understand them several hours would need to be set aside to discuss how the results were derived and what the maps were showing. This was a result of the complexity of data used, key terminology and scale at which the maps were produced. Furthermore, participants noted that, from these maps it was hard to gather a representative and accurate picture of every location, as models all have different calculations and assumptions built into them, which may or may not be representative of environmental characteristics for that location. A key point noted by a farmer was that you should ask farmers first about their own knowledge before showing them any maps, as this could alienate them from actively engaging in conversation, as they may not understand the maps and feel as if their land practices have already been judged. Observations made during the second workshop corroborated this as, after presenting participants with the maps, laughter was heard. Participants did not seem as keen to engage with the maps as they did at the

first workshop or to question them. It was clear, that despite a brief explanation, participants were still confused by what the maps were trying to show.

Benefits were also noted, particularly when participants compared the consultancy mapping work done in EcoServ for the CLNP with the maps produced for this research in LUCI. For instance, individuals found the resolution useful for understanding where project interventions could be targeted and on what land, as opposed to the other EcoServ maps which were of a much broader scale. As mentioned in the first deliberative workshop, these maps could then be used to devise projects and clearly show where ecosystem services needed to be delivered, being useful in funding bids, to show funders the reasoning behind the need for these ecosystem services effectively. Finally, participants also considered the maps to be useful in starting a discussion around ecosystem services delivery, whilst still acknowledging that other ways of securing evidence to implement and measure projects are needed.

6.7.5.2 Measuring Ecosystem Services: A Collaborative Approach through Local Knowledge

When asked in about the relevance of maps in informing project delivery, many interviewees believed that the maps represented key environmental factors to be considered in project work by the CLNP. However, at both deliberative workshops talking to farmers was seen to be the most important way of understanding the land and environmental concerns, where mapping approaches should be secondary to a farmer's own knowledge. In general, most interviewees and workshop participants felt that, it was also important to use social science methods alongside mapping approaches to understand the main issues of contention to generate solutions within a partnership approach. This is especially the case as explained by a farmer in an interview, as "farmers have been farming the same land for generations, with practical knowledge which is unrivalled, compared to any model or science which you could present them with".

Research participants also noted several other environmental concerns and ecosystem services which need to be considered within Cumbria that were not presented in the maps during the workshops. These concerns included soil, where Cumbria was argued to have bad soils, as a result of historical industrial activity which polluted the landscape. Soil was seen to be poor in nutrients, which is why most Cumbrian farming is pastoral as opposed to arable and why some areas are heavily polluted. Moreover, a farmer in the first deliberative workshop spoke of biodiversity and a lack of species richness as being a key environmental problem, especially considering climate change, with many native species in decline in the area. This causes problems for pollination, which can impact upon food supplies and nature across the UK. Finally, there was a point raised by participants around phosphorus and nitrate pollution in rivers resulting from soilage and run-off into

streams from farmland and poor farming practices from a minority of farmers in the area. It was argued that these farming practices need to be curtailed and effectively monitored in order to prevent this sort of pollution. All these concerns represent a need for the agricultural sector and farmers to be involved in PPP approaches for the delivery of ecosystem services, as participants discussed in deliberative workshops.

6.8 Future Directions

By understanding environmental problems and current ecosystem services provision in an area, ecosystem services delivery projects can then be devised. Whilst the CLNP has developed a vision and some initial ecosystem services delivery projects, some individuals on the board consider the progress of the CLNP to be “slow, especially in relation to farming” (Interviewee L9). This was due to a perceived lack of farmer representation in the partnerships – primarily due to lack of time to engage in CLNP activities – and the existence of other partnerships already in existence. Moreover, the CLNP was argued to have limited funding, which has meant that individual “project scopes are limited to focus on areas of expertise by partners, where they can take on most of the responsibility, or where funding permits” (Interviewee L6).

With farming being a big focus for the CLNP going forward, it will be important for more farmers to become involved with the partnership. However, many farmers explained how they had not previously heard of the CLNP. Farmers raised the question of the usefulness of the LNP to their work and the complexity of language associated with partnership approaches like the CLNP, which can make the partnership inaccessible and discourage farmers from being involved in deliberative workshops. Furthering this point, Interviewee L9 showed the researcher a consultancy report which outlined key areas for ecosystem service delivery for the CLNP to focus upon from a recent commissioned mapping exercise, yet said “... if you see the words used ... CEH ... DEM ... what farmer is going to understand that?”. Therefore, it was argued by research participants that clear language needs to be used which farmers can understand and information that is relevant and useful to them to be provided.

Moreover, it was argued that if the CLNP is to secure funding, the impact current projects are having will need to be properly documented. This will require the use of metrics and monitoring techniques that are able to show the impact that the CLNP is having on the area. One farmer, during a deliberative workshop, suggested that there are publicly available toolkits that would enable farmers to monitor their land and report on ecosystem services delivery without the need for much paperwork. In turn, this would enable the LNP to further understand the impacts different projects are having. The Toolkit for Ecosystem Service Site-based Assessment (TESSA), was an example given,

which was argued to be relatively straightforward to use and does not require much time commitment. Through “better understanding impacts the CLNP is having, the work that the partnership is doing could become better documented online and in reports, which would have a significant impact on funding bids and progress targets for the CLNP going forward” (Interviewee L6). This partnership impact reporting need not be through highly advanced scientific mapping processes but could be through simple to use tools which are still robust enough for decision makers to use and friendly enough to not alienate farmers, as put forward as a solution in the first deliberative workshop.

6.9 Conclusion

This chapter has presented results from interviews and deliberative workshops on how PPPs function in practice, in order to understand what PPPs entail, the stakeholders involved and the modes of governance and management. The results suggest that there are a wide range and diversity of stakeholders that can be involved in different partnership approaches. These stakeholders come together to share responsibilities and roles; however, the way that stakeholders perceive their role within the PPP can be different to how academia presents different sectoral roles. Additionally, some stakeholders take on more responsibility than others, leading to nested hierarchies in partnership structures and power differences to emerge. For instance, some board members of the LNP showed confusion around what exactly the LNP does and what they should be doing on the LNP, in turn, they did not take on many roles or responsibilities, with often the third sector steering the agenda and taking on the most responsibility. The causes behind this difference between theory and practice now need to be investigated in Chapter 7.

Stakeholders also share risk. This risk is not always shared equally, with individual stakeholders often taking most of the risk on the projects which they lead, meaning that other stakeholders take less risk upon themselves in comparison to active stakeholders. Risk sharing can be good, particularly for devising creative projects which deliver ecosystem services. Although, it was found that some LNP approaches are risk averse and often follow traditional ways of delivering ecosystem services. If partnerships were prepared to take on more risk, research participants argued that this could lead to greater benefits for ecosystem services delivery. This increase in benefits would be a positive strength of the partnership approach, alongside the sharing of ideas, cohesive potential for partners who work together, as well as projects which carefully appreciate the local geography of an area and are carefully suited to that partnership locality.

Currently, there are many challenges which outweigh the benefits associated with LNP approaches. Many of the challenges stem from the power dynamics within partnership approaches, particularly

as some groups of people feel marginalised, for instance, farmers. This means that not all partners may attend meetings, the sharing of ideas and local knowledge may not be as effective as academic literature suggests, and projects may not have the wide-ranging support needed to be implemented successfully. Hence, several solutions and approaches to farming and partnerships of the future need to be considered. These include the use of farming champions, to inspire a future generation of farmers with good farming practices which are environmentally sustainable. Moreover, partnerships which are more focused upon farmers' needs, for example, developing a training series on accounting and farming businesses, may enable more farmers to become more economically sustainable at the same time as then being able to pay more attention to the environment. Brexit also offers the chance for a fairer and more equitable farming system to be developed, where previous EU-led policies, like the CAP, have not been popular amongst some farmers.

The CLNP is a prime example of a PPP, under an LNP model, which strives to deliver ecosystem services within the Cumbria area. The CLNP is focused upon services like flood regulation, habitat connectivity and agricultural productivity. However, there are many more environmental concerns within Cumbria, such as soil erosion, which the CLNP could develop projects for going forward. The board is comprised of a wide range of stakeholders; however, the way that these stakeholders are elected could be more transparent and democratic to enable others interested in the partnership to understand the governance processes associated with the CLNP. In this way, interested parties who are not on the board, may be less critical and cautious of partnerships (e.g. describing them as a "conspiracy", in the first deliberative workshop, and instead may be more open to an understanding of what partnerships do and how they could become involved.

In getting more people involved with the CLNP's work, the language used was seen to be a big challenge. Technical language is often used within ecosystem services mapping approaches, which aid the understanding of current ecosystem services provision in an area. This was found to potentially hinder the exchange of local knowledge, as farmers became disenfranchised from wanting to engage with such language. Maps enable LNPs to prioritise ecosystem services delivery across the landscape to what is most needed. However, uncertainties in the data used and method were discussed in interviews and deliberative workshops. It was argued that whilst mapping was a useful approach for understanding ecosystem services, a farmer's knowledge is also useful. Therefore, an interdisciplinary approach is needed, which draws upon multiple forms of evidence to be able to best implement ecosystem services delivery.

Chapters 4 and 5 described how PPPs *should* work and this chapter has shown how they *actually* work in practice. Whilst many benefits of PPPs and the governance models they usually adopt were

conceptualised within the previous chapters, this chapter has highlighted how the diversity of PPPs means that one model cannot represent how all PPPs function. The chapter has also appreciated the challenges which exist, and how these can be overcome with beneficial outcomes for ecosystem services delivery. The following chapter will analyse the results presented in Chapters 4, 5 and 6 through a process of retrodution to answer the four main research questions which this thesis proposed and propose new threads or themes of knowledge which future critical realist theory should consider.

Chapter 7

Discussion

“If you don’t do more, LNPs may well fizzle out like damp squibs”

Gordon McGlone (2013)

7.1 Introduction

Chapter 4 provided insights from desk-based research and Chapter 5 gave an overview of the study’s ecosystem services mapping approach to understand what a PPP *should* entail to deliver ecosystem services within UK farming. Chapter 6 then provided information from interviews and deliberative workshops on what is *actually* happening within a PPP approach. The CLNP was used as an empirical example which provided further depth from more generalisable findings to enable a more specific understanding of a localised PPP example. This chapter puts these findings into the context of the literature, emphasising what these findings mean in relation to the four research questions posed earlier in the thesis. Each of the four research questions will be answered in turn, through sections 7.2 to 7.5, from understanding the forms that PPPs take in the delivery of ecosystem services through to which stakeholders need to be involved in such an approach through the process of partnership development. Recommendations for areas of change within PPP approaches will then be postulated at the end of these sections. These recommendations are important to inform the potential impact of this research, in order to inform best practice within partnerships and to inform future developments in the UK agricultural industry.

The answers to the main research questions and key research findings arising from these answers will be summarised, in Chapter 8, where an overview of the thesis and the main concluding points are summarised for academics and policy makers.

7.2 What different models of PPPs are currently in place to provide Payments for Ecosystem Services in UK Agriculture?

7.2.1 Variations of Public Private Partnerships (PPPs) to deliver Ecosystem Services

This first research question focused on the scope of partnerships currently in operation across the UK agricultural industry which aim to provide ecosystem services. Answers found from desk-based research and interviews indicated that many different variations of PPPs were present. These differences ranged from the partnerships’ focus through to their public-private sector make up of stakeholders. As outlined in Chapter 4, there are several types of PPP contracts, ranging from Build-Operate-Transfer (BOT) partnerships through to Operation and Maintenance (O&M) partnerships,

which differ in the amount of responsibility each stakeholder and sector has in the partnership. However, within this thesis, partnerships were also found to deviate from prescribed definitions, as a policy maker during an interview pointed out, “there are many notable definitions of what a PPP means, and no one is quite sure of any official definition, it’s another piece of jargon ...”. This quote implied that, as found in Chapter 4, many definitions and PPP examples exist. However, that there is no one solid definition that policy makers or practitioners often refer to when analysing PPPs. Chan (2012, 122) speaks of how there are “innumerable variations to the tune of partnerships; not every form of partnership will find acceptance in every political and social context.” Hence, this section of the chapter evaluates and understands how PPPs designed to deliver ecosystem services within agriculture vary in their functions, partners and governance features. This variation amongst different PPPs is extensive, making a theoretical model of PPPs challenging to articulate. Nevertheless, three main PPPs in UK agriculture to deliver ecosystem services are presented, with comparisons between each made.

7.2.1.1 Focus of Partnerships

Initially, the research found that the scope of partnerships varied within agriculture through the choice of ecosystem services they aimed to provide. This focus was inevitable because each partnership

sought to find areas and ecosystem services which they could meaningfully deliver, by assessing what other partnerships were doing in the field where they were already working and through an assessment of the current state of ecosystem services. This was found to be important for making sure that the total number of ecosystem service beneficiaries outweighed trade-offs that LNPs had to consider, in line with the decision-making process. Quite often partnerships would carry out ecosystem services mapping to understand where ecosystem services were more valued and by what stakeholders (Colman et al., 2013). It was felt by many LNPs that they “didn’t want to be stepping on other people’s toes” (Interviewee L3). Hence, many LNPs and other partnership examples would work alongside agriculture to obtain the most meaningful ecosystem services for society. Thus, as “partners lead on many of the projects” (Interviewee L6), it was found that the governance and structure of each partnership differed on factors related to funding, stakeholders and management, which are explored later in the chapter. The focus of each partnership aids the form which partnerships take and the level of public-private involvement in each.

One of the main examples of PPPs explored in Chapter 4 through desk-based research - which had a strong focus on agriculture - was the Catchment-based approach (CaBA). The CaBA Rural Sector Engagement (2019) team highlighted several reasons as to why these specific catchment-based

partnerships focused on agriculture in the way that they do; these included each partnership's focus on evidence, customers, inclusivity, collaboration and capabilities. The policy document highlighted that all the partnerships aim to improve soil, water and air quality. Agriculture is an ideal industry for these partnerships to work with, given that agricultural land covers approximately 70% of land use across the UK (Office for National Statistics, 2016). Thus, agriculture is a major land management strategy which can be used to influence the delivery of ecosystem services across the UK and, therefore, some LNPs are beginning to become more engaged with the agricultural sector. It is particularly notable that this partnership approach example operates at a more localised catchment scale, which supports Short's (2015) arguments, and highlights how partnerships are increasingly focusing on SES perspectives and institutional perspectives at the local scale through their work.

When one looks at LNPs, these partnerships have a much larger remit than that of CaBA approaches, outlined above: to "improve the range of benefits and services we get from a healthy natural environment. They will aim to improve the multiple benefits we receive from the good management of the land" (Defra, 2012a, 1). This original definition of what LNPs *should* be doing, provided by Defra, is broad. Therefore, it led some LNPs to describe the advice and direction given as being "like Jekyll and Hyde", because many LNPs felt that there has not been much direction from the UK government which instigated this partnership approach. This generic advice serves to pull different LNPs in several directions, focusing on their own ecosystem services within different industries. Agriculture is a key land management tool, so some LNPs do work with farmers and focus on farmland to mitigate against flooding and help with agricultural productivity. LNP examples elicited from desk-based research and interviews working within agriculture include Morecambe Bay and Cumbria. However, more commonly, several LNPs chose to not focus on agriculture as a tool to deliver ecosystem services. This is connected to Chapter 4 surrounding the assessment of other partnership approaches. Some LNPs believed that catchment partnerships and farming group organisations were already heavily involved in delivering agricultural ecosystem services across the landscape and, therefore, decided to work elsewhere, for instance with health trusts or within urban environments. This was found to not always reflect what partnerships would state on their websites or within their vision statements. However, increasingly LNPs have been interested in devising projects to work within agriculture.

The pioneer partnerships, which are currently undergoing trials in four areas before being further implemented, have a much narrower ecosystem services focus than CaBA or LNP approaches. They were hypothesised as a key enabler of Defra's 25 Year Plan for Nature (2018). Each pioneer project was focused upon ecosystem services delivery in an area based around the geographical features of that partnership's locality. For instance, Devon was a marine based pilot, whilst Cumbria was

focused on a catchment-based approach, and Manchester the urban environment. These partnerships are building on the work of CaBAs and LNPs to advance knowledge around ecosystem services delivery and to help join up landscape scale approaches to conservation and ecosystem services delivery across agricultural landscapes (Natural Environment White Paper, 2011).

Overall, to some extent PPP examples working within agriculture are, therefore, shaped by the focus and overall aims of the partnerships. Some partnerships will be more heavily focused upon agricultural activities to deliver ecosystem services than others, whilst some may work only to a limited extent to deliver ecosystem services through agriculture. This focus dictates what each PPP's structure looks like and makes every PPP unique from the stakeholders involved and their governance structures and functions.

7.2.1.2 Partnership Development: Stakeholders Involved

Depending on the ecosystem services to be delivered and overall focus of the PPPs, the stakeholders involved vary. Stakeholders are drawn from diverse backgrounds, where they have a useful viewpoint or expertise to offer within the partnership. This reinforces Hart et al. (2005) who argue that a wide variety of stakeholders are needed in partnerships so that they are able to deliver multiple ecosystem services. Through such a range of stakeholders, agricultural landscapes then also have the ability to gain political support and capacity to engage with different partners. Similarly, Dwyer (2014) spoke of social capital as being important for trust and engagement between individuals. Thinking retroductively, if more people from diverse backgrounds were involved, greater exchanges of local knowledge could take place, and also there would likely be more engagement in partnership approaches. Through desk-based research it was identified that different PPPs working in the agricultural sector contained varying numbers of stakeholders. Each partnership example (CaBA, LNP and the pioneer partnerships) was often seen to contain stakeholders on a board who were more clearly aligned to setting agendas and delivering projects and then stakeholders from a wider network, with partnerships running under a structural form of co-management as network (Carlsson and Berkes, 2005), who were kept aware of progress and invited to have a lesser position in steering the direction of a partnership. Some stakeholders were also found to be more actively involved than others in different partnership approaches (McErlane et al. 2016). However, a commonality between all three PPPs is that there are usually at least three sectors involved – the public, private and third sector.

Usually, within all three approaches there is some involvement from the public sector, whether from the council, government or government bodies such as Natural England or the Forestry Commission. In addition, the private sector is involved; however, this is more common within pioneer

partnerships and CaBA schemes where individuals can “see more value [for farmers] in being involved with the work” (Interviewee P8). Often farmers and farming organisations, such as the NFU, see more value in certain agricultural partnerships than others given each partnership’s specific focus and the level of funding each partnership has secured. This is important, as “funding dictates what projects can be delivered” (Interviewee F1). This is an interesting point as farmers are important deliverers and providers of ecosystem services benefits, but some PPPs are more inclusive (or the benefits to farmers more obvious), whereas others, arguably LNPs, may be less successful as farmers are peripheral to the decision-making process. For instance, CaBA projects have managed to secure six times more for every £1 that the government has invested in their work with the private sector and NGOs (CaBA, 2019a). This finding builds upon Yoshida’s (2018) work which articulates that whilst most farmers have a considerable understanding and sense of care for the environment, this can be limited by the resources they have available to them to promote the delivery of ecosystem services. In the case of LNPs this can limit farmer engagement and participation in project work.

A common feature of PPPs is also third sector involvement, from environmental NGOs like the Wildlife Trust. The third sector is not often part of the definition of what a PPP *should* be or how it is defined, with some academic definitions provided in the literature review in Chapter 2. The only definition which does refer to the third sector comes from Reed et al.’s (2014) article. Therefore, a redrawing of the PPP model is needed to fully incorporate all the stakeholders involved in different partnership approaches. However, given the differing levels of involvement in several agricultural PPPs of some stakeholders it is impossible to provide a theoretical model which will always be representative for every PPP. This presents a clear role for additional critical realist studies, in so far that past theory needs to be reconceptualised and redrawn to match what is happening in the real world (Fletcher, 2017). The third sector’s involvement is discussed further in Section 7.5.3.

Overall, multiple stakeholders and sectors are involved within these PPPs. Whilst this is only a small study, it may be indicative of important differences in PPP approaches that need to be appreciated going forward. For instance, it matters who is involved and how additionally this can influence the eventual ecosystem services outcomes. Each stakeholder will bring different expertise and hold different roles and responsibilities within the partnership; this will be explored in Sections 7.4 and 7.5 of this chapter. However, the largest important finding of this study is the crucial role that the third sector plays in the operation of PPPs in UK agriculture to deliver ecosystem services.

7.2.1.3 Governance Structures and Power Dynamics

One of the aims of the PPP model is to provide payments to respective stakeholders, such as farmers, to deliver ecosystem services under PES schemes. These payments to deliver ecosystem

services depend heavily on the governance structures in place within a PPP. In Chapter 4, it was outlined that within the UK many PPPs which focused upon health and wellbeing outcomes were funded by PFI. A prime example of PFI schemes operate across NHS hospitals. However, in the case of the LNP model and other PPPs operating in agriculture, it has often been “left up to LNPs to find funding from alternative sources, such as councils, businesses and charities” (Interviewee L3). Therefore, the contractual arrangements are not as clear within LNPs and other agricultural PPPs. This can lead to challenges surrounding power dynamics and some ecosystem services which are prioritised above others.

Within policy documents it was identified that all three partnerships, CaBA, LNP, and Pioneer, secured initial start-up funding from the government. However, to a variable extent between PPP examples, partnerships were expected to also attract private sector funding and alternative sources of money. The greatest emphasis on this task was placed on the LNPs, followed by CaBA schemes and currently the pioneer projects. This has meant that the types of stakeholders involved, willingness of stakeholders to engage in projects, overall focus and, in turn, the governance and structure of these PPPs are different. It was abductively shown that whoever provided the most funding, resources, or personal investment into a partnership often held greater power than other stakeholders. At times this could lead to a division of labour within the partnership, or a nested hierarchy of power (Buroway, 1998; Ostrom, 2005). In turn, this may lead to certain aims being prioritised above others and the governance structures of partnerships to be altered. These patterns were not clear from the extensive method undertaken, only when the intensive methods were used could this be seen in the research.

The following sections provide an analysis of the workings of PPPs, and their successes and challenges related to the ecosystem services delivered, stakeholders involved and their respective roles and responsibilities. The empirical example of the CLNP is used to add depth and meaning to more generic findings.

7.3 What ecological (dis)benefits should occur from PPPs when managing Agricultural catchments for Ecosystem Services?

The second research question aimed to understand the range of ecosystem services which could be delivered across agricultural landscapes. Through doing so, it was possible to comprehend the benefits and challenges associated with the delivery of ecosystem services in agriculture using a partnership approach.

7.3.1 The role of LNPs in managing land to deliver Ecosystem Services

The overall objective for many agricultural PPPs is to ensure that a wide variety of ecosystem services are delivered across the landscape, where prioritised ecosystem services are enhanced whilst negative effects on non-prioritised ecosystem services are minimised. The LNPs focus on a wide range of ecosystem services delivery. Regarding agriculture, good land management is of the utmost importance to ensure that prioritised ecosystem services are delivered with minimal trade-offs to others. It has been widely acknowledged that agriculture can contribute to a wide variety of ecosystem services. Palm et al. (2014) talk of the ability for agricultural land to manage climate regulation through carbon sequestration and greenhouse gas emissions, and the regulation and provision of water through soil physical, chemical and biological properties of such land. The authors speak of the potential for degraded soils and low productivity in smallholder systems to be improved through partnership approaches. This notion was also promoted by Gove (2018) in the Health and Harmony consultation, which advocated a 'Green Brexit'. The consultation reinforced the idea of public money for public goods (i.e. ecosystem services) and a simplification of bureaucracy and payments, which led to problems in prior agri-environment schemes (AES) under the CAP. The report realises the potential of agriculture to contribute greatly to human health and wellbeing. One way to promote these ecosystem services being delivered is through the PPP model, as put forth in the 25 Year Plan for the Environment (2018).

LNPs, when aiming to look after the natural environment, seek to improve the state of and deliver meaningful ecosystem services across the landscape. An LNP's focus helps to "dictate what ecosystem services are provided" (Interviewee L6). For instance, it was found that this focus partly depends on the geographical features of the area in which the partnership is located. Through an analysis of several different LNP policy briefs, which present the information on the purpose of LNPs in Chapter 4, almost all were found to make mention to specific locality details when making ecosystem services delivery decision; some LNPs being more urban-based may decide to focus on green spaces or urban-related ecosystem services, whereas rural LNPs have the opportunity to focus on a wider suite of ecosystem services.

Agriculture for each LNP was considered a key area to work with in vision statements, given its land coverage. Agriculture's wide land coverage is evident in the EU farm structure survey (2018) statistics highlighting the total farm holdings per LNP area, for instance, the CLNP has 3781 farm holdings within its partnership boundary, as discussed in deliberative workshops. However, findings from recent policy documents, where LNPs have updated their vision statements suggest that not every LNP is engaging meaningfully with the agricultural sector. On paper, agriculture and

engagement with landowners or farmers is mentioned. Indeed, the NFU (2012) released a policy briefing paper which outlined the importance of farmers engaging with LNPs to deliver ecosystem services and for LNPs to offer strategic guidance and support to farmers. This is contradictory, as a policy maker in Chapter 6 also commented that LNPs were found not to be useful for farmers to engage with. In practice few projects across LNPs have had meaningful engagement with agriculture. This is an important finding because it evidences the need for LNPs to devise agricultural related projects to deliver a wider base of ecosystem services, which is especially needed in rural areas, where agriculture represents the largest land use. It also shows that empirically evidence does not always add up to what is happening in reality, which is why critical realists argue for researchers not to hold theories or initial ideas as correct throughout the research process, as research needs to be reflexive and show new ways of looking at what is actually happening in reality.

The following sections detail ways of measuring ecosystem services through mapping and the benefits and challenges of promoting ecosystem services within agriculture. Mapping was shown to be important in deliberative workshops, given the evidence it can provide partnerships and decision makers with (Carlsson and Berkes, 2007; De Groot et al., 2012).

7.3.2 Mapping techniques for Ecosystem Services Vs Local Knowledge

There are several ways to measure ecosystem services, all of which are challenging. The predominant mode of ecosystem service measurement is through mapping. Several models exist to do this, from InVEST to EcoServ, depending upon the scale at which mapping outputs required. Each of these models have noticeable benefits and flaws; notable articles and books have offered a comprehensive overview of the choice's modellers have (Maes, 2012; Martinez-Harms, 2012; Jiang, 2013; Kareiva et al., 2013; Schulp, 2014; de Sousa, 2018; Dufour, 2018). As discussed in Chapter 3, LUCI was used within this thesis because the model offers a greater appreciation than other models of various synergies and trade-offs between ecosystem services, which can then be mapped to support landscape management decisions. The LUCI model was able to produce maps at the site-based level, which provided useful outputs to discuss with local knowledge holders in deliberative workshops. Producing data with a clearly defined focus was an important criterion for ecosystem services mapping (Carlsson and Berkes, 2007). Additionally, Colman et al. (2013) argued that ideally such mapping should be carried out at as fine a resolution as possible to gain a greater understanding of the spatial distribution of ecosystem services, which LUCI could offer.

Models are useful for enabling society to understand the provision of ecosystem services in different areas, and, in turn, better understand how ecosystem services contribute to human wellbeing and use this evidence to inform policy decisions (Burkhard and Maes, 2017; DeGroot et al., 2012). For

instance, the current phosphorus load map for the Greystoke area produced in Chapter 5, enables policy makers to understand how low phosphorus regulation is currently apparent across the central and eastern area of the map (orange and red shading). From this, stakeholders are able to consider policy options and the installation of buffer zones to prevent the accumulation of phosphorous in regions where it could enter waterbodies and affect the environment, to enable a reduction in the level of phosphorus to reach levels seen in the western portion of the map (green shading). However, often the inherent uncertainties with these maps are not carefully scrutinised before they are used (Dufour, 2018). Uncertainties in mapping can arise from the data collected, through to model calculation inaccuracies. It was found, through policy documents, that LNPs believed this approach to be important in gathering a knowledge base of their partnership boundary areas. Ecosystem Services mapping was one of the primary objectives that the majority of LNPs set out in their bids for LNP status and later initial vision statements.

During the deliberative workshops, a consensus was reached that farmers' knowledge should be considered before using mapping approaches. It was argued through both interviews and deliberative workshops, that farmers have a lot of local knowledge which maps would not necessarily be able to represent. For example, the CEH landcover file used within the LUCI model is a 2007 version, meaning that land use could have changed since this dataset was produced. Through talking with farmers and studying the local area more closely, such changes could be considered, and mapping outputs would become more accurate. This enables mapping to become more participatory in nature and consider the most important ecosystem services in an area, through an understanding of different stakeholder values, trade-offs, and differences in perception amongst stakeholders (Reilly et al., 2018; Burdon et al., 2019). Through farmers and other stakeholders being listened to it is theoretically possible that farmers would also become more engaged in partnerships, which would overcome challenges associated with inclusion and participation (Wynne, 1996; Dwyer, 2014; Riley, 2011; Fish, 2011).

It was also suggested by interviewees and workshop participants that there were many uncertainties associated with the data used in mapping approaches and that these maps can be overly technical to understand. Local knowledge, it was argued, is the best way to measure and understand the delivery of ecosystem services. This is not a new idea, indeed Kloppenburg Jr. (2009) argued that agricultural science can be deconstructed and reinvented more effectively by researchers listening to local knowledge from farmers (Van Asten et al., 2009; Thompson and Kaplan, 2014). This knowledge can help to aid novel projects and partnership approaches to deliver ecosystem services, from an in-depth understanding from real-world examples on what is working and what is not. This furthers the case for an interdisciplinary approach to delivering ecosystem services and that ecosystem service

mapping approaches need to be accompanied by a farmers' knowledge. The case-study in Wynne (1996) makes this case especially clear in relation to Cumbria, where in the Lake District there was a clear divide between scientists and farmers, arising from misinformation and a lack of effective dialogue between both groups around measures to limit the amount of radioactive fallout from the Chernobyl nuclear disaster.

However, it is arguable that there are financial and time constraints to consulting farmers on an individual basis, for example an interviewee who is on an LNP board, spoke of whether there was a need to engage with the public and others about the work the LNP is doing, especially as many stakeholders in the LNP work on a voluntary basis. However, in order to truly understand ecosystem services it is argued that this consultation needs to happen. In the first deliberative workshop, participants noted the ease of explaining problems to someone, rather than relying solely on mapping approaches. Through this explanation it was argued that someone can gain a lot more detail than simply looking at a map, which highlighted the importance of talking to people alongside the use of science. As will be discussed later, farmers have become more unwilling to engage with policy makers and technocratic experts. It was found through interviews and literature that farmers often feel blamed and held to account for issues such as land pollution or nitrogen runoff from fertilisers despite their best efforts to look after the environment and externalities which have resulted from other and previous economic activities (Gregoire, 2002; Marietu and Olarewaju, 2009; Carrington, 2018; Chain and Lackey, 2018). Therefore, the relationship between stakeholders working in partnerships would be strengthened through approaching farmers first for their knowledge of ecosystem services being provided before reaching a judgement based on ecosystem services maps which could be unreliable. A form of increasing social capital then would be able to be formulated, which would allow for increased farmer engagement in partnerships, and a symmetrical sharing of knowledge, which could lead to better project outcomes (Dwyer, 2014, Riley, 2011). This point was particularly raised in the deliberative workshops. However, both approaches to measuring ecosystem services would be strengthened if they were used in tandem with one another, through an interdisciplinary lens (Miteva et al., 2012, NEA Follow-on Report, 2014).

Despite the benefits of using both methods to measure ecosystem services, some scholars would also argue that the evidence base is already large (Rose and Sutherland, 2019). Many LNPs seem to already understand the main ecosystem services priorities for areas, as evidenced in their policy documents. Hence, some participants in deliberative workshops argued that there should be more emphasis placed on the delivery of projects for ecosystem services and making sure partnerships are functioning effectively as opposed to expanding the evidence base. Therefore, more action and meaningful policy delivery is needed, above reproducing evidence, which Rose and Sutherland

(2019) argue much of which is already in existence. Nevertheless, ecosystem services still need to be understood through evidence in order to better understand where projects are targeted, and the outputs ecosystem services work is having (Verhagen et al., 2016). Therefore, these two forms of evidence (mapping and local knowledge) can be joined up in a concise and meaningful way to aid the delivery of ecosystem services. In doing so, more benefits of partnership approaches to deliver ecosystem services can potentially be achieved and outweigh the challenges discussed below.

7.3.3 Benefits of Partnership Approaches to deliver Ecosystem Services

Partnerships offer the potential to improve the amount of ecosystem services being provided (Allen and Overy, 2012; Mert and Pattberg, 2015; Kavishe et al., 2019). Maps produced in Chapter 5 evidence the potential for ecosystem services to be improved if the land is managed efficiently. For example, Map 5.8 highlights areas across the landscape where levels of nitrogen have accumulated. The red shaded areas on the map enable policy makers and partnerships to understand where more mitigating features could be implemented to reduce the levels of nitrogen likely to enter water streams and cause issues, such as eutrophication. The map also highlights likely areas where a lot of nitrogen is potentially being produced across the landscape, where farmer knowledge could also be used to identify and corroborate map findings. In turn, farmers could be consulted to reduce their use of nitrogen-based products, associated with run-off from sheep grazing, within agriculture. Therefore, this map enables PPP approaches to consider projects which would help deliver ecosystem services across the landscape where potential agricultural strategies present the opportunity to be improved. However, as farmers are in turn seeking to deliver public goods instead of private goods, a free-rider effect emerges (Cornell and Sandler, 2003; Ostrom, 2005). Farmers will need to be compensated in order to do this, as they are potentially limiting their agricultural production in turn to deliver alternative ecosystem services, and the issue of who should be responsible for paying, with multiple beneficiaries for particular ecosystem services, becomes more important. So, whilst maps may provide some useful indicative evidence and suggestions for land managers, their ability to inform policy in reality may be constrained in particular ways.

The ability to increase the delivery of ecosystem services is also proven to be increased if the right expertise is used within projects, as then projects can be targeted specifically to deliver those ecosystem services likely to be of most value (Marx, 2019). Through working with several stakeholders, resources can be pooled, and local knowledge shared, as identified in interviews and deliberative workshops, including “the private sector to help with the financing of projects”, as identified by a policy maker, “the public sector ... for expertise and to help guide agendas” (Interviewee L4), “farmers ... are really important for ensuring good management of the land”

(Interviewee L7), and “organisations such as the National Trust or RSPB, who can ensure the correct ecosystem services are being delivered” (Interviewee P6). This leads to collaborative working or co-management structures within the partnership, which can offer delivery approaches which were not before conceived of to deliver ecosystem services more efficiently and quickly (Haas, 2004; Carlsson and Berkes, 2005). This was one factor also picked up on through Chapters 4,5, and 6, where individual partners were found to often lead on the CLNP’s individual projects, like the *Cumbria Coast Pollinator Project*, as they were arguably best placed to deliver them given their resources, skills and networks.

Moreover, through working together with other stakeholders this meant that projects could be delivered over larger areas. This helped to contribute towards the landscape scale conservation approach, which was advocated in the Natural Environment White Paper (2011) and mentioned as a key aim for LNPs to work towards. Examples of where this has happened was elicited from multiple LNPs who have worked alongside other partnerships and bordering LNPs, as described in Chapter 6. For example, the CLNP works with the Morecambe Bay LNP and Northern Uplands Chain LNP. These LNPs work together to deliver ecosystem services, even when they cover some of the same areas of land and collaborate with each other when implementing projects. This has meant that projects can be coupled up across the landscape to deliver more ecosystem services than if one partnership alone was acting in isolation, ensuring that there is a landscape wide delivery of ecosystem services, rather than ecosystem services being solely delivered across a narrower radius, building upon the landscape scale approach advocated in the Natural Environment White Paper (2011) and helping to meet one of the initial aims of a LNP approach, described in Chapter 3.

A final perceived benefit of partnerships from the National Environment White Paper (2011) to deliver ecosystem services also comes from the perception that local people can make decisions that affect local areas. Many partnerships help to enable a participatory bottom-up approach to ecosystem services delivery (Khadka and Vacik, 2012; El Asmar et al., 2012; Lufthi et al., 2018; Ardern, 2019). This devolution agenda is linked to the UK government’s current aim to devolve political powers to local communities, as they argue that local authorities and individuals can assess and know the needs of their own communities more thoroughly than centralised government is able to, as policy maker interviews implied. Current funds and partnership powers that have been devolved are noted in the *Secretary of State’s annual report on devolution 2017-2018* (UK Government, 2019). This has resulted in ecosystem services projects becoming more targeted and specific to areas, through the expertise and local knowledge of partners (Short, 2015). Otherwise, if national policies were introduced, it may not be as relevant for some regions. For instance, the UK farming industry is very diverse, with differing arable and livestock farming practices taking place

across the landscape. One project in Cumbria may not be as effective in Gloucestershire, as participants mentioned in the second deliberative workshop. If a policy to increase agricultural productivity, as a provisioning ecosystem services, was adopted nationwide then outcomes would differ as a result and impacts on another ecosystem service would vary across regions, as indicated through the examination of example trade-off maps produced in Chapter 5. Hence, a localised approach through the uptake of local knowledge, may improve the ecosystem services delivery within an area, as more ideas are able to be shared among different stakeholders with differing expertise (Wynne, 1996). Many farmers and partnership implementers in the deliberative workshops argued that, through a greater understanding of localised knowledge, ecosystem services delivery could be better targeted and more efficient.

Through these benefits, PPPs and LNPs, are advancing projects which deliver ecosystem services at a local level, which is also connected at the landscape scale approach level (Zavolloni et al., 2015). Through tackling one ecosystem services, it is possible to have several benefits for additional ecosystem services as well, as was discussed in both interviews and deliberative workshops. Power (2010) explains how multiple ecosystem services provision can provide various synergies which, for example, would enable flooding regulation (as an individual ecosystem service) to improve. The maps presented in Chapter 5 helped to illustrate this case, by highlighting where ecosystem services synergies and trade-offs between different ecosystem services were likely.

It is visible from Map 5.3 that there are many areas in Greystoke that have areas which are susceptible to flooding and where flooding regulation as an ecosystem service could be improved, as indicated by the red shading across the map, which is significant. Arguably, one way to help absorb this floodwater and improve flooding regulation as an ecosystem service would be to plant more vegetation, as water would then be absorbed, and vegetation would act as a buffer zone between areas of more valuable land, as identified in deliberative workshops when participants analysed the flooding regulation map. At the same time as planting this vegetation, in Map 5.1, you are likely to improve habitat connectivity (where this has potential to be expanded from existing broadleaved woodland habitat as highlighted by the red shading on the map), as wildlife corridors can be created (LUCI, 2019). The specific synergies between both habitat connectivity and flooding regulation were also illustrated in Chapter 5. It can also be inferred that whilst biodiversity and wildlife (related to the habitat connectivity map) are not ecosystem services in themselves, they can help to promote other ecosystem services and additional synergies, like pollination. The added vegetation would also act as a carbon sink, enabling carbon sequestration services to be improved (Aspinall and Staiano, 2018). Therefore, through focusing on one ecosystem services in an area, synergies amongst ecosystem services can be realised, and another ecosystem service can also be delivered. This

supports Pywell et al.'s (2015) study that argued that the creation of habitat and improvement of habitat connectivity is complementary and beneficial for a wide variety of ecosystem services (in their example, for improving crop yields). Partnerships enable these experts in different ecosystem services fields to become involved, to tailor projects, and make beneficial ecosystem services more likely to be delivered.

Whilst there are many potential benefits of partnerships to deliver ecosystem services, there were also found to be many challenges, to which the chapter now turns.

7.3.4 Challenges of Partnership Approaches to deliver Ecosystem Services

There are many challenges of delivering ecosystem services within partnerships. Often this arises from the stakeholders involved in each partnership and relationships between them, which may influence power relations. Whilst collaborative working can have its benefits it can also bring challenges, especially as time is often limited to meet ecosystem services delivery targets, and whilst collaboration can occur amongst actors, creating a well-functioning network of stakeholders often takes time and does not always happen (Bodin et al., 2016). This results in stakeholders having competing agendas and may limit progress to delivering ecosystem services, as approaches are not always consistent or arguably not as beneficial as other ecosystem services delivery projects may have been. It was found that one stakeholder might prioritise one ecosystem service over another, with the other stakeholder valuing the other ecosystem services more; as identified by interviewee L3, who spoke of the LNP's chair steering the agenda towards focusing on health and wellbeing as opposed to a focus on other ecosystem services. Therefore, the positionality of stakeholders may hinder PPPs to deliver ecosystem services effectively and hierarchies of power inherent in partnership structures could lead to negative outcomes for projects that the PPPs instigate. Contu and Girei (2014) would argue that through abiding by the goals and definitions of the most powerful in judging the success of partnership collaboration, in this case through the most powerful stakeholder steering the specific LNP's agenda, the partnership would be falling foul to power dynamics.

Trade-offs are arguably the biggest challenge when looking at ecosystem services delivery. Howe et al. (2014), through a literature review analysis, noted that ecosystem service 'trade-offs' were referred to three times as much as ecosystem service 'synergies'. Turkelboom et al. (2018) argue that stakeholder decisions in ecosystem services management are central to trade-off analysis, as highlighted in the previous paragraph, as stakeholders can influence specific projects to deliver ecosystem services within PPP approaches. Spangenberg et al. (2014) specified how stakeholders, as human agents, determine the services provided by means of physical resources, energy, labour and

money. This relates very closely to Burawoy's (1998) extended case study method research, which argued that a division of labour will be created when using nature to produce usable goods. This process undergoes reproduction under a regime of power (resulting from capital and differences in worth and value in a division of labour), specified in Spangenberg et al.'s (2014) paper as being related to physical resources, energy, labour, and money. In terms of partnerships, there is still inherently a power dynamic and power structure which can be seen in the majority of cases – as to produce ecosystem services and improve their value, and continue to reproduce these ecosystem services, various partners must take on different roles which are valued differently, leading to a power dynamic to emerge.

When one ecosystem service is delivered, or prioritised above another, it is likely to have impacts on the delivery of others and sometimes negative consequences for another ecosystem service can occur. For example, one scenario discussed in deliberative workshops, was that if agricultural productivity was prioritised as a land management activity (where instances of already high agricultural productivity were highlighted in dark green on Map 5.2), a reduction in the carbon sequestration potential of that land could be seen. This carbon sequestration reduction was discussed to be a result of increasing methane and other agricultural gases associated with livestock production which would be produced alongside declining levels of vegetation that act as carbon sinks. Therefore, partnerships need to carefully consider the consequences of their decisions before implementing ecosystem service delivery projects. Moreover, a variety of stakeholders need to be consulted before project implementation, to properly understand the extent of different sector's ecosystem service valuations, address any uncertainties in the evidence base or mapping, and valuation beliefs, because otherwise some ecosystem services could decline at the expense of others (Reilly et al., 2018; Burdon et al., 2019). Participatory mapping would be a key approach to consider here, and this would enable greater local knowledge transfers to be understood and implemented into policy design.

7.3.5 Cumbria LNP

Many of these benefits and challenges surrounding mapping approaches became apparent when studying the CLNP case study, and alternative mapping models compared to the maps produced using the LUCI model. This helped to understand the advantages and drawbacks of using alternative ecosystem services mapping tools, advancing work by Bagstad et al. (2013) discussed in Chapter 3, who compartmentalised several different ecosystem services models into ways they could be used. Research participants in the deliberative workshops were able to comment on the usefulness of the maps produced and some of the challenges associated with their reliability and understanding.

7.3.5.1 Previous CLNP Mapping Approaches

The CLNP commissioned a report by Holt (2017) which used EcoServ, as an ecosystem services modelling tool to map out ES across three catchments; Braithwaite, Glenridding and Staveley. The report found areas in which ecosystem services delivery could be improved, particularly around ecosystem services such as flood regulation, following the destruction flooding brought from Storm Desmond in 2015. Many of these areas were shown to be susceptible to flooding in Holt's maps and to have areas where flooding regulation could be improved. This work was found to be useful for giving an indicative picture to the CLNP of where projects could be targeted, and best be focused. It was particularly useful within the partnership, as it could highlight stakeholders with the right expertise who would be best placed to be involved in projects within those three catchments around specific ecosystem services. In one of the deliberative workshops, the usefulness of these maps for monitoring was also mentioned. This was because, given the mapping's large resolution, measurements and monitoring changes would be easily recognisable overtime. This would help with LNP reporting and evaluative work to stakeholders and other interested parties.

However, at the same, this mapping approach using EcoServ was also critiqued by research participants, around its mapping resolution and the complex language used. They argued that the resolution was not refined enough to have enough meaningful impact at the local scale projects would be operating across, in agreement with studies from Boyd and Banzhaf (2007). Moreover, there were concerns with uncertainties in the data related to when the data was obtained and changes in environmental conditions since then. Also, when some of the CLNP board members looked at these maps, they did argue that they were unsure what they were showing and about the definitions of the terminology being used in the reports. Therefore, in Cumbria, it was also argued to be important to simplify the language and technology being used so that all stakeholders can understand the evidence base. This could lead to alienation of some stakeholders, such as farmers, which is why other social scientific approaches are also needed when looking at measuring ecosystem services. If LNPs are to be successful they must learn from the failings of other partnership approaches from the past, such as AES, where if stakeholders (like farmers) are alienated, they are more likely to disengage with projects and the outcomes of said projects are likely to be worse off (McCracken et al., 2015).

7.3.5.2 Use of LUCI as an Ecosystem Services modelling tool

LUCI was used as an ecosystem services modelling tool to map some of these ecosystem services out in the research. As discussed in Chapter 5, Cumbria has a primary focus on tourism and farming related ecosystem services. Participants in the deliberative workshops believed that LUCI was a

useful tool given the specific resolution it was able to provide. Participants argued that it would be useful to use in discussion with a farmer, as you can note things down at the farm level. However, at the same time there were also challenges associated with the tool, regarding uncertainties in the data and whether this impacted upon the reliability of the modelling. Therefore, it was argued that farmers also be consulted to truth the data presented and edits be made to take farmers' knowledge into account.

At the strategic level, it was found based upon interviews, that benefits to ecosystem service delivery could happen if the right stakeholders were involved. As farmers know the land more intimately than others and can help to shape plans for project delivery, which are likely to also need to take place across farmland. However, it was also found that with ecosystem service delivery projects like this, trade-offs could occur. For example, map 5.14 compares the relationship between nitrogen and phosphorous regulation. Whilst opportunities exist to greatly improve both services (covering 41.02% of the land area mapped), there are also noticeable areas where trade-offs are likely to occur (covering 36.66% of the land area mapped). Therefore, in these areas of trade-offs, if nitrogen or phosphorous buffers were put in place it could be to the detriment for provision of the other service. These competing objectives show the challenges around implementing projects, as discussed in Chapter 2, where trade-offs were seen to be a hindrance to PPP approaches delivering ecosystem services. However, through the mapping of these ecosystem services it becomes possible to more clearly understand where project work would/would not be best suited and visualise this, as discussed in the deliberative workshops.

6.3.6 Future Directions

Through answering this second research question, it is apparent that PPPs have been trying to play a part in delivering ecosystem services across the agricultural sector. However, this objective of ecosystem service delivery comes with both benefits and challenges for the state of ecosystem services. Firstly, the way in which ecosystem services are measured needs to be carefully thought through. Many ecosystem services delivery models are different, with different methodologies used, and a large amount of data needed for each. This data can prove hard to access, costly and be too technical for all stakeholders to comprehend. It is more practical to try and use a variety of methods, both social scientific and natural scientific, to build up an ecosystem services evidence base to use within project work. There is a large evidence base already available for some areas and it is arguable that more now needs to be done to instil this evidence into policy. Partnerships can offer many useful benefits for ecosystem service delivery, including the pooling of resources and expertise, which can help ecosystem service synergies to be better understood and delivered.

However, challenges can also arise from competing political motives, which gives rise to power differentials, where one ecosystem service could be prioritised above another causing trade-offs to occur. In the case of the CLNP, much mapping work has been done. However, to date measurement of the progress to deliver ecosystem services has been limited and more work needs to be done to engage with agriculture and farmers to enable more ecosystem services to be delivered. The blueprint for ecosystem services to be mapped, devised by Crossman et al. (2013), may be a useful way in which to consider project beneficiaries and engage in a participatory discussion with key stakeholders around mapping options for local areas that is able to benefit the most people.

7.4 What makes a good Partnership Approach?

7.4.1 Partnership Development and Stakeholder Involvement

This third research question analysed the basis of what makes partnerships work in practice. LNPs were conceived as partnerships that would involve “people from local authorities, businesses, statutory authorities, civil society organisations, land managers and local environmental record centres, as well as people from communities themselves” (Natural Environment White Paper, 2011, 9). This positions the LNP as a partnership with multiple stakeholders from both the public and private sectors. Chapter 6 indicated that LNP boards are very diverse, each LNP “has a make-up which is representative of the main aims and objectives of the partnership” (Interviewee L6). Therefore, LNPs need different stakeholders who have the “expertise to advance individual projects, as individual project delivery is often carried out by individual members of the board who specialise in that field, for example, the National Trust” (Interviewee L5). Dwyer and Hodge (2016) and Hart et al. (2005) in their studies also found that PPPs require stakeholders with interests in different sectors to work together towards a common objective, with a board which comprises the range of stakeholders across these different sectors involved. Hence, in order to make a PPP approach work in practice, several partners would be needed who are able to have the knowledge and practical experience to deliver programmes devised under the authority of the LNP, as previously discussed (Ricci and Conrad, 2018).

It was found that stakeholders on LNP boards did come from different sectors. Muhammad and Johar (2019) argue for a shared sense of responsibility between the public and private sectors for PPPs to deliver their objectives. However, some LNPs had more public representation than private and vice versa. This meant that there was not necessarily always a productive balance of stakeholders to take on appropriate roles and responsibilities, leading to differences in power sharing.

7.4.2 Stakeholder Roles and Responsibilities: Power Dynamics

7.4.2.1 Public Sector

The public sector was argued to have responsibility for enabling the agenda for PPPs to be established as well as for creating the legislative frameworks which must be established for a PPP approach to flourish. The public sector must be able to institute an environment where a partnership can work (Panayides et al., 2015). Issues which the public sector must address when starting the PPP include authority, legislation, regulation, and market openness. Authority denotes the specialised public agencies, for example, PPP supporting units and knowledge centres at national or subnational government levels that aim to provide the key functions and services of PPPs, including policy guidance, capacity building, project promotion, assuring finance, and approval of projects (Jooste and Scott, 2012). Guidance from such public agencies would help in supporting the environment; the project's economic viability; and a technically competent consortium (Zhang, 2005).

However, LNPs were found not to have had as much support from the public sector in all instances, despite initial promises in the White Paper (2011) of support from government delivery bodies, such as Natural England and the Forestry Commission. Without much national guidance, such institutional issues must be decided upon at a more local scale and by other stakeholders. As guidance targets are loosely defined it could lead stakeholders to report 'false successes' from their projects; this creates a 'cycle of failure' with limited institutional learning (i.e. feedback on the negative impacts of ecosystem service delivery outcomes) (Thompson, 2018). Indeed, in Chapter 6 it was noted by a LNP board member that without any clear direction, their LNP was setting their own objectives, and stakeholders on the LNP board were not sure whether what they were doing was right or wrong. Through retroduction, this helps to explain how some partnerships may have become 'sleeping' partnerships. Without any clear direction, and no solidified objectives to work towards, LNPs may struggle to find their place in a governance model where partnerships in agriculture are increasingly becoming the norm (see Edwards et al., 2001).

7.4.2.2 Private Sector

Empirically, the private sector was believed to have the most responsibility for providing efficiency gains and financial resources to help the partnership function. Financial resources were argued to be important for delivering PES schemes. For example, Knoot and Rickenbach (2014) explain how financial incentive programmes, play a prominent role in encouraging the management and

protection of privately held forests in the United States, thus ensuring forest-related benefits sought by society (Kilgore et al., 2007). These programmes may even contribute to broader landscape-scale conservation goals, such as forestland connectivity and other ecosystem service provision (Locke and Rissman, 2012). Private investors could also use these financial incentives to hold stakeholders to account for progress and to ensure that stakeholders follow partnership goals (Parkhurst et al., 2002; Warziniack et al., 2007). If goals were not met or followed, funding could be withdrawn and project work scrutinised. However, this could lead to unfair power differentials between the private sector as funders and the agenda of the partnership, as Thompson et al. (2018) discussed in relation to firms having greater control of the aims and objectives of PPPs due to being the main funders, whilst other stakeholders involved in partnerships were excluded.

Yet, this is not necessarily the case when considering the LNP example. Through the intensive methods used, results suggest that it has been difficult for the LNP sector to attract the private sector to invest financially in this way, potentially given the lack of direction some LNPs have spoken of in the previous section from the state and public sector. Therefore, funding in some cases has been sought through applying for third sector grants, such as National Lottery Heritage Funds. As such, if PPPs in the agricultural sector, are to continue to grow more private sector organisations need to be encouraged to commit to a PPP approach, like the LNP, in order to enable them to be self-sustaining, as they were originally devised by Defra to be.

7.4.3.3 Third Sector

Whilst mostly absent in the literature, the third sector was seen to be responsible for acting as a networking agent, who helped to bring multiple stakeholders together. They were viewed as a major player within the PPPs, either acting as the secretariat and helping to set agendas, as well as providing resources such as time and room space for meetings. The role they play has been underestimated, however, scholars are beginning to realise the extent of their involvement in PPPs. For instance, MacDonald and Cheong (2014) speak of their role in PPPs to conserve heritage sites and historic urban areas. The authors recognise the value of the third sector as a community which has a strong sense of commitment and responsibility to conservation values, more than the public sector can provide alone. In Chapter 2 the only PPP definition to recognise some potential role for the third sector was from Rees et al. (2012, 4): a “particular form of collaboration, PPPs have also been a long-standing feature of certain areas of public service delivery, sometimes also involving third sector partners, and often involving long term contracts, major infrastructure renewal and private financing”. However, even in this definition, compared to the significant role this project found the third sector to have in agricultural PPPs for ecosystem service delivery, the third sector

seems to not be too significant, through the wording 'sometimes'. In LNPs, the third sector had a role to play all the time. In some LNP examples, the third sector was considerably noticeable through their roles and responsibilities as being the leading organisation behind the partnership. Thus, this thesis argues for a redrawing of the PPP model and theory to incorporate this – as illustrated by figure 7.1.

7.4.4.4 Independent Representatives

Independent representatives were seen to be important for mitigating against competing power dynamics within partnerships, as an independent candidate would be less likely to have self-interested motivations behind taking a particular position. Ideally, as research participants argued, the chairperson should be independent. This would be useful as a chairperson helps to oversee the direction and maintains oversight of the partnership, holding individual partners accountable for their work. However, the division of these roles and responsibilities do not come without their challenges, especially around power dynamics, as Buroway (1998), Thompson et al. (2018), Contu and Girei (2014) have all discussed. Partners can have diverse interests which pull them in different directions. Whilst this is necessary Fish (2011) argues, given the diversity of ecosystem services and interdisciplinary expertise needed, an independent chairperson must seek to mitigate against this as much as possible. Thus, for PPPs to truly work they must also be governed effectively and managed well. An independent candidate would allow a more objective approach within the LNP to be taken.

7.4.3 Division of Risk

Risk sharing was believed to be closely linked to the roles and responsibilities of the different stakeholders. The sharing of risk is one of the principles identified under neoliberal governance (Peck, 2011). A PPP approach must ensure that there is a proper risk allocation between the partners involved (Kwak et al., 2009). Muhammad and Johar (2019) state that much literature argues for an equitable risk allocation and sharing of this risk within a PPP approach via reliable contractual arrangements, literature noting such an arrangement includes work by Thomson et al. (2005), Li et al. (2005), Zhang (2005), Jin and Doloi (2008), Kwak et al. (2009), Hwang et al. (2013), UN-Habitat (2011).

The public sector should arguably hold most of the political risks (e.g. uncertainty of government policy, government expropriation, and instability of government) and legal risks (e.g., changes in law and regulation and an inefficient approval process) (Xiong et al. 2019). However, within the LNP example, the public sector risks often fall upon third sector organisations and other public bodies, like Natural England. Deliberative workshop attendees advised that a re-theorisation of the PPP

model would be appropriate to incorporate this third sector involvement into thinking behind governance approaches in the PPP, as presented in section 7.5.3.

Whereas, the private sector was argued to carry most of the financial risk associated with projects. Therefore, LNPs need to attract as many alternative private investors and grants as possible. Tang et al. (2019) explain how private investors can undertake various risks to deliver infrastructure, such as ecosystem services, under this business model than the public sector could. The PPP can increase investment diversity as a result and provide a reasonable risk-sharing mechanism for both the public and private sectors. Additionally, the private sector is better able to manage project risks than the government. This is because private sector companies involved in PPP projects are strongly driven by economic benefits, thereby enabling them to implement highly efficient risk management. In addition, the possibility of project overspending is lower than when direct government management is involved (Tang et al. 2019). The private sector, therefore, should solely retain most of the financial risks (e.g. inflation risk and interest risk) and operation-related risks (e.g. technical and management risks) (Ke, Wang and Chan, 2013; Li, Akintoye, Edwards and Hardcastle, 2005).

However, within the LNP model private stakeholders were few and on some LNP boards were not listed, unlike on CaBA partnerships where private stakeholders were more commonly engaged. This picture is starting to change, with more private stakeholders, such as United Utilities, and other economic partnerships, such as the Local Enterprise Partnership, beginning to realise the intertwined nature of ecosystem services and the economy.

7.4.4 Governance Structures, Power Relations, and Resources Needed

As LNPs are also diverse, their governance structures are very different from one another. Many LNPs could be considered to be operating under a co-management by network arrangement, which is highly diverse and complex with multiple linkages and relationships between different stakeholders (Carlsson and Berkes, 2005). Stakeholder numbers vary as do the stakeholders who make up those boards. A generalisable LNP structure (figure 4.5) shows that there is often one main board, with stakeholders from different backgrounds, which is led by a chairperson and supported by a secretariat. This board then may be split into subgroups who focus on specific objectives, for instance farming. A wider range of stakeholders may then be part of a network, where important LNP updates or emails of events may be sent around to.

These LNP structures can be critiqued. For instance, a lot of the LNPs only incorporated powerful actors (scientists, governments, non-governmental organisations and NGOs) and failed to look at more marginalised groups (Mert and Pattberg, 2015). This was the case in many examples, where

representatives came from local councils, had knighthoods or were very highly regarded in their fields. Whilst this is useful for raising the prominence of the partnership, questions surrounding the time each of these stakeholders can give to the partnerships were raised, because of their other commitments. Not many farmers were found to be aware of the LNPs. It was even found that election to some of the LNP boards was done by request or invite, rather than an open democratic process.

Moreover, some boards were found to be silent partnerships or not to have made as much progress as initially conceived. This was in keeping with work by Song et al. (2016), which found conflicting opinions to exist, regarding the negotiation efficiency, service quality, and accountability of PPPs for the delivery of ecosystem services. Therefore, it is arguable that PPPs need a more accountable governance structure with a board that is democratically elected, with people who are fully committed and have the time to devote to partnerships. This will then enable the service quality and accountability of PPPs to improve. In turn, this could also enable more impacts and outputs to be noted, leading to more interest from private stakeholders and others to fund projects or be involved on the board.

7.4.5 Cumbria LNP

The CLNP has a range of partners, mostly from the public and third sector. However, it was found that not all stakeholders on the board were fully aware of what their roles and responsibilities should be. One person when approached for interview responded asking what the LNP was. This indicates that, although many LNPs have vision statements and have produced policy documents, individual stakeholders may not be fully invested in the work of the partnership.

Moreover, the third sector, in this case predominantly the Wildlife Trust, has the largest percentage of representation on the board of two members. They also act as a secretariat, which is why a lot of the work the LNP does may be related to biodiversity outcomes. For instance, there have been projects the LNP have led on such as *MeadowLife*, which have enabled hedgerows to be planted, to enable habitat connectivity to improve. The latest project will be a pollinator project, encouraging the planting of plants along road verges for bees. Whilst these are positive projects, it does raise the question of whether the agenda is being steered in a specific direction as a result of the proportion of interests represented on the CLNP board and power relations at play, with the Wildlife Trust and other third sector organisations arguably sitting at the top of a nested hierarchy of power within the partnership (Ostrom, 2005).

In terms of risk sharing, the third sector takes on the predominant risk as well. They provide the most resources and write funding bids to other third sector organisations for project funding. Thus, clearly the third sector have a fundamental role to play in the development of the partnership's structure, which future studies need to consider further.

7.4.6 Future Directions

To summarise, for a PPP to be managed and governed successfully a clear direction is needed from a chairperson and the public sector as to what public services need to be delivered. The initial LNP brief was broad and LNPs have had to define for themselves what they should be working on. Therefore, it would be useful if the government issued an updated document with ideas of good practice from LNP projects to be shared amongst LNPs, so that silent partnerships or weaker LNPs can have additional guidance. The private sector should help with economic expertise and financial resources, where they can see the benefits to them as well of ecosystem services being delivered. However, there has been no formal requirement for LEPs or health and wellbeing boards (who have more established links to private sector organisations and could help develop the LNP's network) to engage with LNPs, despite LNPs trying to approach these respective boards on the advice of government. Therefore, if government were to place this requirement on well-resourced partnerships to work alongside LNPs, it would enable a further pooling of resources and private stakeholders to become involved with these models of PPP more easily.

7.5 Stakeholders Appraisal of their Role in the PPP

Through earlier research questions, it was explained what a PPP should look like. It was argued that stakeholders had key roles to play and that the public sector should help to direct an agenda, whilst the private sector should have a key financing role. This section outlines what PPP structures look like in practice, with an understanding of which sectors need to be involved and the benefits and challenges associated with their involvement. Moreover, a redrawing of the PPP model is presented, to highlight these sectors role.

7.5.1 Public Sector

Public sector involvement was valued amongst stakeholders within PPP approaches. For instance, all the previous definitions of a PPP in Chapter 2 and figure 4.7 allude to the key role that the public sector must play in the partnership for the delivery of public goods. For example, Ingram et al. (2018) use an empirical example of The Dutch government's involvement in delivering ecosystem services from cocoa, soy, tropical timber and palm oil production along a Dutch supply chain. They argue that the government needed to take a steering but indirect role in all the partnerships

involved, primarily through supporting, financing, facilitating and partnering policies. Moreover, Reed et al. (2014) state that in order to achieve co-ordination across a landscape, a partnership will typically require some level of facilitation or direction, to bring different actors together across property boundaries. In the case of the LNP example, some individuals involved with the LNP approach believed this facilitator should be the government.

The Natural Environment White Paper (2011) set out an initial vision for the LNPs in order to deliver a variety of public goods and ecosystem services. This was in aid of the government initially setting this facilitation and direction for LNPs to follow, which Reed et al. (2014) describe. However, many of the LNPs represented in this study have been disappointed by the public and governmental support they have received. Where LNPs have been successful is when they have specified their own focus and made this narrower, as explained by interviewee L5. This enabled LNPs to focus more specifically on their strengths and targets as opposed to trying to cover as many ecosystem services in their remit as possible, which the government left the idea of the LNP open to. Thus, there has not been as much direction as LNPs would have liked from government or local authorities and therefore public sector involvement, particularly from government sector bodies, within LNPs and other PPPs need to increase.

Although, examples such as Lincolnshire LNP seem to imply otherwise, where an interviewee stated “we have local authority funding and four full-time council staff employed, with key priorities for the work we need to do clearly defined” (Interviewee L8), suggesting that this partnership has had a good level of involvement from the public sector and direction from local authorities which other LNP examples may not have benefitted from. As a result, Lincolnshire LNP is one of the best performing LNPs across the UK, with deliverable outputs and a functioning partnership (Environmental Audit Committee, 2014). Therefore, Lincolnshire LNP highlights the case for public sector involvement to ensure that the public goods and ecosystem services being delivered by these partnerships are directed in such a way to ensure that the desired outcomes of partnership approaches are met and that multiple stakeholders are able to work together effectively.

7.5.2 Private Sector

In terms of the LNP board makeup, many involved in this research felt that the LNP needed to engage with more private investors. Indeed, Opara and Rouse (2019) speak of the clear expansion of investment opportunities for the private sector, particularly through the delivery of ecosystem services which can be financially incentivised and reward companies profitably within PPPs, in keeping with PES schemes discussed in Chapter 2. Interviewees and attendees at the deliberative workshops spoke of the need to encourage private sector involvement in LNPs, particularly as the

LNP is “viewed as a self-sustaining partnership” (Interviewee P3), which requires “financing” and a “combination of voluntary labour” (Interviewee P5) to make such a partnership work. Conversely, the difficulty in attracting private partners into partnerships within the environmental sector comes from “the inability of individuals to speak in business language” (Interviewee L9). This is as a result of ecosystem services and the environment being hard to value and multiple attempts to monetise the public and private goods received from ecosystem services being contested (Wunder, 2005; NEAFO, 2015). Therefore, the sustainability of these partnership approaches is hindered because of the current stakeholder make-up within partnerships.

Private investors are key to a partnership approach for their specialist business knowledge to filter through to the activities within the partnership and the funding which they can bring to deliver ecosystem services. However, more work needs to be done to communicate the potential of a PPP approach in the environment to potential private sector partners. Solutions identified at the deliberative workshops included the adoption of training courses for board members and stakeholders within partnerships, which would enable environmental organisations and public sector to communicate the benefits of ecosystem services more succinctly and in economic terms to private stakeholders. This would then enable private stakeholders to better understand their role in the delivery of ecosystem services and the benefits to be had for them.

7.5.3 Third Sector

Organisations like the Wildlife Trust, National Trust, RSPB and others were fundamental in enabling LNPs to function. The vast majority of LNPs interviewed had one of these organisations acting as their secretariat. This meant that representatives from this sector were able to offer time and resources, such as meeting space, which other sectors were not able to. However, the importance of the third sector has often been underestimated or omitted within PPP literature. Whilst some scholars do make note of their involvement, e.g. Reed et al. (2014), the majority do not. Many theorise the PPP in simplistic terms of having one or two public and private sector partners. However, through this research, it has been found that PPPs are highly complex and adaptive to different situations, with many different third sector organisations also involved.

It has been identified through the empirical, abductive, and retroductive processes undertaken in different stages of the work of this thesis that many PPPs are different in the structural forms they take. Therefore, this thesis argues for a redrawing of the PPP model to consider this diversity and hybridity of PPP forms. Figure 7.1 illustrates a simplified version of a way PPPs could be conceptualised when delivering ecosystem services within agriculture in the future, when compared to the most common version of such a model in figure 4.7. The figure hypothesises players involved,

the roles and responsibilities that they may have (as outlined in section 7.4) and the overall outcomes of the approach, in order to increase ecosystem services delivery. The third sector has been highlighted in green to show an addition to stakeholder involvement in PPPs, which much previous research has undervalued or neglected to include. Moreover, an ‘independent’ stakeholder category has been added to the diagram. As in interviews and deliberative workshops it became clearer that many participants felt that the addition of an independent chair and secretariat would be useful for providing non-biased approaches to partnership working.

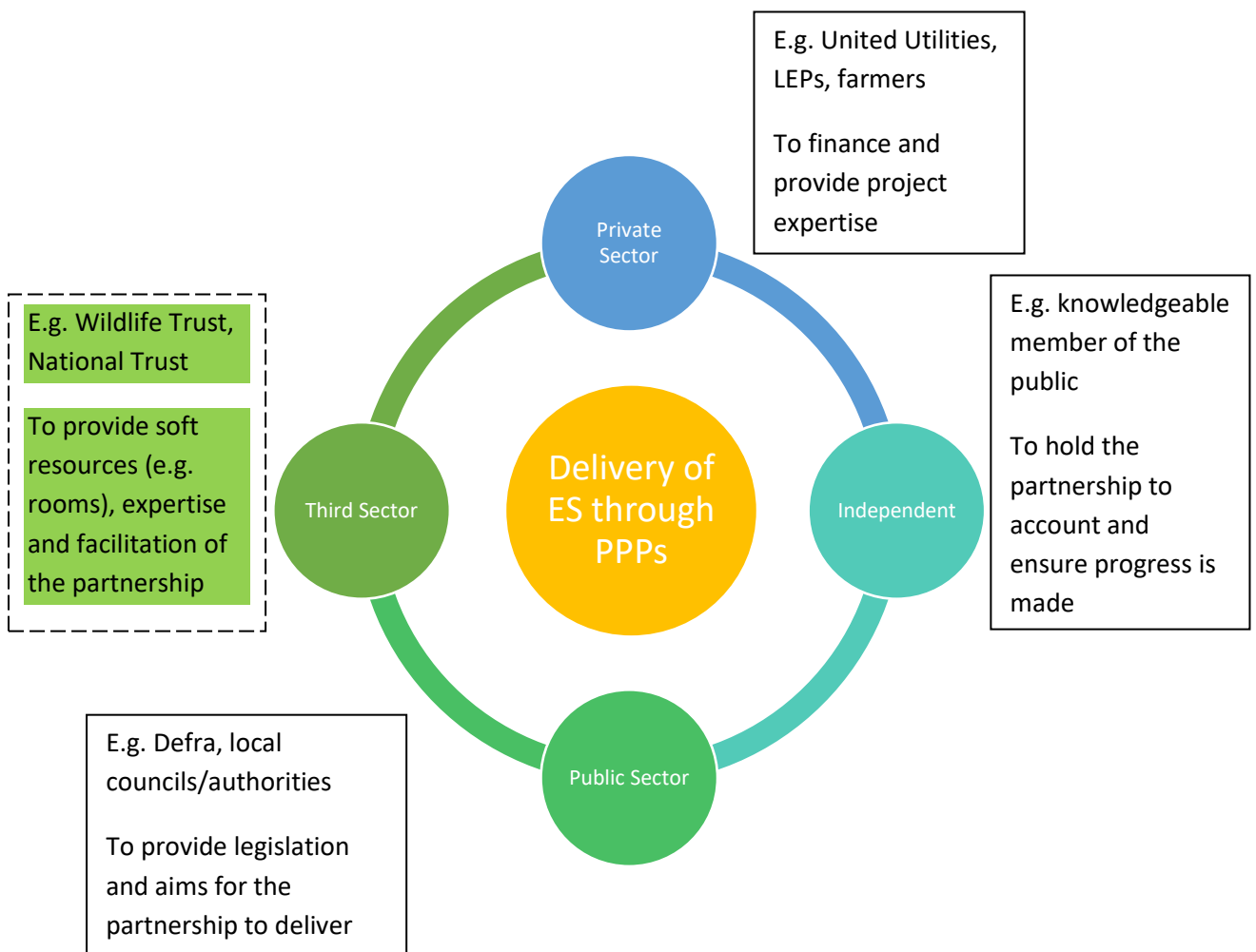


Figure 7.1: Reconceptualisation of the PPP Model

There were also drawbacks considered, especially through the deliberative workshops in relation to the involvement of the third sector. Some argued that environmental NGOs and organisations often were not seen in a positive light by the farming community, which will be discussed in following section.

7.5.4 Farmers' Involvement and Local Knowledge Exchange

Finally, a multitude of practitioners who can deliver these ecosystem services must be involved in these PPPs, i.e. the farmers themselves. Mills et al. (2011) applied the concept of 'collective action' as an analytical framework within their research to understand how individual farmers come together to provide public goods, and the conditions that make this activity a success. Collective action implies that farmers perceive themselves as a group, acting or responding jointly with respect to a joint problem or resource. Through a partnership approach, farmers can theoretically work together with other stakeholders more efficiently to deliver multiple ecosystem services.

As Dwyer and Hodge (2016), McCracken et al. (2015), and Dwyer (2014) imply, this success will depend substantially on farmers' active engagement before and after the partnership has been formally established. Indeed, farmers alluded to their deep connection to the environment and their willingness to deliver ecosystem services in the research, "for us farmers, nature's in our blood" (Interviewee F6). This would suggest that farmers would be willing to engage with partnership approaches. Although, a policy maker suggested that these LNPs are not as relevant for farmers as other PPP examples, saying that farming bodies "stopped showing up [to LNP meetings], as they couldn't see the direct value to their time of being there, it didn't seem like there was much of a focus on farming" (Interviewee P5). Similarly, many farmers during interviews and the deliberative workshops had never heard of the LNP before. Therefore, whilst LNP boards include farmer members, it is as if farming is there as an objective in name but not in practice. Farmers need to be involved as these are the private landowners, in many PPP definitions, who need to work to conserve and deliver ecosystem services.

Farmers were often disillusioned with the environmental sector and what they saw as technocratic experts in agriculture, as through interviews and deliberative workshops it became clear that policy makers "need to win the hearts and minds of farmers back" (Interviewee P2) as they have lost the trust of farmers (a point recognised by Willems and Van Doreen, 2016). Wynne (1996) also spoke of this disconnect between farmers, who felt their opinions were being disregarded by scientists, who were not appreciating the knowledge they had accrued about their own local area over generations. Therefore, farmers have been less likely to actively engage with PPPs, like the LNP. Much of the literature also documents the difficulties of policy makers collaborating with farmers, one such paper called '*Seeing through the Good Farmer's Eyes*', by Burton (2004), highlighted the need for policy makers to understand the cultural dynamics of the farming community. Changes to agricultural practices overtime also need to be considered, such as the shift from productivism to multifunctionalism, which farmers have had to adapt to. It was found through this project's

interviews and workshops that farmers often feel undervalued and held responsible for any negative environmental externalities that occur. Therefore, there needs to be a way by which other stakeholders involved in partnerships can understand the farming communities' perspectives on issues before progress can be made and farmers encouraged to play a more active role in ecosystem services delivery. This will allow trust and co-operation to be fostered, which will lead to a greater sharing of local knowledge and better outcomes for ecosystem service delivery.

It was found to be important that farmers are compensated financially for the work that they do to deliver ecosystem services. During a deliberative workshop, one farmer, argued that the agricultural community would not be able to deliver ecosystem services without being financially compensated for their time in a discussion surrounding how farmers should be rewarded for delivery ecosystem services. This indicates that without payments some farmers would be unable to provide ecosystem services. Yoshida (2018) argues that farmers' involvement in partnership work to deliver ecosystem services may be hindered by their need to financially survive. Yoshida postulates that due to production-oriented pressures of the agricultural industry and livelihood considerations, farmers' human-nature relationships are complicated and have limited their efforts to act upon personal perspectives around conservation and ecosystem services delivery. With some LNPs having limited financial support for agricultural work, this could be constraining the ability to gain farmers' working with them.

7.5.5 Cumbria LNP

The benefits of different stakeholder involvement within PPPs is further evidenced through the case of the CLNP. The CLNP's board makeup changes every few years. The board is made up of individuals predominantly from the public and third sectors, with some independent representatives also on the board, as mentioned earlier in section 7.4.

The chair is currently an independent representative, which is considered within the literature and amongst interviewees to be a positive change. This should mean that the chair has no conflict of interest, which could otherwise influence a partnership's agenda. This was evidenced in the case of another LNP where the chair "steered work more towards the health and wellbeing agenda, as the chair was involved in health work, it was not always the best choice for ecosystem services delivery projects the LNP could have chosen" (Interviewee L3).

Farming representatives were also involved on the board but do not feel as valuable to the partnership as other sectors. Indeed, one indicated that "there's not too much farming related work going on at the moment" (Interviewee L9). This was an interesting finding, as earlier interviews

suggested that farming was one of the main economic areas which the CLNP focused upon. It was found at the deliberative workshops that often farmers did not know the CLNP existed, unless they were also involved in policy level work, as the CLNP operates at a strategic level through its individual partners delivering projects. Through the process of abduction, it is possible to understand that agriculture has not always been a priority for the LNP. Often, this is for a number of reasons, whether that be other partnerships who are already working on agricultural related projects, funding, or power dynamics inherent amongst stakeholders in a partnership which steer partnerships to consider specific agendas (such as healthcare and wellbeing, like in the case of Dickson (2006)).

Participants also noted the importance of the private sector and public sector, yet there was frustration with the contribution these sectors had been making to date. This frustration surrounded themes associated with a lack of guidance, funding and willingness to engage with the partnership, which were common demi-regularities also elicited through interviews with other LNPs. An appreciation of social capital and the ability to discuss and listen to multiple stakeholders may foster greater cooperation amongst different sectors and also enable greater local knowledge to be shared which can then be used in tandem with scientific advice (Dwyer, 2014). To date, the third sector has been the most active in ensuring the running of the CLNP.

7.5.6 Future Directions

It is important that there is fair representation across the sectors for a PPP to properly function and work effectively, as identified by participants at the deliberative workshops and follows the findings of Haas (2004), to address the participatory deficit. This means that the public, private and third sectors should be all involved to equal extents. This will help the sharing of risk, as detailed in section 7.4 and enable an accountability of roles within the partnership to other sectors, as one sector will not be able to predominate the agenda or steer the partnership in a specific direction, as was the case in Interviewee L3's example. Whilst there was frustration with current levels of involvement from the public and private sectors, if this was further encouraged, financial and directional challenges of PPP approaches could be addressed. Within research, more needs to be done to draw upon the third sector as a key aspect of the PPP model and an interdisciplinary approach taken, which can consider both local knowledge from farmers and ecosystem services mapping techniques together. This will enable a more thorough understanding of how PPPs work in practice and how best to deliver ecosystem services, whilst also ensuring that unfair power relations between different stakeholders are accounted for.

7.6 Conclusion

To conclude, as Ronald McQuaid (2000, 9) writes, the benefits of a partnership approach come specifically from “a recognition that any one local actor often does not have all the competencies or resources to deal with the interconnected issues raised in many policy areas”. Through different sectors working with one another, resources can be shared, expertise and knowledge understood, with different stakeholders working together towards the shared goal of delivering ecosystem services. However, this is not an easy task. This research has found that there can be competing agendas from different stakeholders. LNPs found the involvement of the private sector to be a challenge and not all stakeholders may be as invested in the partnership as others. The third sector was also shown to play a large role in PPPs, especially in helping the resourcing and aiding the direction of partnerships, and this is an area that has been underrepresented in previous research, which should be addressed to help redefine what a PPP in the agricultural sector to deliver ecosystem services entails. Additionally, the delivery of ecosystem services is influenced by the decisions stakeholders make; if one ecosystem service is prioritised above another it can either lead to synergies or trade-offs, as illustrated by Maps 5.13 to 5.17 in Chapter 5. Where, for instance, some ecosystem services were shown to be already provided (e.g. erosion and sedimentation maps in Chapter 5), several ecosystem services were shown to be lacking and priorities for further provision (e.g. nitrogen and phosphorous).

In the case of the CLNP, when the partnership was first established their focus was broad and their stakeholders wide. Overtime, the CLNP learnt to narrow down their focus, allowing them to utilise the limited resources that they had to survive. Despite this survival, the CLNP still has much to learn, from getting more private investors involved on the board to publicising their work amongst the public and getting farmers interested with their ideas if agricultural ecosystem services delivery is to increase. Farmers are also likely to be more receptive to the LNP and attending meetings if they know about the LNP’s strategic oversight of project work, and if the LNP talks and listens to farmers, which was emphasised as a current challenge from the results presented in Chapter 6. It was found that far too often there is no ‘middle ground’ between farmers and environmental organisations in the third sector, which needs to change, and an open dialogue of knowledge exchange and especially an appreciation of local knowledge needs to happen. Problems around financial incentives for farmers to deliver ecosystem services also emerged, with Brexit offering an opportunity to redesign a system which many farmers argued to be unjust in its current format.

Considering these findings, some practitioners would argue that the fate of LNPs is set to “fizzle out like damp squids”, as McGlone (2013) stated in the opening quotation of this chapter. LNPs received

little attention in the *25 Year Plan for the environment*, some are silent partnerships, and Defra has shown limited interest in aiding or learning from what the LNPs have been doing. However, it is arguable that the LNPs also have beneficial elements which other PPPs could learn from. LNPs have been delivering ecosystem services with limited resources, with some still defying the odds to survive, often due to several stakeholder's deep enthusiasm for nature and the environment. There is room for LNPs as a model of a PPP to expand and become more successful like other PPPs in agriculture. Farmers were interested in deliberative workshops to know more about the work of the CLNP and be involved.

Ultimately, the success of PPPs to deliver ecosystem services depends on some initial stability that the government and public sector have provided in other PPP contexts. This stability may aid a transition period through which other private sector individuals can become interested in this approach and enable sustainability for the partnership going forward. Trust and confidence can be undermined when the goals of the partners are ambiguous or when their objectives are unrealistic or in conflict, which the government and public sector need to counter.

From a critical realist perspective, perhaps the most significant finding of the research was the role that the third sector plays in LNPs, both in partnership development, encouraging local knowledge exchange (through providing the resources to do so), and directing the focus and agenda of several LNPs and the CLNP. Key organisations were environmental in nature, interested in the provision of ecosystem services, with examples as diverse as the Wildlife Trust and Rivers Trust. These organisations often acted as the secretariat on LNP boards and would act as a point of contact for those interested in finding out more about the LNP's work. However, empirically, their role in many studies has been omitted or under appreciated. Thus, this thesis argues for a redrawing of the PPP definition and conceptual framework to include the third sector and independent representatives, because of abduction and realising what is happening from actual events within the PPP governance structure. From retrodution, it was then possible within the thesis to understand the causes behind third sector involvement: a lack of public sector guidance, and interest from private sector individuals amongst other things.

Through this critical lens and philosophical approach, it has been possible to appreciate how governance structures in agriculture to deliver ecosystem services work in reality (Bhaskar, 1979). Revisiting Bhaskar's (2014, 36) quote: "... society must be regarded as an ensemble of structures, practices and conventions which individuals reproduce and transform, but which would not exist unless they did so. Society does not exist independently of human activity (the error of reification). But it is not the product of it (the error of voluntarism)." It is now clear to see that PPPs are an

ensemble of structures, practices and conventions that have existed for decades. They are reproduced year on year, and have also grown in number (Edwards et al., 2001), however, they have also evolved. This is a consequence of human actions, and underlying factors like power relations and local knowledge exchange. Thus, theory is not static and also needs to change. This study has contributed to the critical realist approach through providing critical findings to advance theoretical development surrounding partnerships in relation to key themes surrounding PPPs, LNPs, ecosystem services, and mapping approaches.

Chapter 8: Conclusion

8.1 Introduction

Agriculture has been highlighted to be a major land management strategy which can be used to influence the delivery of ecosystem services across the UK. PPPs are increasingly being used within agriculture given the devolution agenda in the UK, which seeks to give more political powers to local communities in order to manage several issues, including the environment. Therefore, agriculture is an activity which many of these PPPs see as important to work with, given that by working with the industry there is the potential for more ecosystem services to be delivered and better managed. However, the thesis found that PPPs are extremely diverse from their stakeholder makeup through to the risk and responsibilities stakeholders have. There were idealised characteristics of what a PPP should be, emerging from literature and ecosystem services mapping alongside interviews and deliberative workshops. However, in practice the way PPPs operate was found to be different, with findings emerging around the involvement of the third sector in these approaches, and challenges to their running from limited private sector involvement and public sector direction.

Following on from previous chapters, here the final findings and answers from the study are synthesised. Moreover, the limitations of the study and further research opportunities are presented. Limitations range from the choice of LUCI software for ecosystem services mapping through to the difficulties experienced with collecting interviews when in the field. These limitations are important to reflect upon, as it offers a chance to reflect upon the research process and the researcher's own positionality, an important part of critical realist philosophy. Through doing so, recommendations for further research opportunities and ways in which this project could be taken further in academia are mentioned.

8.2 Key Research Findings

8.2.1 What different models of PPPs are currently in place to provide Payments for Ecosystem Services in UK Agriculture?

From desk-based research and the initial empirical and extensive method used under a critical realist philosophy it was found that there were many different models of PPPs in place to provide payments for ecosystem services in UK agriculture. Three main PPP examples were identified in Chapter 4, with the CaBA approach, LNPs and pioneer partnerships being discussed. These examples had both advantages and disadvantages for delivering ecosystem services in agriculture. CaBA partnerships were seen to be most prominent across the agricultural landscape, both in partnership number and the number of stakeholders involved. LNPs became an approach to deliver ecosystem services across

the landscape scale, which were more modest in number, and had more limited involvement from sectors, with the third sector taking a larger role in enabling their functioning. Whereas, pioneer partnerships are currently being piloted across four different areas of the UK, to target ecosystem services delivery more specifically based around geographical landscape features, i.e. whether areas are more urbanised, marine based or catchment based. The aims and objectives of each of these partnerships were found to enable the form which partnerships take and the level of public-private involvement in each. For instance, in the case of the CLNP, with their focus on agriculture and tourism, they sought to include representatives from farming backgrounds, the business sector, and national parks where a lot of tourists visit. Whilst this is only a small study, it is indicative of important differences in PPP approaches that need to be appreciated going forward. For instance, it matters who is involved and how additionally this can influence the eventual ecosystem services outcome. As Bhaskar (2015) writes, society is not independent from human activity, and it was important to study this from a critical realist perspective.

From this analysis of different PPP examples, LNPs were chosen in this study because many had working with the agricultural sector at the centre of their aims and objectives. The LNP model was relatively new at the beginning of the thesis, being established in 2012, with limited evaluations in academia and policy, which this PhD addressed. LNPs were devised by Defra to work at a landscape scale, adopting new policy practices, as well as be innovative and self-sustaining in their approach to delivering ecosystem services. This offered key opportunities for this thesis to study what a PPP should look like in agriculture to deliver ecosystem services and how it operates in practice. The CLNP was one example of a PPP working in agriculture, having a range of farmers and other agricultural related policy makers on their board. Therefore, it offered an opportunity to study a PPP involved in agriculture in depth.

From studying the LNP approach it highlighted further that within research there is a lack of clarity on the definition and form PPPs should be taking. In the case of the LNP, whilst government postulated this concept in the Natural Environment White Paper (2011), there was not much definition or direction of what an LNP should be doing, which has led to divergent LNPs and forms of co-management as network, which are everchanging, and through which a detailed model for all LNPs is impossible to achieve. The original concept of the LNP was based around an idea to “improve the range of benefits and services we get from a healthy natural environment. They will aim to improve the multiple benefits we receive from the good management of the land” (Defra, 2012a, 1).

This definition, provided by Defra, is broad, which in some ways can hinder the development of the LNP model. For instance, certain LNPs have become sleeping partnerships, whilst others have been

highly successful in ecosystem services delivery. Due to this variation in success, multiple stakeholders have either become interested or disinterested in these partnerships. One key factor to address is the publicity and definition of what the LNP is supposed to do, as many differences were noted in findings in relation to what people understood by the term 'PPP' and 'LNP', with some individuals, who arguably should be key stakeholders in the partnership approach, never having heard of the LNP before. Pinpointing this definition of a 'PPP' and 'LNP' needs to be considered when pursuing future policies as it will enable stakeholders and those involved in these partnership approaches to have better direction and a sense of what needs to be achieved. One factor that definitions should consider is the types of ecosystem services these PPPs should be delivering; i.e. should ecosystem services be delivered through agriculture, the urban environment, the marine environment, all of these, and what specific ecosystem services should be considered a priority above others.

8.2.2 What ecological (dis)benefits should occur from PPPs when Managing Agricultural catchments for Ecosystem Services?

In answering this second research question, approaches to mapping ecosystem services were considered. Several ecosystem service models exist to do this, but through Chapters 3 and 5 it became clear that each have several disadvantages and advantages to their use. Some models, such as LUCI, were found to be more beneficial for site-based mapping at the farm level, offering a finer resolution than other models are currently able to. The LUCI model was also able to show synergies and trade-offs between different ecosystem services in the maps produced. The model could then be used as a participatory decision-making tool for relevant stakeholders to decide which ecosystem services were most in need of delivery and whether synergies could be utilised in project work to manage the inherent trade-offs with ecosystem services delivery effectively. Hence, this model's strengths were based around the scale at which the data could be mapped, the potential to use maps in deliberative workshops, and the model's ability to model ecosystem services trade-offs.

Maps used a traffic-light colour coding system around the Greystoke area to indicate where ecosystem services provision could be improved or if there was no need for project work to do so, as ecosystem services provision was already good. For instance, in the case of erosion and sedimentation regulation, maps in Chapter 5 showed that provision for this ecosystem services was unlikely to be improved in most areas of the mapped region. Alternatively, nitrogen regulation had the potential to be improved and efficiently delivered across much of the mapped area, through the installation of buffer zones which would help excess nitrogen runoff from entering waterbodies. These maps were able to clearly illustrate places where projects could be targeted to benefit

ecosystem service delivery. Additionally, trade-off maps were produced (maps 5.13 to 5.17), which were able to highlight areas where working towards the delivery of two or more ecosystem services would be beneficial for enhancing the synergies between multiple ecosystem services or biodiversity related features. For instance, this was seen in the case of habitat connectivity and nitrogen regulation, where if both these features were delivered together across the landscape net gains could be witnessed. Equally, maps also highlighted where delivering two or more ecosystem services would have a negligible impact or cause trade-offs to occur. Thus, such maps were useful discussion points on ecosystem services which needed to be delivered within agricultural and which PPPs could focus their attention towards.

However, when analysing maps in deliberative workshops, participants did find them useful but also argued that the vocabulary used in mapping and technicality of them needs to be simplified so that all the stakeholders can understand the evidence base being presented. It was argued that this language can be confusing for practitioners, such as farmers, to comprehend which leads to disinterest in discussing what is being shown, and also the likelihood of them to be engaged in partnership work is decreased, which could lead to negative outcomes like those seen in previous AES schemes. Farmers also felt that there were pre-judgements being made about their land and ecosystem services delivery before being consulted, when shown maps before being spoken to. Therefore, it was argued that the relationship between stakeholders working in partnerships would be strengthened through approaching farmers first for their local knowledge of ecosystem services being provided before reaching a judgement based on ecosystem services maps, which could be unreliable due to uncertainties in the data or modelling type used. By using an interdisciplinary approach evidence around where projects would be best suited to deliver ecosystem services would be better understood. Additionally, this would ensure that key stakeholders needed in the partnership approach do not feel alienated from decision making processes and would engender inclusivity, understanding and buy-in to the PPP approach, enabling power relations to be diminished between different stakeholders.

8.2.3 What makes a good Partnership Approach?

This question was answered by examining some of the stakeholders involved in PPPs and answered using interviews and deliberative workshops. Key roles and responsibilities for different stakeholders were elicited, alongside how these roles influence the proportion of risk assigned to different stakeholders, and the governance which needs to be evident in the PPP to ensure it functions effectively.

The public sector was argued to be important for setting the direction and agenda for PPPs. However, LNPs were dissatisfied with their current involvement, where some LNPs implied that this lack of involvement was hindering the setting of effective aims for project delivery. Also, it was argued that without the public sector key skills and expertise surrounding ecosystem services delivery were missing in PPP approaches.

The private sector was also seen as playing an instrumental role in these PPP approaches. However, few LNPs have been able to engage with private stakeholders, partially attributed to the differences in language used between the business and environmental sectors, which hinders the ability for LNPs to disseminate their purpose in business terms to potential private stakeholders. Without private stakeholders involved, it was found that the financial viability of the partnership approach was undermined, and as a result some LNPs were ceasing to exist. However, recently some LNPs, like the CLNP have been able to reengage with private stakeholders who are part of the Local Enterprise Partnership, to understand how all these different sectors could work together more effectively.

This research indicates that there is a disconnect between previous literature and practice. Often the public and private sector are the two sectors most commonly referred to in literature, being considered as the most important for the functioning of PPPs. Yet, this is not the case in LNPs, where in some cases (not all), public and private sector involvement is lacking.

Interestingly, the study did find through abduction that a common feature of PPPs is also third sector involvement, from environmental NGOs like the Wildlife Trust. Many LNPs found the third sector to have the largest role in facilitating the running of PPPs, offering voluntary labour, and offering resources such as rooms for meetings. The third sector is not often part of the definition of what a PPP should be or how it is defined, with some of the most notable definitions given in the literature review in Chapter 2. The only definition which does refer to the third sector comes from Rees et al.'s (2012) article. Therefore, a redrawing of the PPP model was provided in figure 7.1 to incorporate fully all the stakeholders involved in different partnership approaches, evolved from figure 4.7. However, given the differing levels of involvement in several agricultural PPPs of some stakeholders it is impossible to provide a theoretical model which will always be representative for every PPP.

The study proposes the following adaptive definition of a PPP for the delivery of ecosystem services within agriculture, based on findings and the process of retroductive reasoning through the critical realist approach: "a partnership which builds upon the expertise, local knowledge, resources and diversity of stakeholders involved from a multitude of sectors. Each sector can play a unique but hierarchical role within the ecosystem delivery framework. The third sector often offers the backbone behind the partnership, with public and private sector support where available, and

occasionally independent members who help hold the partnership to account". Such a definition incorporates themes of partnership formation, local knowledge and power relations – key themes that were discussed throughout this thesis.

Practitioners and farmers were also shown to be important deliverers and providers of ecosystem services benefits, but some PPPs were found to be more inclusive of engaging with them than others, for instance the CaBA approach. In the case of the LNP, farmer engagement was less successful as in many cases they are peripheral to the process, arguably due to power dynamics within the stakeholder makeup of LNPs which was shown to steer certain LNPs to having a greater focus on other sectors or alternative ecosystem services. Within the CaBA approach, the benefit to farmers was clearer, because of the specific ecosystem services being targeted around land, water and air quality. However, in the LNP approach the PPP's definition and ecosystem services remit is much broader, where some farmers cannot always realise the benefits to being involved.

All these sectors were meant to share risk equally with one another under an idealised PPP model; however, it was often found that the third sector is the most involved in this approach (like in the case of the CLNP, with the Wildlife Trust representing two positions on the board) and so they carry most of the risk associated with the success or failure of partnerships. Due to unequal engagement of PPPs with key delivery partners and stakeholders, such as farmers, the ability to deliver ecosystem services is hindered as the right skills and resources needed are not always adopted through this approach. This, in turn, leads stakeholders to value their own involvement in PPPs in numerous ways and this can lead to power imbalances, as discussed in the following section. Further critical realist studies should build upon this research to redraw theories that reflect the evolving and real-world situation when it comes to ecosystem services delivery in agriculture through PPPs.

8.2.4 Stakeholders Appraisal of their Role in PPPs

The final research question was also approached using interviews and deliberative workshops. Key results indicated that sectors valued their involvement in PPPs differently, depending on how involved they were in partnership approaches and whether they felt their opinions were helping to shape the agenda of the PPP. For example, in theory and previous literature the third sector are not very prominent as stakeholders in PPP approaches, but in this research, they were found to be, potentially fulfilling more of a structural role that is not fulfilled by the other stakeholders. However, this has knock on consequences, as they can be argued to be able to more heavily influence the agenda. This can direct ecosystem services delivery to ecosystem services which they want to prioritise, instead of consulting with other sectors. Whereas, many farmers during interviews and the deliberative workshops had never heard of the LNP before, and so did not feel important in a

PPP approach or able to influence the PPP's agenda. Therefore, whilst LNP boards include farmer members, farming is there as an objective in name but not in practice. Farmers need to be involved as these are the private landowners, in many PPP definitions, who need to work to conserve and deliver ecosystem services. Also, farmers have much to offer and teach other stakeholders through their own local knowledge. They often feel ignored in decision making, and trust needs to be restored between them and key stakeholders, such as environmental NGOs and public organisations, for them to become more engaged in project work.

Moreover, with a lack of definition and the flexibility with which LNPs have addressed ecosystem services delivery, the contractual arrangements are not as clear within LNPs and other agricultural PPPs as they may be in other sectors, like health and education. That is why this study has presented a new definition which could be used by geographers, natural scientists, and critical realists interested in such studies going forward. This may help to overcome challenges surrounding power dynamics and ecosystem services that are prioritised above others, as not all the sectors are involved in the partnership to the same extent, or clear on the roles they have. Therefore, the sustainability of PPP approaches needs to be addressed, as it presents an issue, because of the current make-up of the partnerships.

8.3 Limitations

Whilst these findings have generated interesting knowledge around the PPP approach, it is also important to reflect upon the research process and limitations which may have influenced the results, and how the research addressed these concerns.

8.3.1 Fieldwork Hazards

Firstly, weather proved an obstacle during the fieldwork collection process, with heavy snowfall and rain during the time of fieldwork collection periods. This led to several issues associated with travel to interview sites and some interviews to be cancelled as a result of health and safety concerns. Unfortunately, some of these interviews were never rescheduled due to farmers' time constraints, which could have led to more findings being uncovered.

8.3.2 Ecosystem Services Modelling

With the ecosystem services model called LUCI being chosen there were many drawbacks. Firstly, there was an issue around access to the model. Even though LUCI is due for open access release shortly, initially access has been restricted whilst it was in the testing stage. This led to a long year process of trying to gain access to the software, which limited the research time, through trying to gain relevant contacts to talk to about access and then having to get a contract drawn up and signed,

alongside training in the use of the software. As the model was still in the testing stage, there was also an instance where NATMAP Vector soil values were not matching correctly to the coding used within the LUCI model. This had to be rectified, as it was causing erroneous values and maps to be unable to run. The researcher contacted a developer to enable the situation to be rectified and ensure that the quality of mapping was as strong as possible.

Similarly, data access also proved problematic and time consuming for use within LUCI. For instance, knowing where to find each piece of data took time. Some data files were large, taking hours to download. Others, such as the soil data, required a licence and payment to be used. Some of the data was also not as current as would have been ideal. For example, the CEH Landcover map used is from 2007, the most recent CEH Landcover map is from 2015. However, the Luci model was designed to be used with the 2007 version. This has been discussed within the methodology chapter, where both the 2007 and 2015 maps were compared to one another to show the extent of landcover change and acknowledge this in the outputs.

Other models could have been chosen, such as INVeST. Although, some models require even larger amounts of data which would not have been easy to find and more time, which the project had a limit on. Other models, with higher data inputs, also could give rise to further uncertainties in the mapping produced. Therefore, Luci was the best model for the scale and mapping objectives of the thesis.

8.3.3 Participant Engagement and Positionality

Positionality is another factor to be considered as a limitation, as the researcher was an 'outsider' within the farming community at the start of the research, as discussed in chapter three (Merton, 1972). There was an issue around farmer fatigue with researchers and policy makers which caused this positionality to become apparent, as farmers feel that they are not being listened to and that researchers know more than they do (Holmes, 2014). Therefore, there was reluctance from some farmers initially to speak with the researcher. To overcome this, the researcher shared family stories, to speak about farming heritage in Ireland and build up rapport with individuals to encourage dialogue (Chiswell and Wheeler, 2014). Gatekeepers were also used, such as the CLNP, Newton Rigg College and initial farming contacts, to help with facilitating communication with others in the farming community. Overtime, the researcher's network grew, through snowballing, and a valuable in-depth range of interviews with relevant farmers were carried out.

Despite this, there were still groups within the farming community who it would be useful to engage in future research projects. For instance, the next generation of farmers. Only one interviewee was

part of this demographic. However, despite messages to Young Farmers Associations about the research, no one responded from this group. Much energy and time was put into developing this research and attracting participants to attend both interviews and deliberative workshops. Many notable individuals contributed to the project. Although, the number of invites and those contacted to express their interest, heavily outweighs the number of individuals who took part in the study. The researcher persisted to try and understand a community who were often guarded, in an area where the researcher had not yet visited before the research itself. This presented challenges around access and risk which had to be overcome.

8.3.4 Further Opportunities for Research

This research offers many interesting opportunities for further interdisciplinary research. Within the UK context, agriculture is going to be influenced by Brexit policy, which will lead to the removal of the CAP and a new agricultural subsidies scheme which will have to be devised and implemented by the UK government. A worthwhile project would be to study the changes that Brexit is having on the PPP governance model, perhaps Brexit will bring with it new funding opportunities or stakeholders who will become involved with partnerships such as the LNP. The Health and Harmony consultation highlighted the shift in policy towards public money for public goods, indicating an enhanced focus on the delivery of ecosystem services. Therefore, Brexit could potentially change the very governance dynamics this PhD has discussed. At the time of submission, little is known about the impacts Brexit will have on the agricultural sector, so only some opinions about its impact were able to be gleaned.

Moreover, opportunities exist to instigate a comparative study of PPPs in the UK agricultural sector to deliver ecosystem services with other countries. This would enable a best practice paper to be published, with ideas from other countries also being discussed to see if good practice could be implemented within the UK. Longitudinal analysis may also feature as part of this, to follow the CLNP overtime, and evaluate how its governance has changed. This could then be compared to other examples of PPP as well and how they have changed overtime.

Additionally, comparative opportunities exist to study two LNPs of differing 'success', to see what the strengths and weaknesses are of the two different partnership cases. This was not done in this study given time, as well as resource constraints. The CLNP was chosen alone for this project to be studied in-depth given its involvement with agriculture, which enabled an interdisciplinary approach which comprised mixed methods, each of which taking time to complete. However, through the initial scoping study, several LNP examples were considered where such a study could take place. For instance, Lincolnshire LNP (a highly achieving PPP example) could be contrasted with Lancashire LNP

(a sleeping partnership). Key insights would be able to be evaluated into why both LNPs have had such different outcomes in delivering ecosystem services across the agricultural landscape.

Finally, action research could be undertaken to further understand the PPP's role in delivering ecosystem services across the agricultural sector. As identified through the mapping results, many farmers felt that local knowledge should be prioritised before using ecosystem services models such as LUCI. Hence, participatory mapping tools could offer an avenue for more inclusivity and better engagement of landowners. This approach could then be compared to traditional ecosystem services models, to understand which set of maps are more useful for understanding ecosystem services delivery across the landscape.

8.4 Conclusion

This study has shown that PPPs do have a large role to play in the delivery of ecosystem services across the agricultural landscape. Key gaps in research literature were addressed, including where there have been limited interdisciplinary approaches to understanding ecosystem services (Miteva et al., 2012), and limited evaluations of UK based PPPs within agriculture. The findings found that PPPs were key for providing practitioners with the expertise, skills, resources, and direction needed for ecosystem services delivery. One such example, the LNP, was shown to operate across a landscape scale approach and promote the natural environment at a strategic level.

The empirical example of the CLNP had a strong focus on farming and the delivery of ecosystem services, as outlined in its vision statement. Board members comprised the public, private and third sectors. However, the third sector arguably predominated involvement on the board and heavily influenced the agenda. Whilst other key stakeholders, like farmers, were not aware or consulted of potential projects they could be making decisions on. This indicated unequal power relations within the PPP approach, which in theory should not be happening. The area around Greystoke was shown to have a wide variety of ecosystem services, some being delivered more effectively than others, through using the LUCI model to produce several maps. However, it was argued that mapping should be secondary to local knowledge from farmers due to uncertainties in the data inputs and complexity of the language as well as technology used. Nevertheless, mapping was useful to start discussions around the ecosystem services needing to be delivered, and to highlight specific areas where ecosystem services provision could be achieved, whilst appreciating synergies of ecosystem services to counter trade-offs. The study also highlighted the importance of the third sector's role in PPPs to deliver ecosystem services in UK agriculture and proposed a new definition for these types of PPPs, in line with the critical realist approach, which presents a real-world adaptable option for scholars to consider. Going forward, critical realists may consider a study of rural development,

which combines interdisciplinary methods, to gain a more realistic and useful interpretive stance of governance dynamics and how they have changed over time through the perspectives of the humans who shape them.

Limitations were addressed as thoroughly as possible, with challenges of positionality, and access to farmers and policy makers, overcome to obtain meaningful data. The research project also presents multiple opportunities for further research, through examining the impacts of PPPs post-Brexit, starting a longitudinal study of change overtime of how PPPs develop, creating comparative studies with other PPP examples, and also looking into action research projects and participatory mapping approaches to compare with the maps produced using the LUCI model.

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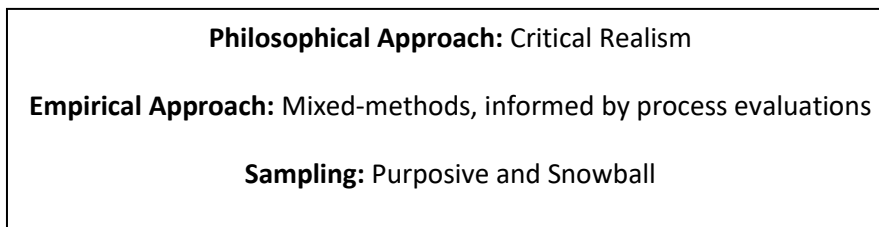
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Appendix 1: Logic diagram illustrating the development of this thesis study

Evaluating the Role of PPPs in the delivery of Ecosystem Services in UK Agriculture



Research Method	Analysis	Research Questions
<p>Desk-based</p> <p><i>Database and Literature</i></p> <p><i>Searching for different examples of PPPs</i></p>	<p>Textual Analysis; thematic coding; synthesis;</p> <p>Deliberative Workshops</p>	<p>KQ1. What different models of PPPs are currently in place to provide payments for ES in UK agriculture?</p>
<p>Semi-Structured Interviews</p> <p><i>Transcription of interviews with policy makers, partnership practitioners and farmers</i></p>	<p>NVivo; thematic coding;</p> <p>Deliberative Workshops</p>	<p>KQ1. <i>As above</i></p> <p>KQ2. What ecological (dis)benefits should occur from PPPs when managing agricultural catchments for ES?</p> <p>KQ3. What makes a good partnership approach? This includes considering who is involved, division of roles and responsibilities, modes of governance and the proportion of risk assigned to different stakeholders.</p> <p>KQ4. How do different stakeholders appraise the relative (dis)benefits of their involvement in PPPs, and what implications does this have for the sustainability of partnership projects?</p>

<p>Case-Study <i>Cumbria Local Nature Partnership</i></p>	<p>Desk-based; Interviews; Ecosystem Service Mapping; Deliberative Workshops (a case-study which is used within each of the other methods to answer all four key questions)</p>	<p>KQ1. <i>As above</i> KQ2. <i>As above</i> KQ3. <i>As above</i> KQ4. <i>As above</i></p>
<p>Ecosystem Service Mapping <i>Use of Luci software to produce a selection of ES Maps</i></p>	<p>Software Analysis; Visual Analysis; Deliberative Workshops</p>	<p>KQ2. <i>As above</i> KQ3. <i>As above</i></p>
<p>Deliberative Workshops <i>Discussion of past research results and the research questions with a larger group of participants</i></p>	<p>Thematic coding; textual analysis from written material produced at workshops</p>	<p>KQ1. <i>As above</i> KQ2. <i>As above</i> KQ3. <i>As above</i> KQ4. <i>As above</i></p>



An evaluation of Public Private Partnerships, for the delivery of ecosystem services within the agricultural landscape: a specific focus on Cumbria Local Nature Partnership (CLNP)

Appendix 1: Logic diagram illustrating the stages of thesis research
Source: Author (2019)

Appendix 2: Participant Information Sheet and Consent Form



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Geography.

PARTICIPANT INFORMATION SHEET

Evaluating the Role of Public Private Partnerships (PPPs) in the delivery of ecosystem services in UK Agriculture

You are invited to participate in the above research study. In order to make an informed decision as to whether to participate you should understand what the project is about, what your involvement would entail and how the findings will be used. Please read the following information to guide your decision: if you have any questions please ask me for further details or clarification. Your decision to participate is entirely voluntary.

What is the purpose of the study?

The aim of this research is to develop our knowledge on partnerships are working within the farming sector to create environmental benefits. The project will focus on the forms these partnerships take, what works well, what does not work well and the key players involved within these partnerships.

Why have I been chosen to take part?

The project is concerned with understanding how partnerships within UK farming to maximise environmental benefits are working. The study uses an evaluative approach to understanding partnerships. You have been contacted as an individual/representative of an organisation of relevance to this topic.

Participation is voluntary and that participants are free to withdraw at anytime without explanation.

What will happen if I take part?

If you agree to participate, we will undertake an interview focussed upon your/your organisation's approach to understanding, implementing or promoting the use of partnerships within UK farming for the delivery of environmental benefits.

Are there any risks in taking part?

There are no known risks in taking part. All data will be held securely and destroyed after research has been written up to comply with the EU's GDPR legislation. If anonymity is requested by the participant this shall also be honoured.

Who is doing the research?

Dan Casey, a PhD Student at the Department of Geography, University of Sheffield. The project is supervised by both Dr Ruth Little (Department of Geography, University of Sheffield) and Professor Lorraine Maltby (Department of Animal and Plant Sciences, University of Sheffield).

Who is funding the research?

The University of Sheffield *and* Grantham Centre for Sustainable Futures at the University of Sheffield.

Are there any benefits in taking part?

There is no payment or formal compensation for participating. However, participants will have access to the finished thesis work with findings of the study and a policy brief which shall be created towards the end of the project (2019).

What will happen to the results of the study?

Findings from the research will be used primarily to write a doctoral thesis. Information will also be used to inform academic publications (through conference presentations and academic articles) and papers written for policy makers and farming representative bodies.

What will happen if I want to stop taking part?

You may withdraw at any point in the research and do not need to explain this decision. You can request that data collected up to that point is destroyed or may give permission for the use of any such information.

You may also refuse to answer specific questions or to request that certain responses be deleted.

Who can I contact if I have further questions?

If you wish to contact the researcher, Dan Casey can be reached at:

Mr Dan Casey

Email: djcasey1@sheffield.ac.uk

Phone: +44 (0)777 280 1433

Post: Department of Geography, University of Sheffield, Winter Street, Sheffield S10 2TN

If you have any concerns with the ethical conduct of this research you can contact the project's main supervisor and Principal Investigator (PI):

Dr Ruth Little

Email: ruth.little@sheffield.ac.uk

Phone: +44 114 222 7983

Post: Department of Geography, University of Sheffield, Winter Street, Sheffield S10 2TN



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CONSENT FORM

Evaluating the Role of Public Private Partnerships (PPPs) in the delivery of ecosystem services in UK Agriculture

Please
initial box

1. I confirm that I have read and have understood the information sheet for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my rights being affected.

3. I understand there is no payment or compensation for participation.

4. I understand that I can at any time ask for access to the information I provide and I can also request the destruction of that information if I wish.

5. I agree to take part in the above study.

6. I agree for the interview to be audio-recorded (recordings will be securely stored in digital format and deleted 12 months after the completion of the project) Yes:
No:

7. I give permission for the transcript of my interview/research to be used for research purposes only (including research publications and reports)

8. I understand that such information will be treated as strictly confidential. I understand that I have the right to anonymity. I assign copyright of my transcript to the researcher (Dan Casey), who may quote the transcript.

9. (Please delete as appropriate) I am/am not happy to be named in the research and I am/am not happy for my organisation to be named in the research.

Please sign and date overleaf

_____	_____	_____
Participant Name and Organisation	Date	Signature
_____	_____	_____
Researcher(s)	Date	Signature

If you wish to contact the researcher, Dan Casey can be reached at:

Mr Dan Casey

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Email: ruth.little@sheffield.ac.uk

Phone: +44 114 222 7983

Post: Department of Geography, University of Sheffield, Winter Street, Sheffield S10 2TN

Appendix 3: Ethical and Risk Approval Forms

 <p>The University Of Sheffield.</p>	<h1>University Research Ethics Application Form for Staff and PGRs</h1>
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This form has been approved by the University Research Ethics Committee (UREC)

Date:	31/5/2016
Name of applicant:	Daniel John Casey
Research project title:	Evaluating the role of Public-Private Partnerships (PPPs) in the delivery of ecosystem services in UK agriculture

Complete this form if you are a **member of staff or a postgraduate research student** who plans to undertake a research project which requires ethics approval via the University Ethics Review Procedure.

or

Complete this form if you plan to submit a **'generic' research ethics application (i.e. an application)** that will cover several sufficiently similar research projects). Information on the 'generic' route is at: www.sheffield.ac.uk/ris/other/gov-ethics/ethicspolicy/approval-procedure/review-procedure/generic-research-projects

If you are an undergraduate or a postgraduate-taught student, this is the wrong form.

PLEASE NOTE THAT YOUR DEPARTMENT MAY USE A VARIATION OF THIS FORM: PLEASE CHECK WITH THE ETHICS ADMINISTRATOR IN YOUR DEPARTMENT

This form should be accompanied, where appropriate, by all Information Sheets/Covering Letters/Written Scripts which you propose to use to inform the prospective participants about the proposed research, and/or by a Consent Form where you need to use one.

Further guidance on how to apply is at: www.shef.ac.uk/ris/other/gov-ethics/ethicspolicy/approval-procedure/review-procedure

Guidance on the possible routes for obtaining ethics approval (i.e. on the University Ethics Review Procedure, the NHS procedure and the Social Care Research Ethics Committee, and the Alternative procedure) is at: www.shef.ac.uk/ris/other/gov-ethics/ethicspolicy/approval-procedure/ethics-approval

Once you have completed this research ethics application form in full, and other documents where appropriate, check that your name, the title of your research project and the date is contained in the footer of each page and email it to the Ethics Administrator of your academic department. Please note that the original signed and dated version of 'Part B' of the application form should also be provided to the Ethics Administrator in hard copy. Ethics Administrators are listed at: www.shef.ac.uk/polopoly_fs/1.99105!/file/Ethics-Administrators.pdf

I confirm that I have read the current version of the University of Sheffield 'Ethics Policy Governing Research Involving Human Participants, Personal Data and Human Tissue',

as shown on the University's research ethics website at:
www.shef.ac.uk/ris/other/gov-ethics/ethicspolicy

Part A

A1. Title of Research Project: Evaluating the role of Public-Private Partnerships (PPPs) in the delivery of ecosystem services in UK agriculture

A2. Contact person (normally the Principal Investigator, in the case of staff-led research projects, or the student in the case of supervised-postgraduate researcher projects):

Title: Mr	Name: Daniel Casey
Post: 89 Erconwald Street, London, W12	Department: Geography
OBT	Telephone: 07772801433
Email: djcasey1@sheffield.ac.uk	

A2.1. Is this a postgraduate researcher project? If yes, please provide the Supervisor's contact details: YES

Title: Dr	Name: Ruth Little
Post: Geography Department, Winter St	Department: Geography
Email: r.little@sheffield.ac.uk	Telephone: 01142227900

A2.2. Other key investigators/co-applicants (within/outside University), where applicable. Please list all (add more if necessary):

Title: Professor	Name: Lorraine Maltby
Post: Animal and Plant Sciences Dept	Department: Animal and Plant Sciences
Email: l.maltby@sheffield.ac.uk	Telephone: 01142224827

A3. Proposed Project Duration:

Start date: 1st July 2016

End date: 30th September 2019

A4. Mark 'X' in one or more of the following boxes if your research:

<input type="checkbox"/>	involves adults with mental incapacity or mental illness
<input type="checkbox"/>	involves prisoners or others in custodial care (e.g. young offenders)
<input type="checkbox"/>	involves children or young people aged under 18 years
<input type="checkbox"/>	involves using samples of human biological material collected before for another purpose
<input type="checkbox"/>	involves taking new samples of human biological material (e.g. blood, tissue) *
<input type="checkbox"/>	involves testing a medicinal product *
<input type="checkbox"/>	involves taking new samples of human biological material (e.g. blood, tissue) *
<input type="checkbox"/>	involves additional radiation above that required for clinical care *
<input type="checkbox"/>	involves investigating a medical device *
<input type="checkbox"/>	is social care research
<input type="checkbox"/>	is ESRC funded

* If you have marked boxes marked * then you also need to obtain confirmation that appropriate University insurance is in place. The procedure for doing so is entirely by email. Please send an email addressed to insurance@shef.ac.uk and request a copy of the 'Clinical Trial Insurance Application Form'.

It is recommended that you familiarise yourself with the University's Ethics Policy Governing Research Involving Human Participants, Personal Data and Human Tissue before completing the following questions. Please note that if you provide sufficient information about the research (what you intend to do, how it will be carried out and how you intend to minimise any risks), this will help the ethics reviewers to make an informed judgement quickly without having to ask for further details.

A5. Briefly summarise:

i. The project's aims and objectives:

(this must be in language comprehensible to a lay person)

The aim of this PhD is to answer questions surrounding public-private partnerships (which bring together different stakeholders – government, landowners and companies) within UK farming and evaluate their effectiveness in promoting both farming productivity and environmental benefits (ecosystem services):

1. What makes a good partnership approach?
2. Who needs to be involved?
3. What are the appropriate roles and responsibilities to make the relationship sustainable?
4. What kind of ecological benefits do these partnerships provide?

ii. The project's methodology:

(this must be in language comprehensible to a lay person)

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1. Semi-structured key informant interviews (which follow an interview guideline) with farmers, government officials, companies and consumers.
2. Desk-based research into public-private partnerships and the forms that they can take.
3. Mapping of environmental benefits (ecosystem services) in the area of study, using a selection of indicators, to illustrate the range of environmental benefits arising from the area and to help inform the research.
4. Deliberative workshops (workshops bringing together research participants to discuss research findings and edit/add to those research findings). Workshops will be held at a central location.

A6. What is the potential for physical and/or psychological harm/distress to participants?

There is no potential for physical and/or psychological distress to participants. However, in line with ethical practice, I will state that interviews may be stopped at any time if the participant wishes and that anonymity can be offered (if desired).

A7. Does your research raise any issues of personal safety for you or other researchers involved in the project? (especially if taking place outside working hours or off University premises)

Potentially – as the research will mostly be conducted by visiting farms and rural parts of the UK. It will also be carried out by driving to different field sites and with this comes personal risks of car accidents, isolation and lack of phone signal possible in some places if needing urgent assistance.

If yes, explain how these issues will be managed.

These issues have been fully accounted for in my risk assessment form. I will make sure that I keep in regular contact with my supervisors – so that they know my schedule and when I am likely to be conducting fieldwork. I will also let a family member/friend know each day where I am. This way if anything does happen someone will know to report this. I will also carry with me my mobile phone in case I need assistance at any time (in case of no signal I will try to search for a satellite phone/radio I might be able to use).

A8. How will the potential participants in the project be:

- i. **Identified?** (i.e. how will you decide who is appropriate to approach?)

Purposive sampling method – through establishing a clear criterion for who to approach before the research begins. Key stakeholder interviews will then be arranged with participants identified, through the internet or their location, who are relevant to the research.

Alongside, a snowball sampling method – After each interview I will ask interviews to suggest others who they believe might be useful to the research and be able to offer interesting insights. These individuals (after further research) will then be identified.

ii. Approached? (i.e. how will you initially engage potential participants?)

Email/Letter – for interviews to be arranged with e.g. key government officials or private companies. Email addresses and relevant individuals to be found online and organisations/individuals to be contacted via this means to see if they would be willing to attend and arrange an interview with me.

Face-to-face – to interview e.g. farmers or consumers whose contact details might not be easily found online or contactable beforehand. The research will then be explained with consent gained if they are willing to engage in an interview.

Email invites – to previous research participants who have indicated they would be interested in further research through engaging in deliberative workshops.

iii. Recruited? (i.e. what will happen before individuals are counted as participants?)

A research study area will be established in the UK – where private-public partnerships are in operation, with a range of criteria set to establish whether an individual can be considered as a participant or not.

An individual will then be approached. The research purpose and what the research is being used for will be explained before asking for individuals to participate in the research. Individuals may then ask me any questions.

Informed written consent will then be asked for, by signing a consent form, before allowing someone to participate in the research.

A9. Will informed consent be obtained from the participants?

Yes No

If informed consent or consent is NOT to be obtained please explain why. Further guidance is at: www.shef.ac.uk/ris/other/gov-ethics/ethicspolicy/policy-notes/consent

N/A

**A9.1. This question is only applicable if you are planning to obtain informed consent:
How do you plan to obtain informed consent? (i.e. the proposed process?):**

I plan to gain informed written consent before the interview starts. I will present a written consent form (attached) to the interviewee and ask them to sign it, so that they give consent to their details being used in the research or if they want to remain anonymous and consent for the interview being recorded. An explanation of the research and an opportunity for the interviewee to ask me questions will be offered to them prior to them signing to give their consent. Information about the project's aims and objectives will also be made available to the interviewee and contact details for myself and supervisors made available if they have questions (e.g. in an email approach to potential participants). Moreover, it will be explained that they have the right to end the interview at any time.

I also understand and am aware of the Data Protection Act. In order to comply with the Act I will make sure participants consent to the use of their personal information before the interview proceeds and my thesis is written, as above. I will not use, share or display this information for any other purpose than what I make clear to participants. When my thesis has been written and marked by the examining board I will destroy any personal research material I have, as it shall no longer be needed.

Remember to attach your consent form and information sheet (where appropriate)

A10. What measures will be put in place to ensure confidentiality of personal data, where appropriate?

In order to ensure confidentiality, I will relay to participants that the material I gather may be contained within my thesis. If they wish to remain anonymous I will ensure this anonymity is followed in the thesis write-up. I will also ask if participants wish to be associated with their place of work. After the research is finished and the thesis marked personal data will be destroyed, in line with the UK Data Protection Act. Material in the meantime will be kept secure on my laptop. I am also attending on the 16th June 2016 a University training lecture on "Looking after your research data" which will help me to put some of this into practice.

A11. Will financial/in kind payments (other than reasonable expenses and compensation for time) be offered to participants? (Indicate how much and on what basis this has been decided)

No.

A12. Will the research involve the production of recorded media such as audio and/or video recordings?

YES NO

A12.1. This question is only applicable if you are planning to produce recorded media:

How will you ensure that there is a clear agreement with participants as to how these recorded media may be stored, used and (if appropriate) destroyed?

When I ask for written informed consent it will also be asked if the interviewee would be happy for the interview to be recorded using a Dictaphone for the purpose of the research. It will be explained that these recordings will be deleted from my Dictaphone after the thesis has been written and the mark for the thesis awarded.

Guidance on a range of ethical issues, including safety and well-being, consent and anonymity, confidentiality and data protection are available at: www.shef.ac.uk/ris/other/gov-ethics/ethicspolicy/policy-notes

University Research Ethics Application Form - Part B - The Signed Declaration

Title of Research Project:

Evaluating the role of Public-Private Partnerships (PPPs) in the delivery of ecosystem services in UK agriculture

I confirm my responsibility to deliver the research project in accordance with the University of Sheffield's policies and procedures, which include the University's 'Financial Regulations', 'Good Research Practice Standards' and the 'Ethics Policy Governing Research Involving Human Participants, Personal Data and Human Tissue' (Ethics Policy) and, where externally funded, with the terms and conditions of the research funder.

In signing this research ethics application form I am also confirming that:

- The form is accurate to the best of my knowledge and belief.
- The project will abide by the University's Ethics Policy.
- There is no potential material interest that may, or may appear to, impair the independence and objectivity of researchers conducting this project.
- Subject to the research being approved, I undertake to adhere to the project protocol without unagreed deviation and to comply with any conditions set out in the letter from the University ethics reviewers notifying me of this.
- I undertake to inform the ethics reviewers of significant changes to the protocol (by contacting my academic department's Ethics Administrator in the first instance).
- I am aware of my responsibility to be up to date and comply with the requirements of the law and relevant guidelines relating to security and confidentiality of personal data, including the need to register when necessary with the appropriate Data Protection Officer (within the University the Data Protection Officer is based in CiCS).
- I understand that the project, including research records and data, may be subject to inspection for audit purposes, if required in future.
- I understand that personal data about me as a researcher in this form will be held by those involved in the ethics review procedure (e.g. the Ethics Administrator and/or ethics reviewers) and that this will be managed according to Data Protection Act principles.
- If this is an application for a 'generic' project, all the individual projects that fit under the generic project are compatible with this application.
- **I understand that this project cannot be submitted for ethics approval in more than one department, and that if I wish to appeal against the decision made, this must be done through the original department.**

Name of the Principal Investigator (or the name of the Supervisor if this is a postgraduate researcher project):

Dr. Ruth Little

If this is a postgraduate researcher project, insert the student's name here:

Daniel Casey

Signature of Principal Investigator (or the Supervisor):



Date: 26/05/2016

Email the completed application form and provide a signed, hard copy of 'Part B' to the Ethics Administrator (also enclose, if relevant, other documents).

GEO6002 Risk Assessment Form

Department of Geography

Name: Daniel Casey (djcasey1@sheffield.ac.uk)

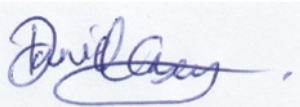
University of Sheffield

Activity: PhD thesis research. Primary data collection obtained from interviews and deliberative workshops with farmers, government officials, private companies and local consumers in the case study site. Research carried out in the UK.

Hazard Detail specific hazards foreseen within each category	Initial Risk Level	Potential consequences Detail potential outcomes of hazards	Minimise risk by: (What control measures will you take to reduce the level of risk?)	Residual risk
Disease (e.g. malaria, rabies, other infectious diseases)	1	As I am in the UK no known disease outbreaks are currently present, however this could change in the future.	Keep up to date with media events and in the case of a disease outbreak follow instructions provided to me by organisations like the NHS etc. Maintain good hygiene and washing of hands regularly. If I fall seriously ill I will seek help from a local hospital.	1
Climate & weather (e.g. exposure)	1	This threat is low. However, as fieldwork is being carried out all year round at times temperatures could be very cold and others hot. Periods of heavy rainfall could also occur.	Remain well hydrated and wear sun protection when necessary. Wear appropriate clothing in cold weather and when driving in rainy conditions reduce speed and be extra vigilant on the roads.	1
Hazardous flora and fauna (e.g. venomous creatures, predators, poisonous fungi)	2	There might be some flora and fauna on farms that could pose a risk or cause an allergic reaction to occur.	Be aware of my surroundings and stay away from what might seem to be hazardous flora and fauna (farmers and locals may advise me if this is the case as well). If anything does happen I will seek help from a local emergency department. Bring an emergency first aid kit into the field with me along with cetirizine hydrochloride tablets in case of an unforeseen allergic reaction (an antihistamine).	1
Physical safety (e.g. personal)	2	Crime in the UK can cause a problem. In the UK incidents can happen.	Hopefully, the risk of this can be reduced from taking a number of precautions. Keep my car locked when not sat in it. Avoid travelling alone at	1

attack, abuse, assault)			night. Be aware of my surroundings. Do not have valuables on show. The police will be informed in the case of any incident.	
Transport and vehicular (e.g. local driving conditions, excessive driving hours, road-worthiness of vehicles, remote or hazardous terrain, check validity of license & insurance)	2	This is a medium risk – as I will be travelling by car to fieldsites. The risk will come from walking (e.g. crossing roads etc.) and also driving on both motorways and country roads.	Only crossing roads at designated crossings and traffic lights (where available). Observing when it is safe to cross a road. Driving at a safe speed. Being extra vigilant on roads and not driving when tired. Making sure I have adequate insurance and breakdown cover in case of an accident. Through doing these things it will reduce the risk of accidents happening.	1
Food and drink (e.g. safety of local water)	0	This will not cause a problem as I am staying in the UK and water supplies and food is safe.	N/A	0
Terrain (e.g. quicksand, cliffs)	2	As some of my fieldwork is being carried out on farms terrains I encounter may vary from one place to the next. Some areas may be hilly and steep, whilst others may be muddy and difficult to walk in.	I will make sure that I wear appropriate footwear (e.g. walking boots, wellington boots). Also, I will judge the terrain and if it seems unsafe will turn away and not attempt to walk through that area. Any areas of land blocked off will also be avoided. A mobile phone and first aid kit will also be carried in case of accident.	1
Methods-related (e.g. lone working, interviews in private spaces)	2	Working alone as a researcher can present challenges – of loneliness and isolation at times. Also, as I am carrying out semi-structured interviews and deliberative workshops sometimes these may be carried out in private unfamiliar spaces.	I have family and friends in London as well as Sheffield and a good network of support available and will make time for social activities alongside research activities, when at home. Interviews and deliberative workshops where possible will be carried out in public areas or areas where other people are also around.	1
Security (e.g. theft)	2	Theft can happen in the UK.	Similar precautions will be taken, similar to the 'personal safety' risk. Where possible valuables will not be carried with me, however if they are I will make sure they are not shown in public. However, when working I may need to bring my own laptop with me, but this will be carried in a discreet bag. Similarly, I will be aware of my surroundings and try and avoid quieter streets where theft may be easier. I will not travel alone at night if possible. The police will be informed in the case of any incident.	1

Accommodation (e.g. security, emergency procedures/fire risk)	1	As I will mostly be staying at my home address, issues are limited. Fire alarms and fire extinguishers etc. are installed around the house and relevant safety measures are already in place. It is also safer as it is private accommodation. However, on some occasions it may be necessary to stay out in the field (e.g. hotels, B&Bs).	When staying away from home – check online reviews of accommodation options, to make sure that they are reputable and safe. When accessing room make note of the nearest fire exit incase of fire. Also, lock valuables in a safe (if the room has one) or out of sight (if not).	1
Local customs (e.g. religious practices, dress codes)	0	The UK is a multi-cultural country and as such there are a number of different cultures and religions. In walking around areas and talking to individuals these will be respected. However, there are no specific local customs.	N/A	0
Security of data and prevention of harm to participants	1	Data will be secure and kept in line with the UK Data Protection Act. However, data may be lost – for example, if my laptop is stolen. As data is not sensitive there should be no harm to participants.	To prevent this I will keep my laptop secure. Similarly, interviews and deliberative workshop information will be anonymised and non-traceable to anyone except me (if this is what the NGO and individual asks for) to prevent harm to the participants. I will also attend a university training workshop about how to keep my data secure.	1
Economic (e.g. loss of bank card, theft of cash)	2	Again with theft this may occur in the UK and a bank card could be lost.	At bank machines I will be careful to see who is around me, shielding my pin and only carrying limited amounts of money I need with me daily. This should prevent major monetary loss. If I lose my bank card I will call my bank immediately to get the card cancelled and will store my bank card in my wallet. The police will be informed in the case of any incident.	1
Legal (e.g. specific local laws and customs, alcohol prohibition)	0	The general laws of the UK will be upheld, as already is the case.	N/A	0
Political stability & Terrorism (protests, civil unrest, terrorist activities)	2	The UK is on high alert in relation to terrorist attacks, given recent attacks in other countries.	Emergency procedures and advice given will be followed in the case of any situation which may arise.	2

Final assessment of overall risk level:	2	The main risks presented in the UK arise from personal safety, theft, economic loss and from the threat of terrorism. Risks also from driving and my mode of transport are apparent.	These have been addressed above, some risks are hard to mitigate against, due to their unpredictability, however as many risk adverse measures have been put in place as possible.	1
<p>Final assessment: Many risks are possible when carrying out any fieldwork activity in the UK. However, when compared to doing research overseas these can be considered (in certain instances) to be lower and by mitigating these risks and being careful and conscientious risk levels should be minimal.</p>  <p>Daniel Casey, 25th May 2016</p>				<p>Overall risk: Initial Risk – Medium (2) Final Risk – Low (1)</p>
Assessor:			Date:	

Guide to Risk Level Rating System Used

Field	Rating	Score	Description
Severity of Harm	High (H)	3	Hazard capable of resulting in death, severe injury or illness, or major loss to equipment or buildings.
	Moderate (M)	2	Hazard capable of resulting in injury or illness requiring absence from work, or equipment damage.
	Low (L)	1	Hazard capable of resulting in minor injury requiring first aid, or inconsequential loss.
Likelihood	High (H)	3	Likely to occur imminently – hazard exists permanently.
	Moderate (M)	2	Likely to occur in time – hazard exists intermittently or the hazardous operation occurs occasionally.
	Low (L)	1	May occur in time – hazard exists infrequently and there is a low expectation of occurrence.
	None (N)	0	Hazard removed completely or effect of potential hazard made impossible by design (applies only to residual risk).

Final Risk Rating	High (H)	6, 9	Priority risk. Must be reduced to a level that is acceptable through practical and effective control measures.
	Moderate (M)	3, 4	Lesser priority risk. Should be assessed to see if further control measures can be applied to reduce to low risk.
	Low (L)	0, 1, 2	No further action is required.

Appendix 4: List of search terms and phrases used within Web of Science

The below list of search phrases were used in desk-based research into the types and forms of PPPs operating in agriculture. Some searches were broader to find some international comparisons for chapter four and difference between the number of partnerships in developed and developing countries, whilst others were narrowed to gain a further understanding of PPPs operating in the UK agricultural sector.

For wider international Comparisons:

Partnership AND Farming OR Agriculture

Partnership AND Farming OR Agriculture AND Environment

Partnership AND Farming OR Agriculture AND Ecosystem Services

Public Private Partnership AND Farming OR Agriculture

Public Private Partnership AND Farming OR Agriculture AND Environment

Public Private Partnership AND Farming OR Agriculture AND Ecosystem Services

Public Private Partnership AND Developing Countries

Public Private Partnership AND Developed* Countries

Public Private Partnership AND Agriculture AND Developing Countries

Public Private Partnership AND Agriculture AND Developed* Countries

Public Private Partnership AND Ecosystem Services AND Developing Countries

Public Private Partnership AND Ecosystem Services AND Developed* Countries

Public Private Partnership AND Agriculture AND Ecosystem Services AND Developing Countries

Public Private Partnership AND Agriculture AND Ecosystem Services AND Developed* Countries

For narrower UK-based Comparisons:

Partnership AND Farming OR Agriculture AND Environment AND UK

Partnership AND Farming OR Agriculture AND Ecosystem Services AND UK

Public Private Partnership AND Farming OR Agriculture AND UK

Public Private Partnership AND Farming OR Agriculture AND Environment AND UK

Public Private Partnership AND Farming OR Agriculture AND Ecosystem Services AND UK

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Appendix 5: Interview Guides and Indicative Questions sorted by Interviewee Type

Policy Maker Interviews: Interview Structure

Introductory Questions

Simple questions

- Role of person
- Understanding of partnerships
- Partnerships that have worked well
- Challenges and lessons learnt

Ecosystem Services (ES)

Linking partnership approaches to the delivery of ES

- Role of ES in partnerships
- The importance of ES
- Whether ES are understood and how to improve understanding

Future Directions

Understanding future policy directions

- Future of partnerships
- Brexit impacts on partnerships

Local Nature Partnerships (LNPs)

LNPs as a form of partnership (a possible area of focus in the interview)

- LNP awareness
- Consultation process for LNPs
- Key players in LNPs
- LNPs that have worked well
- LNPs that have had challenges
- Improvements to LNPs

Concluding Questions

Wrapping up the interview

- Further policy documents
- Contacts
- Opportunity for further information
- Participation in future deliberative workshops
- Questions for the researcher

Interview Questions – Policy Maker

Hi, my name is Dan. Thank you for agreeing to take part in my PhD research project. The project is a University of Sheffield initiative and also is funded by the Grantham Centre for Sustainable Futures. The aim of my PhD is to evaluate partnership approaches that are working towards promoting positive environmental outcomes in UK agriculture. I am collecting data via interviews with key individuals, ranging from policy-makers and researchers through to farmers and environmental organisations. I will be carrying out some environmental mapping of a selected area in the UK and conducting workshops with past participants to enable them to evaluate the relative success of the partnership approach using evidence collected throughout the duration of the project. The research aims to contribute to wider discussions about UK farming policy and provide evidence on the utility of partnership approaches in delivering a variety of benefits for us and the environment.

I appreciate your time and willingness to help. The interview will last for approximately an hour but I appreciate any time you are able to give. However, if you need to stop the interview at any time please let me know. Equally, if you would like clarification about any question I ask, please do ask me to explain further.

~Quick discussion around participant consent, research ethics etc. to follow~

Introductory Questions and Partnerships

1. Can you tell me about your role in the organisation?
2. Can you tell me a bit about the key policies that focus on promoting environmental benefits alongside agriculture?
3. One area of policy work that has become increasingly important recently has been the encouragement of partnership approaches in farming. In particular, partnerships that bring together the public and private sector to work towards a common goal. Do you know about any examples of partnerships within UK farming which work towards providing environmental benefits?
4. Within these examples have any partnership approaches worked well? Why?
5. Similarly, have any partnerships come across challenges? Why and what are the lessons learned?
6. In your opinion, do you believe that these partnerships are a good way of managing resources and encouraging environmental benefits? Why?

Ecosystem Services (ES)

7. I'm also interested in the concept of ecosystem services – how important is the ES approach to your policy area? If not why not?
8. How important is ecosystem services to your policy area? Why/why not?
9. Is the concept of ES understood by those key players involved in its delivery? Why/Why not?
10. What is being done to promote ES among people tasked with delivering them?

Future Directions

11. What do you think the future is for partnership approaches in delivering environmental benefits through agriculture?
12. What might be the possible impact of Brexit on these partnership approaches?

Local Nature Partnerships (LNPs)

13. One example of a partnership approach is a LNP. Are you aware of LNPs?

14. Are you aware if LNPs exist under any other names in the past? How? If so, were they successful?
15. What is working well within the LNPs? Do you feel that LNPs are on track to achieving the aims they set out to do? Why?
16. Are there any limitations/challenges to the LNP model?
17. How could the LNP model be improved?
18. Are there examples of LNPs you feel have been successful or examples of LNPs that have come up against different challenges?

Concluding Questions

19. Are there any policy documents which may be particularly useful for my work in this area?
20. Are there any useful contacts you might be willing to share?
21. Is there anything else you would like to tell me?
22. Would you be interested in taking part in a workshop with other interviewees towards the end of this year or early next year to debate some more issues surrounding these areas of research?
23. Do you have any further questions for myself?

Local Nature Partnerships: Interview Structure

Introductory Questions

Simple Questions

- Role of person
- Role within the LNP
- Reasons for getting involved in the LNP

Local Nature Partnerships (LNPs) and Partnership Approaches

- LNPs as a partnership approach
- Other examples of partnerships in UK farming

Environmental Benefits and Ecosystem Services (ES)

- Evidence used by partnerships to measure ES
- Robustness of ES evidence base for making decisions
- Understanding of ES among key players
- How is understanding being promoted and improved amongst different key players and the public

Specific LNP Questions

- Organisation/s before the LNP
- Need for LNP and conditions of area
- Aims of the LNP and prioritisation/trade-offs of aims
- Key players in the LNP
- Roles and responsibilities of key players
- Relationships between key players – linkages
- Successfulness of the partnership – benefits and challenges
- Community engagement

Future Directions

- Importance of Partnerships for managing farming and ES
- Lessons learnt from LNP approach
- Missing skills and knowledge in the LNP partnership
- Partnerships in the post-Brexit landscape

Concluding Questions

Wrapping up the interview

- Further documents
- Further contacts
- Any other information
- Roundtable discussion invitation
- LNP follow-up work
- Any questions for the researcher

Interview Questions – Local Nature Partnerships

Hi, my name is Dan. Thank you for agreeing to take part in my PhD research project. The project is a University of Sheffield initiative and also is funded by the Grantham Centre for Sustainable Futures. The aim of my PhD is to evaluate partnership approaches that are working towards promoting positive environmental outcomes in UK agriculture. I am collecting data via interviews with key individuals, ranging from policy-makers and researchers through to farmers and environmental organisations. I will be carrying out some environmental mapping of a selected area in the UK and conducting workshops with past participants to enable them to evaluate the relative success of the partnership approach using evidence collected throughout the duration of the project. The research aims to contribute to wider discussions about UK farming policy and provide evidence on the utility of partnership approaches in delivering a variety of benefits for us and the environment.

I appreciate your time and willingness to help. The interview will last for approximately an hour but I appreciate any time you are able to give. However, if you need to stop the interview at any time please let me know. Equally, if you would like clarification about any question I ask, please do ask me to explain further.

~Quick discussion around participant consent, research ethics etc. to follow~

Introductory Questions

1. Tell me a little about your main job role
2. Tell me about how you're involved in the Local Nature Partnership (LNP)
3. Why and when did you choose to become involved with the LNP?

Local Nature Partnerships (LNPs) and Partnership Approaches

4. What is an LNP and why is it considered a partnership approach?
5. Within policy many partnerships continue to develop to deliver a range of services on behalf of the government by working with organisations and businesses. Are there any other examples of partnerships involved in the farming sector you can think of?

Environmental Benefits and Ecosystem Services (ES)

6. Many of these partnerships today focus on delivering environmental benefits, or ecosystem services, within UK agriculture. In terms of managing ES, how are partnerships able to tell what ES needs to be prioritised and what evidence can you use?
7. Is this evidence base good enough – why?
8. Do you believe that the concept of ES is understood by those key players involved in its delivery? Why/Why not?
9. What can be done, or is being done, to improve understandings of ES among key players and the public by your LNP?

Specific LNP Questions (Various questions targeted at each different LNP)

10. Moving onto a discussion more suited to your LNP's work, was there an organisation that existed before this LNP? How did it differ? Why was it in existence? What key players were involved?
11. Pre-LNP what were conditions like in your partnership area? Was there a solid need for the LNP? Why?
12. Looking at the current aims set out by your LNP, do different aims of the LNP receive more or less attention than others? Why?
13. Who are the key players currently involved with the LNP?

14. What are their roles and responsibilities? Which key players are most influential/have most responsibility?
15. What are the relationships between key players? Formal? Informal? Strong? Weak? Non-existent?
16. Can you please tell me about how successful the partnership is at developing and managing farming and ES? What is contributing to the success? What has hindered it? What has been achieved?
17. How were the local community engaged in the project? What was the level of input? How did this contribute to the development/management of the ES and farming?

Future Directions

18. Do you think that partnerships are the way forward for managing farming and ES? Why/why not?
19. What lessons can be learnt from the LNP approach that can inform future partnership projects in the area/city/country?
20. Do you feel that there any missing skills and knowledge currently in the partnership?
21. Do you think LNPs and other partnerships will survive post-Brexit? Why?

Concluding Questions

22. Are there any documents relevant to the LNP which may be particularly useful for my work in this area?
23. Are there any useful contacts you might be willing to suggest for me to contact?
24. Is there anything else you would like to tell me?
25. Would you be interested in taking part in a roundtable discussion with other interviewees towards the end of this year or early next year to discuss the findings of this research?
26. Do you have any questions for myself?

Interview Questions – Farmers

Hi, my name is Dan. Thanks very much for agreeing to take part in my PhD research project. The project is a University of Sheffield initiative and is collaborative with Defra. The aim of my PhD is to evaluate public private partnerships (PPPs) operating within UK farming which aim to promote environmental outcomes. One way by which I am collecting my data is from interviews (like this) with you a farmer who plays a fundamental role in looking after a lot of the UK's environment. Whilst I am not a farmer myself my family has a long history of farming in Ireland – sheep and vegetables. I'm always amazed by the stories they are able to tell and teach me about and I'm looking forward to hearing your stories as well. I'm also conducting interviews with policy makers, researchers, those responsible for implementing the partnership and practitioners. I'll also be reading literature to find information, be carrying out some environmental mapping of the area and conducting deliberative workshops (bringing past participants all together to discuss my results and offer me feedback on my initial findings). The research will be able to contribute to a wider discussion about UK farming policy and how these PPPs deliver a variety of benefits for us and the environment – not just food production.

I appreciate your time and willingness to help. The interview will last for between approximately an hour and an hour and a half but I would be grateful for any extra time you have. However, if you need to stop the interview at anytime please let me know. Equally if you would like clarification about any question I ask please do tell me.

~Discussion around participant consent, research ethics etc. to follow~

Introductory Questions

1. Tell me a bit about your farm and how long you've been farming for
2. Why did you take up farming?
3. What different activities do you carry out on your farmland? (e.g. food/tourism)
4. Are there others who also help on the farm?
5. Have you experienced changes over the last few years in how you run your farm? What are the main changes? Why have you had to change your practices?
6. In regards to legislation, what are the main forms of legislation you have to deal with today in the UK? What are your feelings about this legislation?

Public Private Partnerships (PPPs)

7. Have you heard of a term PPP and what do you understand by it?
8. In farming, do you know of any PPPs? If so, how is this a PPP?
9. Are you aware of any organisations (outside the farm) who aim to help the wellbeing of the farming community and the environment at the same time?

Local Nature Partnerships (LNPs)

10. Have you heard of the term LNP before? What do you understand by this
11. Are you aware that your region has an LNP?
12. If so, does the LNP contact you on a regular basis? How? Why?
13. Do farmers have a say within the LNP?
14. What is the LNPs involvement with your farm? Why do they encourage you to allow their involvement? Do they provide any support to you?
15. To what extent do you believe the LNP has made a difference to your farm?

Ecosystem Services (ES)

16. How do you manage the environment successfully at the same time as producing produce?
17. Do you believe it's important to manage the environment on your farmland? Why/why not?
18. Have there been changes to how you produce goods and manage the environment at the same time over the years? Why?
19. Do you monitor environmental characteristics around the farm? How? Why?

Future Directions

20. For your farm to remain competitive what further support would you benefit from?
21. Do you believe the LNP is a useful organisation to help farmers like yourself? Why?
22. In regards to 'Brexit', what opportunities and challenges can you see this bringing to your farm?

Concluding Questions

23. Are there any other farmers who you know, like yourself, who may be willing to talk with me?
24. Is there anything else you would like to tell me?
25. Would you like to ask me anything?
26. Finally, in July 2017, I'll be holding a range of roundtable discussions to discuss these issues further with different interviewees. Would you be interested in attending?

Appendix 6: List of Interviewees and their Affiliations

Policy Makers (P)	LNP Implementers (L)	Farmers (F)
Julian Harlow (Natural Capital Select Committee, Defra)	Dr Colin Studholme (Gloucestershire LNP, also Wildlife Trust)	John and Jack Peile (Greystoke Estate)
James LePage (Natural England)	Liz Mile (Kent LNP, employed as part of Kent County Council)	Will Cockbain (Keswick)
Pat Thompson (RSPB)	Antony Leeming (Cumbria LNP, also has links to farming in the past and own estate)	Will Rawling (Calder Bridge, also on Cumbria's LNP board)
Neil Johnson (National Trust)	Lord Inglewood (X-Cumbria LNP Chairperson, also House of Lords)	Ruth Walters (Bamber Bridge)
Paul Cottingham (NFU, also on the board of Devon's LNP)	Graham Jackson Pitt (Cumbria LNP, also Wildlife Trust)	Ian Corri (Farming Contractor, Greystoke Estate)
Professor Mark Reid (Newcastle University, researcher and policy adviser)	Matt Millington (Hull & East Riding LNP, North Yorkshire LNP)	Donald White (Farming Contractor, Greystoke)
	Tim Mitcham (Lancashire LNP, also Wildlife Trust)	Paul Barnes (Bassenthwaite Lake, Keswick)
	Fran Smith (Lincolnshire LNP, employed as part of Lincolnshire County Council)	Bill Grayson (National Trust Tenant, Kendal)
	Gemma Wren (Morecambe Bay LNP, also National Trust)	

Total number of interviews: 23 semi-structured interviews (1 hour to 3.5 hours in length)

The coding system used is randomly anonymised to protect anonymity of research participants. However, so the reader can tell what group the interviewee belonged to in-text if cited, the following letters are placed before the interviewee numbers:

P – Policy maker

L – LNP implementer

F – Farmer

For instance, F7, would refer to an interview with a farmer.

Appendix 7: Extract from an interview transcript which has been thematically coded

(Extract from Interviewee P5's Transcript)

...

Yes, no, definitely. Going forward, if you said there were **key people or key organisations that need to be more involved [KC37]** within these various partnerships we've discussed, whether that is the **Catchment Scale Partnership or Local Nature Partnerships [KC9/KC17]**, who would you say should be more involved in those?

I think it, I mean, I would say that's pretty much in line with what we've been talking about, so I think there's quite that genuine mix of **national local politicians [KC35]** stroke stakeholders, **land management community [KC4]**, **environmental NGO's [KC3]** and then the kind of new interests potentially, the **potential funding [KC6]**, well funders, you know, so we **talk about flood alleviation and catchment management to reduce floods [KC5/KC22]**, you know, whose going to broker how we do some of this kind of stuff. We've never actually had **the insurance industry [KC1]** brought in, I mean to some extent the kind of conversation were having around **SCAMP [KC9]**, well that was to some extent **underpinned to drinking water [unclear 1.23.49.9]** who accepted the argument that if we worked in this new way there would actually be benefits for the water customers. So, where's the benefit for the insurance company, where's the benefit for the people that are investing now in new means of protecting some, you know **protecting downstream flooding [KC5/KC22]** for example. So, we can have fairly narrow conversations but **there may be new ways of brokering some of these conversations as well, bringing kind of new interests in basically [KC10]**.

Yes.

So that's one, I think the other **community of people that are often just not involved at all [KC37]** really are the more kind of **public stakeholders [KC1]** who are often, well let's face it are mostly the people that are **paying for what we do [KC6]** at the moment.

Yes.

I really don't have any say in this and in some of these **upland catchments, uplands [KC19]** again, they are really the drivers of the overall **economic picture [KC26]**, so the **access and recreation, tourism visitor agenda [KC24]** actually is what really drives the local economy in some of these places, whether you like it or not and **Cumbria's [KC19]** a great example of that when one reflects on what happened during the **foot and mouth incident [KC29]**, the major crisis, you know back in two thousand and one, two I think it was where the **Cumbrian economy just crashed and burnt [KC19/KC26]**...

Yes.

Because people couldn't come into Cumbria, although it had a devastating impact on the farming community [KC4], the impact was much much wider felt and all the economic analysis that's been done since then, you know really articulate just how critical that [unclear 1.24.30.7] economy [KC26] is to the whole kind of Cumbrian thing.

...

Below is a list of 37 key codes [KC] which were used in analysing both interviews and deliberative workshops to draw out key emergent themes. These codes enabled easier searching through interview transcripts for similar and contrasting opinions. Parts of transcripts where two or more codes could be applied were shaded in a green colour, to draw attention to more complex underlying themes:

Key Codes

Public Sector [KC1]	Ecosystem Services [KC5]	PPP [KC9]
Private Sector [KC2]	Financial [KC6]	Future [KC10]
Third Sector [KC3]	Nature [KC7]	Power [KC11]
Farmers [KC4]	Natural Capital [KC8]	Skills [KC12]
Language [KC13]	LNP [KC17]	Evidence [KC21]
Policy [KC14]	LEP [KC18]	Climate [KC22]
Government [KC15]	Location [KC19]	Listening [KC23]
Defra [KC16]	Mapping [KC20]	Tourism [KC24]
Green Infrastructure [KC25]	Livestock [KC29]	Knowledge [KC33]
Economy [KC26]	Business [KC30]	Brexit [KC34]
Health [KC27]	Diversification [KC31]	Politics [KC35]
Agenda [KC28]	Sustainability [KC32]	Public [KC36]
Engagement [KC37]		

Appendix 8: Example of a ten-point interview key summary

Interviewee L1

1. LNPs followed the **Biodiversity Action Plans (BAPs)** in many areas. These were set up following the 1992 Rio convention on biological diversity which recognised the need for these BAPs. The UK was one of the first countries to follow through on devising some. However, that's all they were plans – at different scales – very ambitious but a lot of targets still not met. Each target was not prioritised. LNPs followed this to incorporate some of the BAP frameworks into their work but also broaden the scope to focus on business and the health sector too.
2. There was an LNP bid system by government before LNPs were established. Much argument over the Cotswolds area LNP and several counties applied for LNP status given that the Cotswolds covers seven counties, however, Gloucestershire LNP which covers a much large area received this status. Strategic board consists of 8/9 people, including most importantly a strong link with the **Local Entrepreneurship Partnership (LEP)** ... something that other LNPs tend not to do so well. All board members get on well given personalities and are high profile. No skills/expertise said to be missing. Noted by the latest evaluation of LNPs across the UK as being in the top 25 percent of LNPs and operating to a good standard.
3. LNP is considered to be a 'light touch' approach. There is a loose association of partners which work towards a common agenda ... LNP only work on certain projects together under its remit (most prominent being natural flood management. Not much work with/around agriculture specifically. However, each partner delivers a number of different beneficial projects themselves.
4. Jenny Phelps would be the person to talk to re. agriculture and PES schemes. The LNP does do some engagement with the FWAG (Farming Wildlife Advisory Group) in Gloucestershire. Most work with farmers comes from the natural flood management strategy which covers areas of agricultural land, where dams and felled trees were positioned near Stroud, so farmers need to be consulted.
5. Many projects are set up without empirical evidence but there is a perceived need – e.g. the 2012 flooding event
6. One major area which needs work to make it long-lasting and sustainable is the mechanism to deliver ES – i.e. who should pay? One avenue might be taxation of the community, at the moment many projects funded for a few years by the Environment Agency. Thus, the overall mechanisms are weak.

7. Through Brexit there will be a believed further rationing of money ... public money for public benefit ... and there is a need for more of a landscape approach to conservation as highlighted in the Lawton Report (Lawton was not original in his thinking, was first to articulate it, but this has always been the ultimate goal). Cornwall/Devon area is a good example of 'upstream thinking'. E.g. Wessex Water found it cheaper to pay farmers to remove phosphates/nitrates from the water than them removing them further downstream.
8. Gloucestershire LNP developing an innovative **Green Infrastructure Benchmark scheme**, being piloted and due to be released at end of this year. Aims to promote development of sustainable and manageable GI projects and give accreditation to providers where due. Promoting economic development (rather than opposing it) at the same time as benefiting wider goals of biodiversity, health, environmental regulation etc. whilst also removing work from the Local Authorities (who do not have specialised knowledge of GI or wider sustainability issues).
9. LNP wrote an application for LEP to the European Growth Funds ... around Environmental Enhancement, regeneration and economic growth and secured £3.3 million to support three main projects they are working on. However, **funding remains the biggest challenge** for the LNP. Government not willing to financially support the LNPs. Luckily, Wildlife Trust pays Colin to do secretariat role. Defra have recently announced a new funding application for a £5000 grant but still that's no way near enough.
10. LNP not engaging with the public very well. Wants to be 'invisible'. No official website for the LNP, only the old BAP website is online at the moment. There is a risk that promoting the LNP will cause an overburden of work for the small board. They publicise their successful projects at the end but that is it.

Also, mentioned at the end he believes Natural England will cease to exist in a number of years given pressure from above and them not critically objecting to development plans. Will send on further resources, members of the board, happy to be used as a case-study (if chosen) and take part in the roundtable discussion. Also, believed that the 25 Year Plan was due to be released 2 weeks ago but was pulled last minute.

Appendix 9: List of Deliberative Workshop Attendees and Affiliations

Tuesday 15th January 2019

Name	Organisation
Graham Jackson Pitt	Cumbria Wildlife Trust and Cumbria LNP
Gemma Wren	Cumbria National Trust and Morecambe Bay LNP
Simon Hill (non-interviewee)	Area Ranger (Coniston and Little Langdale), Cumbria National Trust – work with tenant farmers
Paul Farrington (non-interviewee)	Cumbria National Trust – work with tenant farmers
Bill Grayson (non-interviewee)	Farmer
Tonia Armer (non-interviewee)	Farmer
Martin Fishwick (non-interviewee)	Farmer
Christa Nelson (non-interviewee)	Cumbria Wildlife Trust and Farmer

1 scribe and facilitator – **Amanda Cave** (X-University of Sheffield MA Student)

Friday 8th February 2019

Name	Organisation
Pat Thompson	RSPB
Helen Rawlinson (non-interviewee)	Countryside Officer, Arnside and Silverdale AONB
Celia Tibble (non-interviewee)	Cumbria County Council and Cumbria LNP
Adam Day (non-interviewee)	Director of Cumbria Farmers Network
Lord Inglewood	X-Chair of Cumbria LNP, House of Lords
Jackie Jobes (non-interviewee)	Gloucestershire LNP Partnership Manager
Jenny Phelps (non-interviewee)	Gloucestershire Farming and Wildlife Advisory Groups' (FWAG) Senior Farm Conservation Adviser
Amy Cowburn (non-interviewee)	Natural England (Natural Course Project Officer, Cheshire to Lancashire Area Team)
Jo Lapin or another representative (non-interviewee)	Cumbria Local Enterprise Partnership (LEP)
James LePage	Natural England
John Peile	Farmer
Maurice Hall (non-interviewee)	Foundation for Common Land, Farmer
Pauline Blair (non-interviewee)	Farmer
Libby Bateman (non-interviewee)	Countryside and Landowners Association (CLA)
Julia Aglionby (non-interviewee)	Executive Director at Foundation for Common Land, Farmer, Natural England – lots of affiliations

2 scribes and facilitators – **Amanda Cave** (X-University of Sheffield MA Student), **James Brooks** (PhD Student, University of Manchester)

Appendix 10: Indicative Timeline of Activities for Deliberative Workshops

Programme – Tuesday 15th January 2019 and Friday 8th February 2019


Time	Session
08:30 - 09:15	Registration, refreshments and networking
09:15 – 9:45	<p>Welcome Presentation Dan Casey (University of Sheffield, UK – PhD Researcher) Introduction to the research and findings so far. Brief outline structure for the day explained. Opportunity for initial thoughts around the topic and Q&A. ACTIVITY: Post-It Notes in a sentence/few words “What comes to mind when you hear the phrase PPP?”</p>
9:45-10:50	<p>Whole Group Discussion 1 Environmental Concerns in Cumbria</p> <p>This group discussion will focus upon questions from the group which arise from the initial welcome presentation. Discussion around some of the main environmental problems in Cumbria (using past interviewee prompts) and what governance approaches/resources are needed to address them from participant feedback on the day. This will help set up a wider discussion and other activities for the day.</p>
10:50 – 11:10	Break
11:10 – 12:40	<p>World Café 1 Approaches to Partnership Working</p> <p>This world café will bring participants together in smaller groups of about 6-7 to answer the following questions:</p> <ol style="list-style-type: none"> 1. What partnerships are the main ones you know of that focus on delivering ecosystem services within farming in Cumbria? (10/15 minutes) <p>ACTIVITY: Place the partnerships discussed as to where your group thinks they should fit on the large A3 PPP diagram provided (5 minutes)</p> <ol style="list-style-type: none"> 2. What are the strengths of these partnership approaches? (10/15 minutes) 3. What are the weaknesses within these partnership approaches? (10/15 minutes) 4. Who are the key players that need to be involved in any such partnership approach and why? (10/15 minutes) <p>Group feedback at the end. One person from each table to feedback findings from the group (5 minutes each), opening up to a wider group discussion (15-20 minutes)</p>
12:40 – 13:30	Lunch
13:30 – 15:00	<p>World Café 2 Ways of measurement and payment for delivering Ecosystem Services</p>

	<p>This hour slot will be used to consider how policy can best measure and reward farmers for delivering such a wide selection of environmental benefits. There will be a focus on ecosystem service mapping techniques.</p> <p>Maps will be presented from Dr. Alison Holt's (Natural Capital Solutions, UK) work for the Cumbria LNP and those produced from the PhD project.</p> <p>Participants in alternate small groups of 6-7 people will be asked to discuss:</p> <ol style="list-style-type: none"> 1. Is mapping the best way to measure ecosystem services? (20 minutes) 2. What alternate forms of measurement are also possible? (20 minutes) 3. How should farmers be best rewarded for their delivery of ecosystem services? (20 minutes) <p>Group feedback and discussion at the end.</p>
15:00-15:20	Break
15:20 – 16:05	<p>Imagining the Future 1: Farming Possibilities</p> <p>ACTIVITY: Flip-chart Brainstorming</p> <p>In smaller groups of 4-5 brainstorm what are the biggest opportunities, challenges and possible solutions for farming going forward in delivering ecosystem services. Use a different coloured pen for each theme.</p>
16:05 – 16:50	<p>Imagining the Future 2: Idealised Partnerships of the Future</p> <p>ACTIVITY: Flip-chart Brainstorming</p> <p>In alternate smaller groups of 4-5 brainstorm what partnerships need in terms of resources, what they should deliver for farmers/ecosystem services and how they should be different in the future.</p>
16:50 – 17:00	<p>Whole Group Discussion 2 and Plenary</p> <p>Dan Casey (University of Sheffield, UK – PhD Researcher)</p> <p>Wrapping up the day, looking at brainstorms and drawing together a picture of the final results presented. Opportunities for participants to feed into the final summary.</p>
17:00 +	<p>Close and opportunity to further network</p> <p>ACTIVITY: Anonymous last thoughts forms dropped into a box</p> <p>Refreshments provided until 18:00</p>

Appendix 11: Deliberative Workshop Presentation Slides

The presentation used during the second deliberative workshop (February 2019) is shown below, split into the separate parts of the programme for the day. Initially, an opening presentation was given as a brief introduction to the research. This was followed by a number of group discussions and activities, where after initial thoughts were noted, participants were then able to see and critique earlier stages of the research.

Introductory Slides



WELCOME

Please collect your name badge from the front

Please also help yourself to breakfast items and refreshments

Outline for the day - 08/02/2019

- 8.30-9.15 Breakfast and Networking
- 9.15-9.45 Introducing the project and findings so far
- 9.45-10.50 Environmental Concerns in Cumbria
- 10.50-11.10 Break (Refreshments and mini Danishes)
- 11.10-12.40 Approaches to Partnership Working
- 12.40-1.30 Lunch (Lunch Selection - Sandwich)
- 1.30-3.00 Ways of Measurement and Rewards for delivering environmental benefits
- 3.00-3.20 Break (Refreshments and Biscuits)
- 3.20-4.05 Imagining the Future 1: Farming Possibilities
- 4.05-4.50 Imagining the Future 2: Idealised Partnerships of the Future
- 4.50-5 Plenary and Last thoughts
- 5pm + Networking (Wine, Refreshments and Crisps)

Confirmed Participants

Dan Casey – PhD researcher, University of Sheffield
Amanda Cave – past MA student from University of Sheffield
James Brooks – PhD researcher, University of Manchester – Earth Sciences and photographer

John Pelle - Farmer
 Pauline Blair – Farmer
 Gavin Bland - Farmer
 Maurice Hall – Foundation for Common Land, Farmer
 Julia Aglionby – Foundation for Common Land
 Adam Day – Cumbria Farmers Network
 Helen Rawlinson – Countryside Officer, Arnside and Silverdale ADNS
 Libby Bateman – Countryside and Landowners Association (CLA)
 Amy Cowburn – Natural England
 James LePage – Natural England
 Pat Thompson - RSPB
 Jenny Phelps – Gloucestershire and Farming Wildlife Advisory Group (FWAG)
 Jackie Jones – Gloucestershire LNP Manager
 Celia Tibble – Cumbria County Council and Cumbria LNP

Lord Inglewood – House of Lords and Cumbria LNP

Opening Research Presentation

Evaluating the Role of Public Private Partnerships (PPPs) in UK Agriculture



Dan Casey
University of Sheffield
djcasey1@sheffield.ac.uk



@dancaseyuos

Dan Casey

Born in London; family heritage in Kerry, Ireland – grandparents and backwards being farmers, still some connection to the community there

Geography – degrees from University of Cambridge and Sheffield
Applied, Relevant and Practical – PhD
 Graduate Teaching Assistant – Tanzania fieldtrip through to seminars
 Royal Geographical Society Council Member and Postgraduate Fellow
 GCSE Geography Examiner
 Private Geography Tutor (KS3 – University level)

My ideal goal ... lecturing ... now ...

The Project



- 2015-2019 (1st November 2019 deadline)
- Funded by the University of Sheffield and Grantham Centre for Sustainable Futures
- Established to be collaborative with Defra

https://www.youtube.com/watch?time_continue=34&v=14FAQB7_0XE

"The great challenge of the twenty-first century is to raise people everywhere to a decent standard of living while preserving as much of the rest of life as possible."
 ~Edward O Wilson



If you hear the phrase 'Public Private Partnership', what comes to mind?



The Public Private Partnership (PPP) Model

- 'Governance for **Sustainability**
- Old concept, new term – turnpike trusts, 18th C
- Public infrastructure viewed as an asset class by government and, therefore, private financiers and investors have become involved
- Rural areas facing pressure to deliver both **public and private goods** from land management
- **"Public money for public goods"** – multiple interviewees
- However, why the PPP? – both advantages and drawbacks

Simply put ...



EXAMPLE: A Farming PPP

LOCAL NATURE PARTNERSHIPS (LNPs) – Emerging in 2012, totalling 47 partnerships across England – emerging from BAPs

“encourage and support Local Nature Partnerships where local areas wish to establish them. These partnerships will work at a strategic scale to improve the range of benefits and services we get from a healthy natural environment. They will aim to improve the multiple benefits we receive from the good management of the land.”
Natural Environment White Paper (2011)

- Self-sufficiency, a devolution of power, local people are best placed to devise projects

Translation across to farming ...



PRODUCTIVISM



MULTIFUNCTIONAL LANDSCAPES

A period of constant evolution

- CAP - 1950s
- Post 1980s – butter mountains and wine valleys
- Reforms (1990s) – quality and environment ... towards sustainable intensification
- Today – more reformation, environmental benefits, spatially targeting what goods society is perceived to value the most
- Natural Environment White Paper (2011)
- Landscape scale conservation
- Agriculture which is more competitive and sustainable

The UK Picture

FARMING MATTERS – over 2/3 of our land

- 3781 total farm holdings (Cumbria LNP); 2551 total farm holdings (Gloucestershire LNP) (EU Farm Structure Survey, 2018)
- Food sufficiency, environmental stewards, diversification

Yet, challenges ...

- The 'Perfect Storm'
- Rising fuel, feed, fertiliser costs, weather extremes

- Total Income from Farming is expected to be £4,850 million, a decrease of £861 million (-15%) (Defra, 2018)
- Agriculture is expected to contribute £9,684 million to the national economy (Gross Value Added), a decrease of £601 million (-6%) (Defra, 2018)

All about the Ecosystem Services ...

• **Ecosystem Services** - conceptualise the benefits we, as humans, are able to derive from our surrounding environment and different ecosystems.

• An interdisciplinary approach bringing together stakeholders together in new interdisciplinary partnerships alongside encouraging participatory governance.

PES

“... a voluntary transaction where ... a well-defined ES (or a land-use likely to secure that service) ... is being 'bought' by a (minimum one) ES buyer ... from a (minimum one) ES provider ... if and only if the ES provider secures ES provision (conditionality)”.
Wunder (2005, p.3).

• The commodification of nature, green capitalism, a new era of neoliberal conservation

• BENEFITS and DISADVANTAGES

• UK - Natural Capital Approach

Brexit – Futures and Partnerships? An Agriculture Bill fit for purpose



<https://www.youtube.com/watch?v=tr0j19IS1m8>

UK's Clean Air Strategy – 14/1/19

“Farming has yet again come under fire”

Agricultural fertiliser under scrutiny in Government air pollution plans



Farming has yet again come under fire in a new Government set of ambitious long...

Research Questions – With a focus on the CLNP

- 1) What is a PPP?
- 2) What makes a good partnership approach?
- 3) Do PPPs help to deliver environmental benefits in farming?
- 4) How do different stakeholders appraise their roles within PPPs?

Phase I: Desk based

- Types of PPP (many identified)
- Literature and database searching
- PPP structures and their governance
- Definitions vary with a complicated language



Phase II: Semi-structured interviews

- 23
- From 1 hour to 3.5 hours in length
- Policy makers/LNP Practitioners/Farmers
- Key themes identified, e.g. finance/power etc.
- Occasional farm visit and tour



Policy Makers	LNP Implementers	Farmers
Julian Harlow (Natural Capital Select Committee, Defra)	Dr Colin Studholme (Gloucestershire LNP, also Wildlife Trust)	John and Jack Pelle (Greystoke Estate)
James LePage (Natural England)	Liz Miles (Kent LNP, employed as part of Kent County Council)	Will Cockbain (Kewick)
Pat Thompson (RSRB)	Anthony Leeming (Cumbria LNP, also has links to farming in the past and zoom estate)	Will Raebling (Calder Bridge, also on Cumbria's LNP board)
Neil Johnson (National Trust)	Lord Inglewood (St. Cumbria LNP Chairperson, also House of Lords)	Ruth Walters (Bamber Bridge)
Paul Cottingham (NFU, also on the board of Devon's LNP)	Graham Jackson Pitt (Cumbria LNP, also Wildlife Trust)	Ian Grogg (Farming Contractor, Greystoke Estate)
Professor Mark Reid (Newcastle University, researcher and policy adviser)	Matt Millington (Shull & East Riding LNP, North Yorkshire LNP)	Donald White (Farming Contractor, Greystoke)
Environment Agency	Tim Mitcham (Lancashire LNP, also Wildlife Trust)	Gevin Edgell (Pewrth area, had an operation, then lambing, potential to recontact as he was interested)
Rivers Trust	Fran Smith (Lincolnshire LNP, employed as part of Lincolnshire County Council)	
Lake District National Park	Gemma When (Morecambe Bay LNP, also National Trust)	

Phase III: Mapping

- LUCI – to open up a discussion
- One localised area – 600km²
- Natural Capital Solutions – Dr. Alison Holt's work with Cumbria Wildlife Trust around 3 catchments – Staveley, Glenridding, Braithwaite
- Habitat Connectivity; Agricultural Productivity; Flood Mitigation



Phase IV: Deliberative Workshops (TODAY)

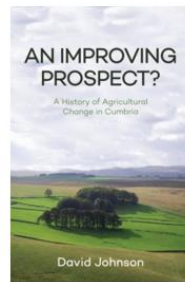
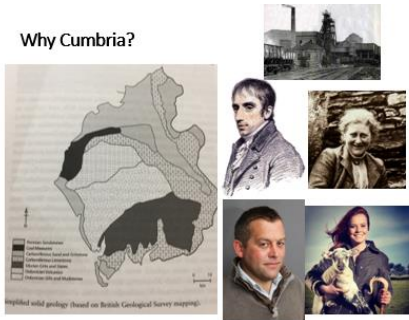
- 2 x 1 day workshops – 15th January (Kendal) and 8th February (Penrith)
- Opportunity to help feed into the final research findings, furthering their development



15th January – Previous Participants

Name	Organisation
Grady Jackson Pitt	Cumbria Wildlife Trust and Cumbria LNP
Emma Wynn	Cumbria National Trust and Morecambe Bay LNP
Simon Hill (non-interviewed)	Anna Ranger (Cockburn and Little Langdale), Cumbria National Trust – work with tenant farmers
Paul Farrington (non-interviewed)	Cumbria National Trust – work with tenant farmers
Bill Cropper (non-interviewed)	Farmer
Lucy Arner (non-interviewed) - vegetables	Farmer
Martin Roberts (non-interviewed)	Farmer
Christa Kean (non-interviewed)	Cumbria Wildlife Trust and Farmer

Why Cumbria?



Case-Study: CLNP



- Area shared with two other LNPs:
- Northern Upland Chain LNP
 - Morecambe Bay LNP

Environmental Concerns in Cumbria

Environmental Concerns in Cumbria (1)

What are some of the main environmental/landscape issues?

Interviews

"The farmer over there has had a false positive [for TB] in the last month ... it's ridiculous, the stress and worry of that" – env. health

"The weather is a major factor which hinders us [the farm] ... we've had so many cold and wet winters, with extreme summers at times ... the calving and lambing can be really difficult"

"Some farmers never recovered from Storm Desmond"

"Cumbria's known for its poor soils"

"You look at Ullswater, right, fishing was banned there following Storm Desmond to allow stocks to recover. They [Environment Agency] said it was due to pollution and toxins following the storm. Sailing, swimming and all that was still allowed though, what about the pollution then with people going into it?"

"Tourists and sometimes even locals have no idea about where they're visiting or the countryside access rules – they cross over into fields where they shouldn't be ... the farmer is then liable for anything that goes wrong" – Access

Environmental Concerns in Cumbria (2)

What governance approaches/resources are needed to address these issues?

Interviews

"Nature is in a farmer's blood"

"There was this ... from the Environment Agency ... telling us what to do ... they couldn't have been more than late twenties ... I told ... it wasn't going to work but they didn't listen? ... so, I did what they said to, but did it work? No!"

"The politicians these days are all from the South, they have no idea what issues we are facing up here in the North"

"I don't see how trees can stop flooding to be honest ... once one absorbs the most water it can, it's going to fall over and knock all the others down ... what about the impacts further downstream as well?"

"We just don't have the time anymore to build the stone walls, all our fences are wired now ... given the lack of labour and time we have to do the work we need to for the environment and farm"

"Finance is the major issue – Defra offered a £5000 grant a few months ago, that's no where near enough"

"We don't really have any measurable outputs yet"

Approaches to Partnership Working

Approaches to Partnership Working (1)

- What partnerships are the main ones you know of that focus on delivering ecosystem services within farming in Cumbria/further afield?

E.g. LNP ... what others can you think of?

1. Place your examples onto the blank PPP spectrum diagram provided, as to where you think they sit in terms of co-operation and make up of stakeholders.
2. Write a sentence as to your group's definition of that example
3. Write a sentence or two as to why you've placed PPP in that specific location on the spectrum diagram

Approaches to Partnership Working (2)

What are the strengths of these various partnership approaches?

PPP Benefits

- Skills/Expertise across the board
- Different individual partners can lead on specific projects
- A renewed/refreshed energy and dynamism between individuals working towards a shared goal
- Opportunity to advance new tools and methods of working/thinking about the environment – e.g. Gloucestershire LNP, GI toolkit and work with LEP on motorway/Cumbria Pioneer Partnership natural assets mapping work
- Opportunities to promote the environment alongside other agendas, e.g. economic

Approaches to Partnership Working (3)

What are the weaknesses with these partnership approaches?

PPP Challenges

Seeing Through the 'Good Farmer's' Eyes: Towards Developing an Understanding of the Social Symbolic Value of 'Productivist' Behaviour

Rob J.F. Burton

- Financing – self-sustaining
- Non-financial resources
- Individual commitment – many PPPs are voluntary
- Reaching a wider audience
- 'Buy-in' of other partnerships and cross-partnership collaboration (e.g. LEPs)
- Board make-up ... backgrounds and gender (what about the smaller farmer?)
- Good on paper, but in practice ... (e.g. many LNPs are "sleeping partnerships", there in name but not actually doing anything)
- Defining what the PPP is and what each partnership does ("it's a bit of a Jekyll and Hyde ... no real direction"; not stepping on others' toes)
- Winning "the hearts and minds of farmers" – payments/knowledge/fairness

Approaches to Partnership Working (4)

Who are the key players that need to be involved in any such partnership approach and why?

Interviews

- Make up broad and diverse
- Often described as getting on well with other individuals
- However, as you look more deeply, tensions do emerge ... "the chair is more interested in XXXX, so ultimately we do often end up going down the XXXX route, even if another project seems more viable ... there is some steering that goes on"
- Big tensions as well between the NFU and CLA; farmers and environmental agencies – e.g. Environment Agency and (in Cumbria – the National Trust in particular, tenant farmers)
- Are the right people involved? Do people know what they're doing?

Interviews - 2

"They [government] need to place more people with a farming background and experience into positions where these individuals can influence farming policy ... too often policy makers haven't a 'scooby doo' about farming"

"The question is do farmers really want to be in partnerships though? It's all well and nice if you have an afternoon free to have a chat and cup of tea, but farmers often don't"

Ways of Measurement and Rewards for delivering environmental benefits

Ways of Measurement and Rewards for delivering environmental benefits (1)

Is mapping the best way to measure ES?

- ✓Weaknesses and strengths?
- ✓Resolution?
- ✓Uncertainty in the data?
- ✓What about the person doing it?

"I just don't get all this stuff with mapping"

"If you can't attribute values to something, there's no way to have a benchmark or know whether what you're doing is working, it's useful"

Ways of Measurement and Rewards for delivering environmental benefits (2)

What alternate forms of measurement are also possible? – benefits/weaknesses ... who should take responsibility?



Ways of Measurement and Rewards for delivering environmental benefits (3)

How should farmers be best rewarded for their delivery of ecosystem services?

Interviews

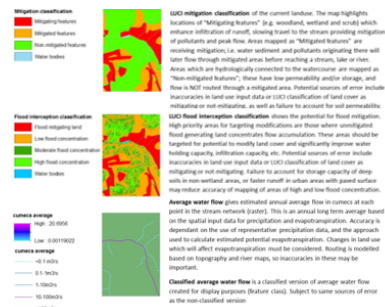
"the current system is **unfair** – good smallholder farmers get nothing compared to landowners who have lots of land but are bad farmers and don't look after the environment ... it's all done by hectares"

"I spoke to Michael Gove and post-Brexit said that he shouldn't forget a farmer who is **unlucky** with his land. As one farmer may have land which has a river, has trees etc. and so is able to deliver a wider range of ecosystem services. Yet, another farmer may have poor soils and not be able to deliver as much in terms of ES through no fault of their own"

- E.g. payments? Tax-relief? Grants for business development?
- Deliberative Workshop 1 – 'polluter pays' mechanism?, shift towards a natural capital approach ongoing

Ways of Measurement and Rewards for delivering environmental benefits (4)

- Why has landcover changed? – 2007 and 2015
- Can you guess the mapped area?
- Do you have confidence in the 3 maps provided? – annotate onto the map any concerns/questions your group has
- What about these set of maps?
- Which do you feel would be more useful? Why?



Imagining the Future: Farming Possibilities

Imagining the Future: Farming Possibilities

- Brainstorm using your flipchart:

Opportunities (1 colour)
Challenges (1 colour)
Possible Solutions to challenges (1 colour)

Q. What will the future farming landscape look like? (1 colour)

- At the end, I want you to write one word – does your group feel that farming will **IMPROVE** or get **WORSE**, as a way to deliver environmental benefits alongside food, in light of your discussion?

Imagining the Future: Idealised Partnerships

Imagining the Future: Idealised Partnerships

- Brainstorm using your flipchart:

Resources partnerships need (1 colour)
What should partnerships give/deliver to farmers? (1 colour)
What should partnerships deliver in terms of ES? (1 colour)

Q. How should partnerships be different to today in the future? (1 colour)

- Finally, give your new idealised partnership a **GROUP NAME**

Plenary

Plenary – Final Thoughts

Next Steps

- **Analysis and thesis submission** – by 1/11/19 (Aim – 30/9/19)
- **Policy Briefs** – coming November – December 2019
- **Wider dissemination/impact work** – 2019 to 2020

Before you leave please fill out a **feedback form**

Also, please put your individual **anonymous last thoughts** on these topics into the envelope provided

Appendix 12: Extract from Deliberative Workshops Notes and thematic coding

Below is an example of notes scribed during the second deliberative workshop and later thematically coded by the researcher, using the same coding system as was adopted in interviews. This note-taking style was adopted by James Brooks, where he summarised key points from discussions during the workshops with his smaller group of participants.

...

Defining a PPP

- From the outset, clear differences in what people believe - for example, the PPP definition first task: one person said **no funding [KC6]** but another from RSPB said the opposite, and felt much more optimistic about the idea of PPP - whereas the person who has worked for Gloucestershire LNP feels more negative
 - General feeling of **confusion [KC13]** on the term and what it means
 - Promising nature of PPP to be a 'win win' but scepticism comes in - **challenges of people to work together, and the lack of funding [KC6, KC11, KC37]**
 - RSPB person felt another person was overthinking the definition, but that highlights the complicated nature of the topic
 - High amounts of **funding [KC6]** from **private sector [KC2]** and the **third sector [KC3]**
 - **NGOs etc - third sector organisations [KC3]** were argued to be most involved in the approach
 - Important consideration - where their **funding comes from – constitution, as this can affect agendas [KC6/KC28]**
 - **Gov't [KC15] – private [KC2] – public [KC1]** and then **non gov't organisations [KC3]** were key stakeholders that need to be involved in PPPs
-
- However, there are **issues in the literature definition of the sectors and organisations that should be involved [KC13/KC14]**
 - **Catchment partnerships [KC9]** were an example of a PPP given
 - **Not many PPPs in Cumbria [KC9] – at least farmers do not know about them [KC4/KC33]**
 - **Local enterprise partnerships have much more money compared to LNPs [KC6/KC17/KC18]**
 - Argued to be issues with applying for **funding for LNPs - as there is not as much money for the environment, as opposed to the economy [KC6/KC7/KC17/KC26]**
 - **LEP reports do not contain much mention of the LNP and there is no emphasis on them working with the LNP [KC17/KC18]** ... in some cases LNPs have been able to work with them and in others this has led to LNP's downfall.

...

Key Codes

Public Sector [KC1]

Ecosystem Services [KC5]

PPP [KC9]

Private Sector [KC2]

Financial [KC6]

Future [KC10]

Third Sector [KC3]	Nature [KC7]	Power [KC11]
Farmers [KC4]	Natural Capital [KC8]	Skills [KC12]
Language [KC13]	LNP [KC17]	Evidence [KC21]
Policy [KC14]	LEP [KC18]	Climate [KC22]
Government [KC15]	Location [KC19]	Listening [KC23]
Defra [KC16]	Mapping [KC20]	Tourism [KC24]
Green Infrastructure [KC25]	Livestock [KC29]	Knowledge [KC33]
Economy [KC26]	Business [KC30]	Brexit [KC34]
Health [KC27]	Diversification [KC31]	Politics [KC35]
Agenda [KC28]	Sustainability [KC32]	Public [KC36]
Engagement [KC37]		

Appendix 13: PPP spectrum diagrams from deliberative workshops

