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Power-Sharing in the English Lowlands? Exploring Farmer Cooperation and Participation in Water Governance

School of Energy, Environment, and Agrifood

Doctorate of Philosophy (PhD) Thesis

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Abstract

Involving stakeholders in water governance is becoming an increasingly important topic in England. In this thesis I consider this ambition from the farming perspective, by investigating the potential for farmers to cooperate and participate in water governance. This dynamic is viewed through the conceptual lens of adaptive comanagement, an approach which its proponents claim can achieve the dual focus of ecosystem protection and livelihood sustainability under conditions of change and uncertainty. The relevance of adaptive comanagement is highlighted by the increasing complexity and uncertainty surrounding water governance in England, amongst other things because of the effects of climate change and a growing population.

The research adopts an integrated methodological approach that revolves around a "politicised" version of the Institutional Analysis and Development (IAD) Framework. Initially, three separate analyses investigate the context surrounding farming and water governance. The results of the contextual phase are incorporated into a more focused analysis, involving five farmer irrigator groups in the lowlands of eastern England. Here the intention is to explore the broader issues the research raises by investigating the potential for these groups to comanage water resources. Nine factors of success are identified, from which deeper, more abstract causal mechanisms are inferred. The relevance of the findings are discussed in relation to farming and water governance in England going forwards.

Several key outcomes emerge from this research, including: 1) a theoretical and practical demonstration of the applicability of the politicised IAD Framework to studies of adaptive comanagement, 2) an understanding of the ways in which power, policy, and levels of trust influence the ability of lowland farmers to cooperate and participate in water governance, 3) specific strategies that can be used to develop comanagement arrangements between farmer groups and water managers.

Key words: Water governance, adaptive comanagement, farming, power, lowland England

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Thesis Publications

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Whaley, L. and Weatherhead, E.K. 2015b. Power-Sharing in the English Lowlands? The Political Economy of Farmer Participation and Cooperation in Water Governance. *Water Alternatives* 8(1), *in press*.

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Whaley, L. and Weatherhead, E.K. (under review). Using the Politicised IAD Framework to Analyse Comanagement: Farming and Water Resources in England. Submitted to *Ecology and Society*.

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List of Abbreviations

CAMS	Catchment Abstraction Management Strategy
CAP	Common Agricultural Policy
CBA	Catchment Based Approach
DEFRA	Department for the Environment, Food, and Rural Affairs
EA	Environment Agency
EC	European Commission
EC	European Community
EEC	European Economic Community
EU	European Union
ESS	Environmental Stewardship Scheme
GAEC	Good Agricultural and Environmental Conditions
GATT	General Agreement on Tariffs and Trade
IDB	Internal Drainage Board
MAF	Ministry of Agriculture and Fisheries
MAFF	Ministry of Agriculture, Fisheries, and Food
NE	Natural England
NFU	National Farmers Union
RA	River Authority
RB	River Board
RBMP	River Basin Management Plan
RT	The Rivers Trust
RSPB	Royal Society for the Protection of Birds
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme

UNDP	United Nations Development Programme
WAG	Water Abstractor Group
WCED	World Commission on Environment and Development
WFD	Water Framework Directive
WTO	World Trade Organisation
WWF	World Wildlife Foundation

Chapter 1: Introduction

1.1 Research background and rationale

"Water is life" appears to be an almost ubiquitous turn of phrase these days, kick-starting the introduction or opening chapter to what feels like nearly every publication on the subject of water. Yet, from a slightly different perspective, we might say that "water is opportunity". To the extent that it is an opportunity for life is clear when considering humankind's great quest to find life in outer space. Despite mindboggling advances in the sophistication and performance of the technologies at our disposal, and an ever-deepening understanding of biology and biological processes, the first sign of life we look for is not DNA but a much simpler chemical compound: we look for water (Rayner, 2011). On earth, the intrinsic relationship between water and life can be seen everywhere. Thus even in the most arid hills and mountain ranges one may find green-tinted valley bottoms, hinting at the presence of water. Indeed, wherever water flows and gathers, life is bound to follow; from the moss-clad gaps between inner-city paving stones, to palm and shrub-lined desert oases; from the alluvial floodplains along the river Nile, to the vast, verdant growth of our planet's tropical rainforests.

The human body, like all terrestrial life-forms, behaves essentially as a container for water. With a protective, selectively permeable skin, our constant requirement to replenish the water we've lost through evaporation and other bodily processes is a reminder of our aquatic beginnings in prehistoric seas and oceans (Suzuki, 1999). Within human societies, the centrality of water to our existence and way of life cannot be overstated. It is no coincidence that many of the world's towns and cities have been built adjacent to rivers, lakes, and seas. After all, beyond its basic life-giving function, water provides the opportunity for communication, travel, transport, defence, attack, ablution, farming, recreation, and many other things besides. It is also no coincidence, therefore, that water is fundamental to the spiritual beliefs and values of so many human cultures. This is reflected in our religious ceremonies, our creation myths, our

literature, our imagery, and our language (Strang, 2004). Yet the array of opportunities water provides also means that controlling it offers one further opportunity; the opportunity to hold and exercise power.

1.1.1 Adaptive comanagement: The rise of a new paradigm

For much of the twentieth century, this power tended to be held centrally by technically-minded governments (Andersson and Ostrom, 2008). Within this framework, water management, as with other forms of environmental and natural resource management, became the preserve of "experts" who were viewed as the only ones with the requisite knowledge to participate in decision-making processes (Bocking, 2004). However, prompted in part by a recognition that "top-down" forms of natural resource management were often proving ineffective, and even resulting in resource degradation (Dietz *et al.* 2003; Holling and Meffet, 1996), the 1990s witnessed widespread decentralisation and devolution of management responsibilities, particularly among the developing countries of the global south (Ribot, 2002).[1] More recently, this trend has been followed in many developed countries (Berkes, 2010; Brunner *et al.*, 2005).[2] The changing picture of natural resource management has been termed a move "from government to governance" (de Loe *et al.*, 2009). Among other things, this phrase emphasises cross-scale interplay and a more substantive role for non-governmental actors in decision-making and action, in turn making space for stakeholder participation at the local level (Kooiman, 2003).

Even before this time, scholars were turning their attention to participatory and collaborative approaches. Of particular note are the studies undertaken by those

[1] There are now many examples where decentralisation appears to have failed to achieve its objectives. Whilst this has caused some to reject decentralisation outright, others argue that one must look at these failings on a case by case basis, where often a range of different factors explain the outcome (Ribot *et al.*, 2006). For example, Larson and Soto (2008: 213) write that "policies implemented in the name of decentralization…are often not applied in ways compatible with the democratic potential with which decentralization is conceived, and only rarely have they resulted in pro-poor outcomes or challenged underlying structures of inequity".

[2] It seems unlikely that this challenge to the role and responsibilities of "big government" in the field of natural resource management is wholly separate from the rise in market fundamentalism and the widespread adoption and imposition of neoliberal doctrines during the latter decades of the twentieth century (see Harvey 2005).

working in the commons tradition, an academic movement which rose to prominence in the 1980s, spearheaded by the late Nobel Prizewinning political scientist Elinor Ostrom (Dietz *et al.*, 2002; Feeny *et al.,* 1990; Ostrom, 1990). Commons theory has tended to focus on how communities and groups of resource users, acting without assistance or intervention by a larger government, have been able to collectively devise rules that enable them to sustainably manage natural resources such as water, and the conditions that facilitate this outcome (Wade 1988, Ostrom 1990, Baland and Platteau 1996, Agrawal 2002). Out of this endeavour arose an interest in situations where community and user groups do not manage in isolation, but instead form power-sharing arrangements with governments in order to "comanage" a given resource (Berkes *et al.,* 1991; Borrini-Feyerabend *et al*., 2004; McCay and Acheson, 1987; Pinkerton, 1989a). Comanagement has been promoted as a way of improving the appropriateness, efficiency, and equity of natural resource management (Pinkerton, 1989b; Plummer and Fitzgibbon, 2004). It has also served as a distinct challenge to the *modus operandi* of government managers and experts operating within centralised power structures (Pomeroy and Berkes, 1997; Castro and Nielsen 2001; Ribot *et al.,* 2006).

Running parallel to the emergence of commons theory, a new mindset has slowly pervaded environmental and natural resource management, with significant repercussions for approaches to governing water. This understanding questions the logic that held sway for much of the twentieth century; a logic that assumed a "stable and certain operating environment in which discreet policy problems could be addressed rationally and objectively by neutral officials acting alone" (Watson and Treffney, 2009: 450). Instead, there is now an emphasis on conceiving of humans *in* nature, rather than humans *and* nature, as well as a propensity to treat social and ecological system as intrinsically coupled (Folke 2006). The dynamics characterising these "social-ecological systems" are understood to be inherently complex and uncertain, leading to shocks, surprises, and even transformations (Gunderson and Holling, 2002; Olsson *et al.*, 2006). As with comanagement, these developments have

posed serious questions to the underlying assumptions, organisational structure, and goals of traditional management approaches.

The origins of this new perspective can be traced back to non-equilibrium thinking in ecology during the 1970s (Holling, 1973), and the emergence of the concept of adaptive management (Holling, 1978; Lee, 1993). Adaptive management, which aims to treat policies as experiments or testable hypotheses, was promoted as a necessary tonic to the prevailing "command and control" management style which its critics claimed took the wrong approach to dealing with uncertainty, by attempting only to reduce or eliminate it. Such an approach tends to restrict natural variation in order to benefit from "a stable flow of goods and services or to reduce destructive or undesirable behaviour of those systems" (Holling and Meffet, 1996: 329). One clear danger of command and control management is that it is prone to result in pathological outcomes, as a loss of natural variability leads to rigid ecosystem dynamics with a low adaptive capacity, in turn greatly increasing the chances of system collapse (Holling and Meffet, 1996). Furthermore, from a social perspective, this style of management tends to be reactionary and inflexible, lacking the innovation to manage effectively in an unstable operating environment (Glasbergen, 1998; Pahl-Wostl, 2006; Pahl-wostl *et al.*, 2007b). In contrast, adaptive management is viewed as a way of increasing system resilience in the face of change and uncertainty, where much of the theoretical basis for this approach derives from work on complex adaptive systems (Levin, 1999).

In more recent times, the unsettling effects of globalisation and climate change have done much to magnify the complexity and uncertainty of the challenges human societies face. As Gallopin (2002: 361) writes:

> On the one hand, the world is now moving through a period of extraordinary turbulence, reflecting the genesis and intensification of deep economic, social, political, and cultural changes associated with the current technologic-economic revolution. In addition, the speed and magnitude of global change, the increasing connectedness of the social and natural systems at the planetary

> level, and the growing complexity of societies and their impacts upon the biosphere result in a high level of uncertainty and unpredictability. These changes pose new threats but also new opportunities for humankind…On the other hand, the current trends are seen to be unsustainable for both ecological and social systems.

More than ever before, these so-called "super wicked problems" (Lazarus, 2009; Levin *et al.*, 2012) have drawn attention to the need to enhance the resilience and adaptive capacity of social-ecological systems. With respect to natural resource management, one promising response has been to combine the comanagement concept, with its emphasis on stakeholder participation and cross-scale interaction, with adaptive management, which promotes a learning-by-doing approach. The merger of these two narratives, each with their own distinct disciplinary history, has paved the way for a new area of enquiry centring on the concept of "adaptive comanagement" (Armitage *et al.*, 2009; Armitage *et al*., 2007a; Olsson *et al*., 2004a).

With one foot in commons theory and the other in resilience thinking and complex adaptive systems theory, adaptive comanagement is viewed by its proponents as a way of securing ecosystem protection and livelihood sustainability under conditions of change and uncertainty (Armitage, 2007). However, the cross-disciplinary nature of adaptive comanagement demands a wide methodological breadth that is able to encompass concepts and approaches deriving from both the natural and the social sciences (Whaley and Weatherhead, 2014). Thus a challenge for scholars of adaptive comanagement relates to the need to develop a common framework that is capable of addressing its many dimensions across differing physical and social settings, where at present "our tools for conceptualizing and analyzing [the concept] are strikingly blunt" (Carlsson and Berkes, 2005: 72). Alongside this, a number of scholars are calling for an approach that is also able to ground the normative concepts associated with the subject in a critical awareness of how power and context fundamentally influences the process and its outcomes (Armitage, 2008; Wilson, 2010).

1.1.2 Water governance in England

On the surface of it, water governance in England shares a number of similarities with the global trend from government to governance discussed above. Over the course of the last century, controlling the flow and use of water became an increasingly technical affair, undertaken by government officials in a system of governance where real decision-making power was located at the centre (Parker and Sewell, 1988; Watson, 2005; Watson and Treffny, 2009). The twentieth century also witnessed for the first time water issues stemming from a shortage of the resource (CAWC, 1960). This is in stark contrast to periodic bouts of coastal and riparian flooding, which have always challenged the existence and livelihoods of the inhabitants of the British Isles (Cook and Williamson, 1999; Purseglove, 1988). A burgeoning population and an increasingly consumption-based, materialistic society also brought with it new difficulties relating to water pollution, which as time has progressed has moved from the singular focus of providing potable water for human use, to the additional goal of securing clean water for a healthy aquatic environment (Barker and Turner, 2011). Now, alongside a recognition of the new challenges that a growing population and changing lifestyle preferences will throw up for water governance in England going forwards, there is also a realisation that climate change is fundamentally altering the ground upon which much of the thinking concerning the environment and its management has traditionally been based.

As a result, a key concern for decision makers in England is enhancing the country's resilience in the face of these challenges (BIS 2013; DEFRA 2013a). In this respect, water governance is no different. For example, the Government's department for the environment, Defra, states that its "vision shows a sector that is resilient to climate change, with its likelihood of more frequent droughts as well as floods, and to population growth, with forward planning fully in tune with these adaptation challenges" (DEFRA, 2008: 8). Furthermore, in recent years, and particularly since 2000 when the EU Water Framework Directive (WFD) was introduced, there has been a move towards greater stakeholder participation in water governance (Cook *et al*., 2012). This includes the nationwide rollout of a catchment-based approach in 2013

(DEFRA, 2013b). Both of these developments - the desire to enhance resilience and the adoption of participatory and cooperative management approaches - do not sit comfortably with the organisational structure and *raison d'etre* of the system of water governance that emerged in England over the last century. Nonetheless, driven on by a changing climate, a shrinking national budget, rhetoric that revolves around the notion of the "big society", and developments in water and environmental policy emanating from the EU, it is clear that they will remain prevalent features of the way in which water is governed going forwards (Newson, 2011; Norton and Lane, 2011; Pahl-wostl *et al.*, 2007a).

These are not the only salient aspects of the direction water governance is taking. For example, it is also clear that another prominent strand of thinking favours the use of economic instruments. Much energy has gone towards concepts such as Paying for Ecosystem Services (PES) and the development of a more fluid system of water licence trading (UK NEA, 2011; DEFRA, 2013c). Nonetheless, the stated desire to focus on enhancing system resilience, as well as the development of approaches that encourage stakeholder participation in water governance, highlights parallels between the objectives of policy makers in England and basic tenets of adaptive comanagement, as outlined above. In this thesis I propose, therefore, that it is useful to adopt adaptive comanagement as a conceptual lens through which to view water governance in England. This is particularly relevant given such issues as climate change and population growth, which only promise to increase the complexity, uncertainty, and severity of the challenges that lie ahead (DEFRA, 2013a; Environment Agency, 2010; IPCC, 2007).

1.1.3 Farming and water governance in England

One sector whose participation appears crucial to the success of inclusive forms of water governance in England is farming. In large part this is because farming is the dominant land use, with responsibility for managing roughly 70% of the country's landmass. As a result, it is one of the primary sources of water pollution due to farm run-off and other agricultural practices (Strosser *et al*., 1999). Since the 1950s, farmers

have also started abstracting water for irrigation. Although irrigation only accounts for a small fraction of the total water taken from rivers and aquifers in England, locally the impact can be significant because this water is typically abstracted during the hottest times of the year, often in the more water-sensitive catchments, when flow is at its lowest. As will be explored in this thesis, farmers have had to make significant adjustments in response to the very different demands that have been placed upon the agricultural sector over time. However, it is perhaps not since the medieval period that there has been a clear emphasis on farmers needing to work together in order to succeed (Pretty, 1990). Despite the sector's ability to adapt to changing circumstances, the extent to which many farmers in England are able to embrace new forms of water governance that centre on cooperative and participatory approaches, as is now increasingly called for, is questionable.

Yet with respect to water resources, there are already a number of examples in England where farmers are working together as members of farmer irrigator groups; or, as they are known in England, "water abstractor groups". Situated largely in the low-lying east of the country where irrigated agriculture is most prevalent, the majority of these groups have emerged in the first instance to defend farmers' water rights in the face of changing political, regulatory, and climatic conditions.[3] Over time, however, it has become clear that acting collectively brings a number of additional benefits, both to the members of the group and to the government. Leathes *et al.* (2008) have discussed the institutional capacity of four of these groups to work together to defend their rights to abstract water for irrigation. However, beyond this reactive function the authors also ask if there isn't a role for abstractor groups in water governance more generally. In a separate report, Leathes (2007: 16) poses the question as follows (quoted at length):

> But can water abstractor groups play a greater role in addressing the emerging challenges in water management? In future there will certainly need to be

[3] Bringing to mind Schattschneider's (1960: 71) observation that "organization is the mobilization of bias".

more emphasis on managing change and uncertainty due to climate change, increasing demand and competition for water and reallocation between uses. Increasingly, change will have to be managed and scarcity shared, but within constrained funding limits. Recent policy changes such as the introduction of time-limited licences and water trading, and the implementation of the Water Framework Directive will increasingly rely on collaboration for success. Abstractors, regulators and other organisations (particularly those promoting environmental issues) will need to be open to new and innovative approaches, adapt to new, more flexible ways of working and foster a spirit of collaboration. In part, this may result in a more flexible system of regulation where users have a much greater role in making allocation decisions based on their local needs, within defined limits.

Abstractor groups are well placed to play an influential role in this emerging agenda as they provide an opportunity for improving information sharing, cooperation and collaboration, delegating responsibility to the lowest level and encouraging self-monitoring and restraint. Only time will tell if abstractor groups in the UK evolve to take on a more central role in water management and water policy formulation. However, experience would suggest that it is certainly possible, as many institutions that now manage natural resources have their origins in response to conflicting claims to the resource or to reassert identity or influence.

1.2 Research aim

The previous section has located the various problem areas this research concerns itself with. It brings attention to theoretical, methodological, and practical considerations. From a theoretical perspective, it discusses the development of adaptive comanagement and its usefulness as a conceptual lens through which to view the direction of water governance in England, whilst highlighting methodological difficulties associated with studying the subject. From a practical perspective, it draws attention to both the importance and the challenge of securing the cooperation and

participation of farmers in more pluralistic approaches to governing water. Specific attention was given to water abstractor groups because they serve as an example of instances where farmers are already cooperating to influence decision-making concerning water resources management. I have asserted that this makes abstractor groups a useful focal point for research concerned with exploring issues of farmer cooperation and participation in the changing system of water governance outlined above. With these issues in mind, I can state that the aim of this research is: ***To explore farmer cooperation and participation in English water governance, through the conceptual lens of (adaptive) comanagement.***[4]

1.3 Research framework

As noted, several methodological issues pose a problem for scholars attempting to study adaptive comanagement. During the early stages of the research, a broad, exploratory review of commons theory, resilience thinking, and adaptive comanagement literature led me to discover a framework that appeared to address these concerns. This is the "politicised" Institutional Analysis and Development (IAD) Framework (see Figure 2.4 in Chapter 2), which is a modified version of the much-used IAD Framework originally developed by Elinor Ostrom and her colleagues. In the next chapter the politicised IAD Framework is discussed in detail. However, given that all four research objectives revolve around this framework, in this section I will provide a brief overview.

The original IAD Framework has been described as a tool for analysing how diverse governance systems affect the ability of people to solve problems (McGinnis, 2011). It works by drawing the analyst's attention to the participants in an "action situation" (see Figure 2.2 in Chapter 2) and the actions they are capable of, the positions they take up, the information they have access to, the ways in which their actions are linked to certain outcomes, the control they exercise over outcomes, and the benefits and

[4] Below, in Section 1.5, I shall provide working definitions for the key terms contained within this statement. This will include the reasoning behind the use of the terms "comanagement", "adaptive comanagement", and "(adaptive) comanagement".

costs assigned to them. The IAD Framework also considers how three exogenous variables - the "biophysical and material" world, the "rules-in-use", and the "community" - influence the behaviour of participants by acting upon the various components that comprise the action situation (Ostrom, 2011). The Framework is compatible with a range of evaluative criteria, including resilience, efficiency, equity, and accountability (Ostrom, 2005).

Later, the "politicised" element of the Framework was introduced by Clement (2010), who modified the original schema in such a way that it now draws explicit attention to the wider context and power relations between participants in an action situation. This was achieved by the addition of two further exogenous variables to the Framework, namely the "political-economic" and "discourse" variables. As I will discuss in Chapter 2, it is this modification that makes the politicised IAD Framework especially well-suited to analysing adaptive comanagement.

1.4 Research Objectives

All four research objectives revolve around the politicised IAD Framework. In Chapter 2 the process I have adopted when employing the Framework is outlined, and then, in Chapter 3, I link the Framework to the other elements of the research design.

The four research objectives this thesis sets out to address are:

Objective 1: Demonstrate whether and how the politicised IAD Framework can be applied to studies of (adaptive) comanagement, and discuss the benefits of doing this.

Objective 2: Analyse the extent to which English water policy provides an enabling environment for adaptive comanagement.

Objective 3: Analyse the ways in which power and levels of trust influence the ability of lowland farmers to comanage water.

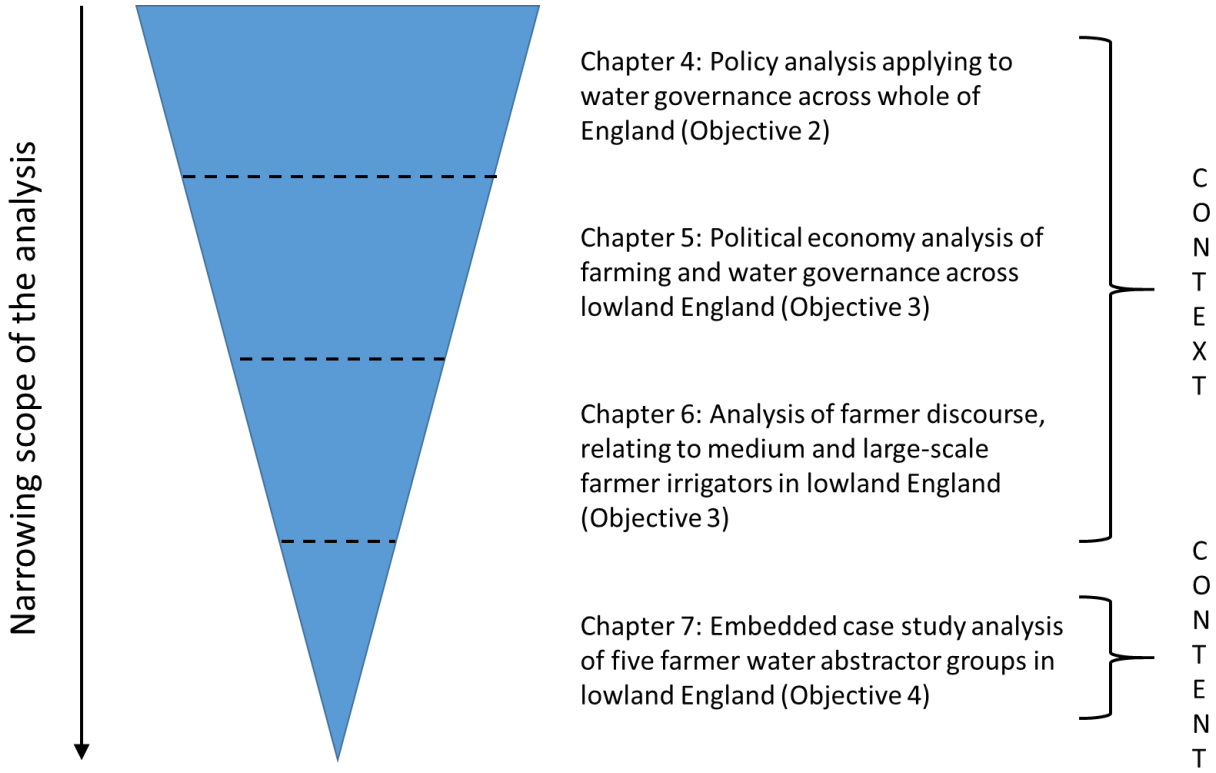
Objective 4: Analyse the relationship between water abstractor groups and water resources management and identify the mechanisms that generate comanagement

outcomes. Discuss the relevance of the findings for water governance in England going forwards.

The four objectives reveal three different phases of the research. Objective 1 spans all three phases, and is concerned with the theoretical, methodological, and practical aspects of applying the politicised IAD Framework to (adaptive) comanagement. However, Phase 1 relates only to the theoretical and methodological aspects of Objective 1. Phase 2 is comprised of Objectives 2 and 3. This phase entails an exploration of the context in which farming and water governance takes place, considering how policy, power, and trust influences the ability of farmers in lowland England to comanage water. The scope of the analyses in Phase 2 increasingly narrow until Phase 3, which relates to Objective 4 and is a more focussed, "content-oriented" analysis (Figure 1.1 overleaf).

By investigating three of the politicised IAD Framework's exogenous variables - the rules-in-use, political-economic, and discourse variables - Objectives 2 and 3 consider the broader context in which farming and water governance takes place. As will become clear in Chapter 3, this contextual phase is an important part of the research strategy I have adopted. Objective 2 does this by investigating the direction of water policy in England, asking in what ways this policy context serves as an enabling environment for adaptive comanagement. As the thesis title and the discussion in Section 1.1 allude to, a central concern of the research agenda is power. This is most explicitly addressed by Objective 3, which looks at the broad political economy of farming and water governance in lowland England from World War II until the present day, and the discourse of farmers as they talk about their relationship with water resources management as members of an abstractor group. The intention is to understand how the present-day power dynamic as well as levels of trust between farmers, and between farmers and water managers, conditions their ability to comanage water.

Figure 1.1 The narrowing scope of the analysis through Phase 2, a contextual phase, and Phase 3, a more focused, "content-oriented" phase.



Finally, by employing the politicised IAD Framework in a way that incorporates the findings from Objective 3, Objective 4 concerns itself with a more focused examination of comanagement. Here the Framework is employed to analyse the relationship between farmer abstractor groups and water resources management, and to identify the "factors of success" that lead to comanagement under the conditions revealed by the contextual phase of the research. Using these factors as a point of reference, I then propose more abstract causal mechanisms that appear to generate comanagement. In Chapter 3 I discuss why this search for generative mechanisms is an important part of the research strategy. I finish by discussing the relevance of the findings for water governance in England going forwards.

1.5 Definitions of key terms

In this section I consider the key terms used in the thesis, including how they relate to one another. This terminological discussion is intended to clarify why, according to the research aim, I claim to be exploring "farmer cooperation and participation in water governance, through the conceptual lens of (adaptive) comanagement". I shall discuss three pairs of terms, namely "farmer cooperation" and "farmer participation"; "water management" and "water governance"; and "comanagement" and "adaptive comanagement".

By "farmer cooperation", I mean situations where farmers are working together towards some end as a group or cooperative. However, this collective effort need not imply any involvement in water governance. By "farmer participation" I mean situations where farmers are actively involved in water governance. Therefore, according to these definitions, a comanagement arrangement would be one where farmers are *cooperating* as a group, where this group is seen to be *participating* in one or more comanagement activities.[5]

The terms water management and water governance, although in some ways similar, are also quite different. Generally speaking, "water governance" is a broader, more inclusive term than water management, and can be thought of as "the whole range of institutions and relationships involved in the process of governing" (Pierre and Peters 2000: 1). The distinction between the two terms is aided by the discussion in Section 1.1.1 above, where I noted that the phrase "from government to governance" has come to imply the participation of both state and non-state actors in decision-making processes that span levels of organisation. In contrast, "water management" is narrower and more action oriented. It is about "achieving goals, preferably in a functionally and socially responsive and efficient manner, with given means, and largely within given conditions and constraints" (Toonen, 2011: 13). Therefore "[water] management is about action; [water] governance is about politics, sharing of rights

[5] These activities will be discussed in later chapters.

and responsibilities, and setting objectives and the policy agenda" (Berkes, 2010: 491). By speaking of farmer cooperation and participation in water *governance* in this thesis, I am therefore including the involvement of farmer groups in more narrowly defined management activities, but am not restricting them to this.

I have already discussed both comanagement and adaptive comanagement in Section 1.1.1, yet their relationship to this thesis requires clarifying. Although the theoretical foundation of my research centres on adaptive comanagement as a guiding concept, when analysing the more concrete possibility of farmer cooperation and participation in the later chapters, it will become clear that the focus is instead centred more on the concept of comanagement. This is intentional, and relates to the fact that adaptive comanagement is considered an evolutionary development of comanagement (Berkes, 2009). Given the challenge of securing farmer cooperation and participation in water governance (see above), it was necessary to frame this phase of the research in relation to developing *comanagement*, whilst accounting for the potential for such an arrangement to evolve into adaptive comanagement. For this reason, in the thesis I often speak about "(adaptive) comanagement" as a way of accounting for comanagement's evolutionary dimension, whilst recognising that this dimension may be underdeveloped, or that it is not the focus of the present discussion.

Finally, from one angle the use of "management" in "comanagement" is misleading. This is because "the basic idea of comanagement fits with the evolving notions of people-centred governance approaches in which the management responsibility is shared among…a diversity of players, including public and private actors" (Berkes, 2009: 1694). Thus, according to Berkes (2009), both comanagement and adaptive comanagement can be viewed *as* governance.[6] This observation provides further justification for my decision to consider the involvement of farmer abstractor groups in water governance from an (adaptive) comanagement perspective.

[6] Although a slightly different position is taken by Folke *et al.* (2005), who put forward the notion that adaptive comanagement instead *operationalises* adaptive governance.

1.6 Outline of Thesis

The thesis is structured into eight chapters. Five of these (Chapters 2, 4, 5, 6, and 7) are written in the format of a journal article. As a result, they represent relatively stand-alone pieces of research that pertain to the various analyses undertaken during the course of this research programme. Each paper has been reformatted and sections renumbered so as to be consistent with the style of the thesis, and the references combined in the final reference list. All of the chapters that have been written in paper format also contain either a prologue, epilogue, or both, that detail additional information deemed necessary for the thesis but which could not be included, or not included in as much detail, in the papers themselves. A full list of publication details is provided on page V, and details of individual papers are stated in the relevant chapter prologues.

Chapter 1: Introduction

This chapter introduces the rationale and various strands of the research, highlighting an approach which is concerned with making contributions to theory, method, and practice. It outlines a three-phased process, and alongside discussing the research aim and objectives, it introduces the politicised IAD Framework to the reader.

Chapter 2: Applying the politicised IAD Framework to (adaptive) comanagement

This chapter discusses how the politicised IAD Framework is well suited to studying (adaptive) comanagement. It begins with a review of the comanagement concept from its origins in commons theory through to the development of adaptive comanagement. It then highlights the issues associated with studying adaptive comanagement, before going on to review the IAD Framework and the modifications made to it by Clement (2010) in order to bring explicit attention to the role of power in natural resource governance. This is followed by a discussion of how and why the Framework is suited to analyses of (adaptive) comanagement and the process one may wish to follow when employing the Framework, whilst also outlining the benefits of doing this.

Chapter 3: Research design

Chapter 3 links in to Chapter 2. That is, whilst Chapter 2 is concerned with the framework I have employed to guide my analysis of (adaptive) comanagement, Chapter 3 is concerned with the overall research design and its relationship to the politicised IAD Framework. The chapter moves from a discussion of the research paradigm I am working within, through a consideration of the research strategy, the methods I have employed, my position as the researcher, the measures I have taken to ensure the quality of the research design, and finally to an outline of the study's limitations.

Chapter 4: Policy analysis

Chapter 4 is the first of three analyses that sets out to investigate the broader context in which farming and water governance takes place in England. This chapter relates to the "rules-in-use" variable of the politicised IAD Framework. As with Chapter 2, but in greater detail, it starts by reviewing the development of comanagement from its inception through to the emergence of adaptive comanagement. From the literature review five policy categories are identified which appear to provide an enabling environment for the emergence of adaptive comanagement. These categories are then used to perform a directed content analysis of key water policy documents in England dating from 2008 onwards. The intention is to reveal the extent to which water policy objectives in England appear to facilitate the emergence of adaptive comanagement, and the barriers that stand in the way. In the conclusion I offer suggestions that would favour the emergence of adaptive comanagement from a policy perspective.

Chapter 5: Political economy analysis

Chapter 5 sets out to investigate the "political-economic" variable of the politicised IAD Framework. It is concerned with power structures and how these structures condition the relationships between lowland farmers, and between lowland farmers and water managers. The intention is to understand how this power dynamic affects the ability of these farmers to cooperate and participate in the governance of their water environment.

To do this I undertake a political economy analysis of the major developments affecting farming and water governance in lowland England from World War II until the present day. The analysis is guided by a heuristic known as the Power Cube, which is an analytical tool for thinking about the interplay between different forms of power operating in different types of spaces and at different levels of governance. I then discuss the consequences of the findings for farmer cooperation and participation in water governance, and reflect upon measures to encourage this outcome.

Chapter 6: Discourse analysis

In Chapter 6 I investigate the "discourse" variable of the Framework, focusing on medium and large-scale farmers who are members of water abstractor groups in lowland England. The intention is to explore the current dynamic that exists among farmer irrigators in England, and between irrigators and water managers in order to understand the potential for comanagement to develop. By borrowing concepts from the field of critical discursive psychology, I analyse the ways in which these farmers talk about their relationship with each other, with water managers, and with the water environment. In light of the findings, I discuss measures that could help to facilitate the emergence of comanagement arrangements between farmer groups and water managers.

Chapter 7: Case study analysis

The various analyses described so far culminate in Chapter 7 (Phase 3), where the contextual phase of the research is incorporated into a more focused study that considers the relationship between water abstractor groups and water resources management in lowland England. Again, the analysis is guided by the politicised IAD Framework, but where attention shifts to local dynamics and the way in which these dynamics are structured both by the broader context already identified in Phase 2, as well as case-specific factors. The analysis leads to the identification of various "factors of success" that link farmer cooperation with comanagement, and from which I make inferences about more abstract structures and mechanisms that appear to generate

(adaptive) comanagement. I finish by discussing what the findings imply for the future of water governance in England from a farming perspective.

Chapter 8: Conclusion

In this final chapter I initially review the research aim, and the way in which this study has set out to address it. I then proceed to discuss the conclusions of the research as they relate to the four research objectives, before outlining a series of recommendations, firstly for policy makers, and then for researchers and further research.

Chapter 2: Applying the Politicised IAD Framework to (Adaptive) Comanagement

Prologue:

The paper below (Paper 1) sets out to address Objective 1 of the research agenda from a theoretical and methodological perspective. It has been published in the journal Ecology and Society (Whaley and Weatherhead, 2014). The discussion of how the politicised IAD Framework can be applied to (adaptive) comanagement in Section 2.5 below reflects the process I have adopted in this thesis. This, and the relationship of the Framework to the rest of the research design, will be discussed in Chapter 3.

Paper 1 - An Integrated Approach to Analysing (Adaptive) Comanagement using the Politicised IAD Framework

Luke Whaley and Edward K. Weatherhead

Abstract

Scholars of comanagement are faced with a difficult methodological challenge. As comanagement has evolved and diversified it has increasingly merged with the field of adaptive management and related concepts that derive from resilience thinking and complex adaptive systems theory. In addition to earlier considerations of power sharing, institution building, and trust, the adaptive turn in comanagement has brought attention to the process of social learning and a focus on concepts such as scale, self-organization, and system trajectory. At the same time, a number of scholars are calling for a more integrated approach to studying (adaptive) comanagement that is able to situate these normative concepts within a critical understanding of how context and power fundamentally influences the behaviour of a system. We propose that the "politicised" version of the Institutional Analysis and Development (IAD) Framework, originally developed by Elinor Ostrom and her colleagues, is well suited to addressing this challenge. The framework provides breadth, clarity, and structure by drawing the analyst's attention to the range of variables and questions to be considered when attempting a study of comanagement, the various components of the situation, and the ways in which they interact, and the criteria the analyst may wish to adopt in evaluating the outcomes of the process. Alongside its ability to address contextual factors and power dynamics, the socioeconomic and institutional dimension of the politicised IAD Framework means that it can be used to conduct analyses that result in sound policy recommendations.

Key words: comanagement; adaptive comanagement; IAD Framework; politicised IAD Framework; methodology; institutions; power; discourse; resilience

2.1 Introduction

Many of the world's habitats and ecosystems are failing because of human activity and many more are under threat and face an uncertain future; yet at the same time a growing global population and changing lifestyle preferences is only set to exacerbate these issues in the coming years (UNEP, 2012). A tremendous amount of work has concerned itself with potential solutions to the difficult problems associated with ecosystem loss and natural resource management, attracting the attention of scholars working within and across different disciplines. Amongst academics and practitioners there is a growing appreciation of the shortfalls associated with a one-size-fits-all approach to environmental governance (Meinzen-Dick, 2007; Ostrom, 2007) and an awareness that centralised and bureaucratic attempts to manage the environment tend to be exclusionary, reactive, insensitive to changing circumstances, and prone to result in pathological outcomes (Holling and Meffet, 1996; Glasbergen, 1998; Pahl-wostl, 2006; Pahl-wostl *et al.,* 2007b). In the place of top-down governance a suite of institutional arrangements have emerged as viable alternatives in particular circumstances, ranging from markets in natural resources to community-based systems of management (de Loe *et al.*, 2009). One approach which links centralised and decentralised forms of governance across scales of organisation and which is gaining increasing attention as a means of addressing these challenges is comanagement.

Comanagement has its roots in the work of commons scholars (Kearney, 1984; McCay and Acheson, 1987; Pinkerton, 1989a), although in the last decade it has increasingly merged with the field of adaptive management and related concepts found in resilience thinking and complex adaptive systems theory (Folke, 2006; Holling, 1978; Lee, 1993; Levin, 1999). This merger has tended to combine the linkages typical of comanagement with the learning dimension associated with adaptive management, resulting in what has been termed 'adaptive comanagement' (Armitage *et al.*, 2009, 2007b; Olsson *et al*., 2004a). The cross-disciplinary nature of (adaptive) comanagement demands a wide methodological breadth that is able to encompass concepts and approaches deriving from both the natural and the social sciences. Thus a challenge for comanagement scholars relates to the need to develop a common framework that is capable of addressing the many dimensions of comanagement across differing physical and social

settings, and to ground the normative concepts associated with the subject in a critical awareness of how context fundamentally influences process and outcomes.

In this paper we discuss how a version of the Institutional Analysis and Development (IAD) Framework originally developed by Ostrom and her colleagues (Kiser and Ostrom, 1982; Ostrom, 1990, 2005, 2010) but that has been adapted by Clement (2010) to explicitly consider important contextual variables, can be used to analyse comanagement. To do this we first briefly review comanagement and the developments it has undergone since its establishment as a concept in the 1980s, as well as the methodological challenges associated with the study of the subject. We then provide an overview of the 'politicised' IAD Framework as proposed by Clement, before discussing how this framework is well suited to analyses of comanagement. We conclude with a synopsis of the main points of the discussion.

2.2 The development of comanagement theory

Emerging as a branch of commons theory, comanagement has come to be seen by some as a fourth ideal form of property-rights regime alongside the government, market, and community (Imperial and Yandle, 2005). At the same time, "comanagement is not envisioned as a replacement for central government, nor is it incompatible with existing market-based systems; it is a supplement to these decision-making processes" (Plummer and Fitzgibbon, 2004: 63). Despite its common point of origin in the academic literature, the concept of comanagement has since been influenced by a diverse group of scholars, managers, and commentators, resulting in variegated explanations of the term as one moves from place to place, resource to resource, or between different junctures in time. Nonetheless, rather than contradicting themselves, these conceptions of comanagement instead serve to highlight the multi-faceted nature of the subject, as well as the conceptual developments that have occurred as new insights have emerged, different analytical approaches have been adopted, and previously separate fields of enquiry have come together.

One way of interpreting these various conceptions of comanagement has been provided by Berkes (2009), who charts the development of the term from its initial focus on structural dimensions through to an appreciation of complexity and the need to give

precedence to function and process. From this perspective, early attempts at analysing comanagement tended to focus on formal power-sharing arrangements between a community of resource users and a central government (Berkes *et al.*, 1991), the development of adequate levels of trust between participants (Daniels and Walker, 1996; Leach and Pelkey, 2001; Ostrom, 1999a; Pinkerton, 1989b), and institution building both at the local level and between levels of organisation (Jentoft, 1989; Pomeroy and Berkes, 1997). Increasingly, however, consideration was given to the temporal dimension of comanagement and "how different management tasks are organised and distributed, concentrating on the function, rather than the structure, of the system" (Carlsson and Berkes, 2005: 73).

This change in focus has turned attention towards the mechanisms via which the process of comanagement proceeds. Here scholars have found fertile ground in merging the narratives of comanagement and adaptive management, where the former's attention to system linkages complements the latter's concern with problem solving and learning-by-doing. The merger of these two fields, each with their own distinct disciplinary histories, has resulted in what has come to be called adaptive comanagement (Armitage *et al.*, 2009, 2007b; Olsson *et al*., 2004a). This development has propelled comanagement into the realm of complex adaptive systems theory and resilience thinking, where concepts such as scale, self-organisation, and emergence have established themselves in the discourse (Folke, 2006; Levin, 1999; Olsson *et al*., 2004b). It has also placed a strong focus on the concept of social learning as a means by which the multiple perspectives represented in a system of comanagement are to jointly learn about and adapt to change and uncertainty (Armitag *et al*., 2008).

The adaptive turn has also brought attention to earlier depictions that portrayed comanagement as a binary relationship between a homogenous community of resource users and a monolithic government. It is recognised that neither the government, nor a community of resource users are simple entities acting in unison but instead can themselves be thought of as complex systems comprising networks of individuals and groups. In an attempt to elucidate this perspective, Carlsson and Berkes (2005) have put forward the idea of 'comanagement as governance', where the system of management can be described in terms of the networks and institutions that emerge as a result of the process of collaboration. This version of comanagement "encompasses the idea that in

many real-life cases, we can expect to find rich webs of relations and agreements linking different parts of the public sector to a similarly heterogeneous set of private actors, all within the same area or within the same resource system" (Carlsson and Berkes, 2005: 69).

2.3 Methodological considerations

The above short synopsis shows how comanagement can be thought of in terms of power sharing, trust building, institution building, process, problem solving, social learning, and as governance (Berkes, 2007, 2009; Plummer and Armitage, 2007b). All aspects of comanagement are valid and convey important messages. Furthermore, for analytical purposes it is helpful to distinguish between the various ways in which comanagement can be understood, but in reality the boundaries of these categories are permeable, allowing each to flow into the other. However, the 'many faces' of comanagement (Berkes, 2007) provides a methodological challenge to those attempting to study it. The cross-disciplinary nature of the subject permits scope for investigating comanagement according to the tenets of a range of distinct and sometimes seemingly incompatible scholarly lineages. The adaptive turn in comanagement has brought in concepts and perspectives that stem from the natural sciences, whilst the large social and institutional component of the subject, where issues of power, collaboration and conflict abound, plants comanagement firmly in the social sciences, with their diverse philosophical and methodological underpinnings.

Broadly speaking, a great deal of research aimed at understanding comanagement has tended to focus on and contribute towards the normative concepts that have come to characterise the field. These studies have been invaluable in developing a general relational picture of comanagement and for theory building. On the other hand, far fewer studies have adopted a more critical stance. Those that have demonstrate the importance of taking into account case-specific histories and the role of power when attempting to understand situations which are significantly less technical then many analyses of commons governance might lead one to believe (Li, 2006). And yet despite the large and growing body of literature on the subject, Carlsson and Berkes (2005: 72) observe that "our tools for conceptualising and analysing comanagement are strikingly blunt".

Armitage (2008) has argued for a more inclusive approach that is capable of incorporating the normative concepts associated with governance arrangements such as (adaptive) comanagement within a framework that grounds them in the contextual details of a specific case. To this end, he suggests a fruitful synthesis could see commons and resilience discourses merge with concepts, methods and approaches found in political ecology, including analyses of history, discourse, and the political economy. Wilson (2010) points out that when it comes to discussions of social resilience a tension often exists between systematic approaches that proceed upon normative lines, and more critical attempts that fail to achieve the same systematic rigor: "when [resilience] discussions are systematic they tend not to be critical, and when they are critical they fail to be systematic" (Wilson, 2010: 52). Similarly then, Wilson posits that it would be beneficial to combine resilience thinking with approaches developed in critical social theory and which are employed by those working within political ecology.

The challenge then is the development or adoption of a framework that is general and flexible enough to encompass the methodological diversity required to investigate the various dimensions of comanagement from both a normative and critical perspective, and detailed enough to ensure a systematic and structured analysis. Articulating this goal, Plummer and Armitage (2007a: 841) state that "to further build and consolidate the theoretical foundations of comanagement, it will be necessary to pursue methodologically consistent avenues of research across geographical locations and resource contexts. Systematic evaluation of experience grounded in commonly framed approaches will play a key role in this regard." In the following sections we demonstrate how the politicised IAD Framework can be used to address this challenge.

2.4 The politicised IAD Framework

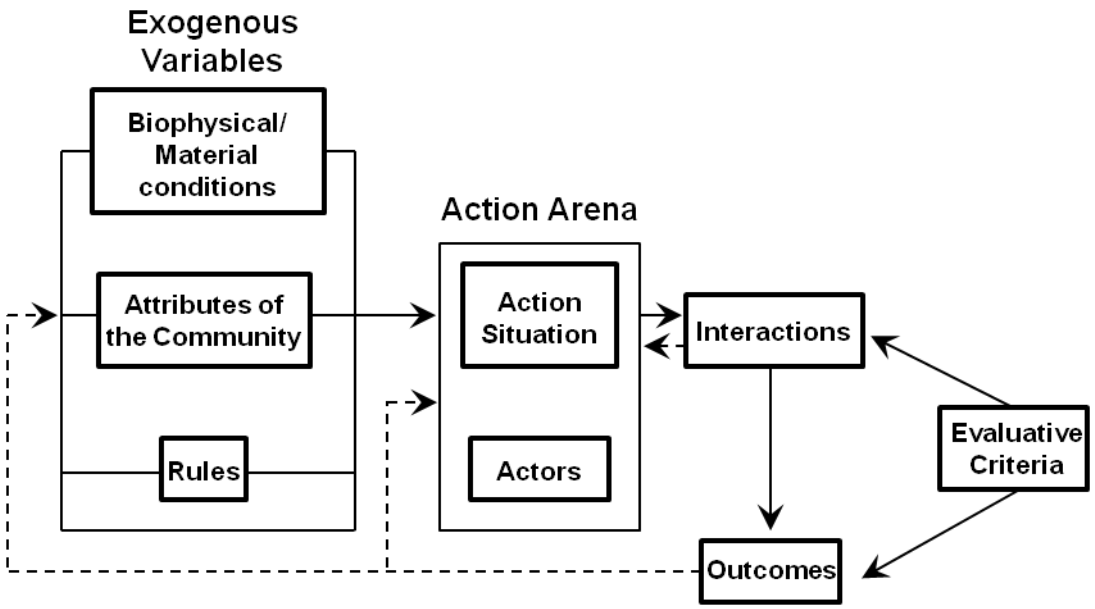
In this section we provide an overview of the Institutional Analysis and Development (IAD) Framework, a key tool for scholars interested in how diverse governance systems affect people's ability to solve problems, as well as the modifications Clement (2010) has made to the Framework in bringing explicit attention to the role of the political economy, discourse and power in studies of natural resource management. We keep our discussion of the original IAD Framework to a minimum, and instead refer the reader to

the many good summaries and expositions to be found in the literature (see for example Ostrom, 1990, 2005, 2011; Ostrom *et al.,* 1994; Kiser and Ostrom, 2000; Blomquist and DeLeon, 2011; McGinnis, 2011).

2.4.1 The IAD Framework

The Institutional Analysis and Development (IAD) Framework provides a means for inquiring into a subject by bringing explicit attention to the relevant variables and the questions one may want to ask (Blomquist and DeLeon, 2011). At the heart of the Framework is an 'action arena', consisting of an 'action situation', which is the social space where individuals or groups of individuals interact and outcomes are produced, and the 'actor', which contains the theory of the individual that the analyst wishes to draw upon. Behaviour of participants in the action situation is influenced by three sets of exogenous variables: the biophysical and material world, the community, and the rules-in-use (Figure 2.1). According to McGinnis (2011: 172), these variables "encompass all aspects of the social, cultural, institutional, and physical environment that set the context within which an action arena is situated."

Figure 2.1 The IAD Framework. Adapted from Ostrom (2005).



The action situation can be further broken down into seven working components (Figure 2.2) consisting of *participants* who take up various *positions*, where any given position allows the participant to undertake certain *actions* that are dependent on how much *information* they possess about each available action, how actions are linked to potential *outcomes*, the degree of *control* individuals exercise over these outcomes, and the *costs and benefits* they assign to them (Ostrom, 1990). McGinnis (2011: 173) observes that these working components of an action situation serve to "specify the nature of the relevant actors as well as the resources and options they face." The three exogenous variables are able to affect different parts of the action situation (Ostrom, 2005). Furthermore, a key feature of the IAD Framework relates to its ability to analyse behaviour at multiple theoretical levels by shifting from one action situation to deeper rule-changing situations (Kiser and Ostrom, 1982). Three nested levels are commonly recognised: the operational, collective-choice, and constitutional choice (Figure 2.3). One of the main strengths of the IAD Framework lies in its ability to provide a structured and consistent approach to analysing complex phenomena. It also recognises the interdependency of the three exogenous variables. For example, the relevance of any set of rules-in-use depends strongly on the prevailing biophysical conditions and the shared norms and values of those for whom the rules are intended.

Figure 2.2 The action situation of the IAD Framework. Adapted from Ostrom (2005).

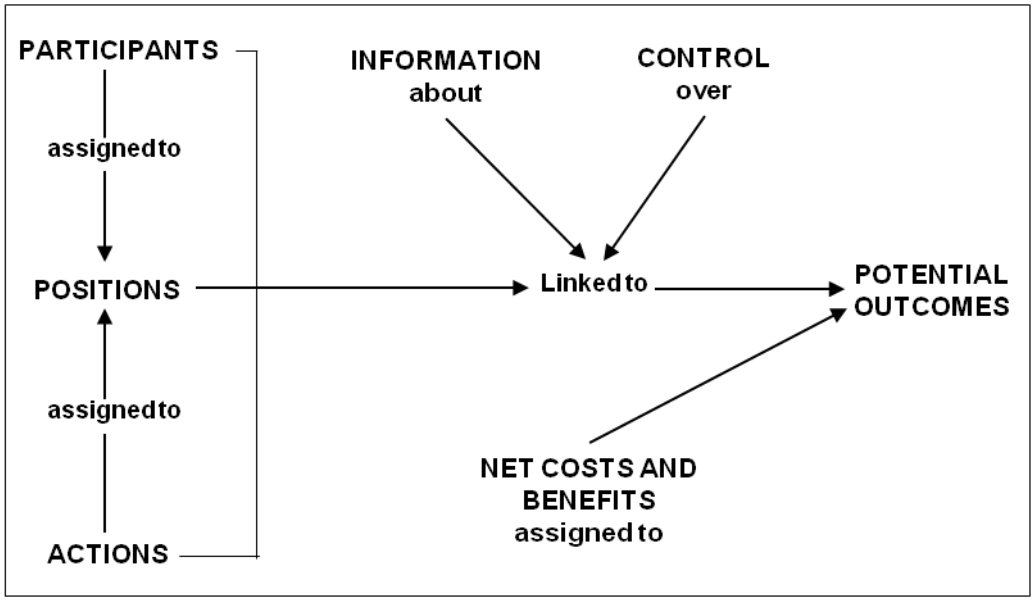
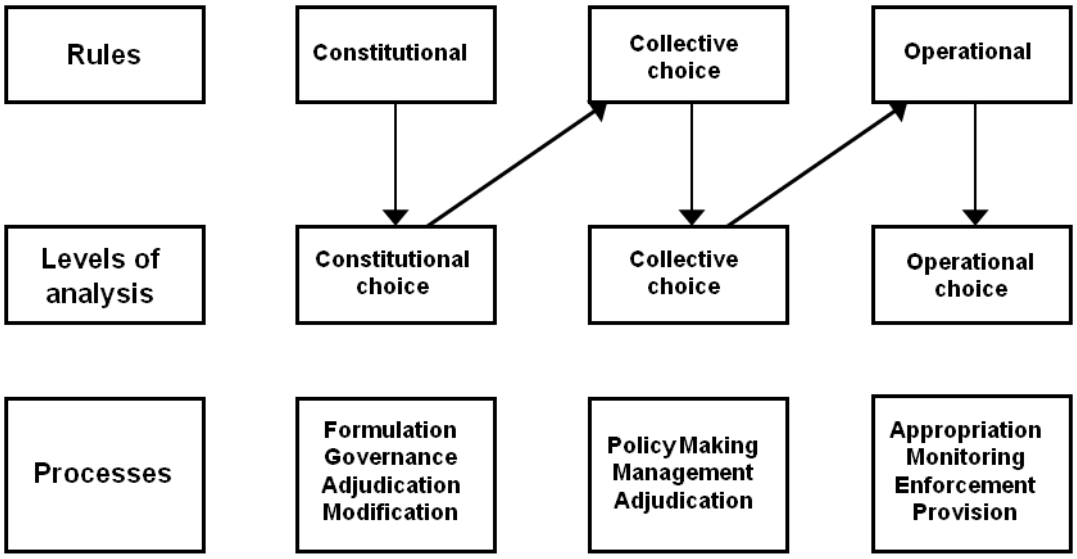


Figure 2.3 The linkages among rules and levels of analysis. Adapted from Ostrom (1990).



The IAD Framework is compatible with a range of criteria which can be used to evaluate the process and outcomes related to the institutional arrangement under consideration. For example, Ostrom (2005) lists as examples of criteria which are suitable for examining the overall performance of an institutional arrangement, 1) economic efficiency, 2) equity, 3) adaptability, resilience and robustness, 4) accountability, and 5) conformance to general morality. Furthermore, Imperial (1999) discusses how the IAD Framework brings attention to three interrelated transaction costs which are associated with inter-organisational policy implementation and which provide a suitable means for assessing an institutional arrangement at different points in time: information costs, coordination costs, and strategic costs. Ostrom (2005) observes that changing to a different institutional arrangement generally entails trade-offs between different sets of evaluative criteria, where the relative success of an arrangement will depend upon stated policy or other objectives.

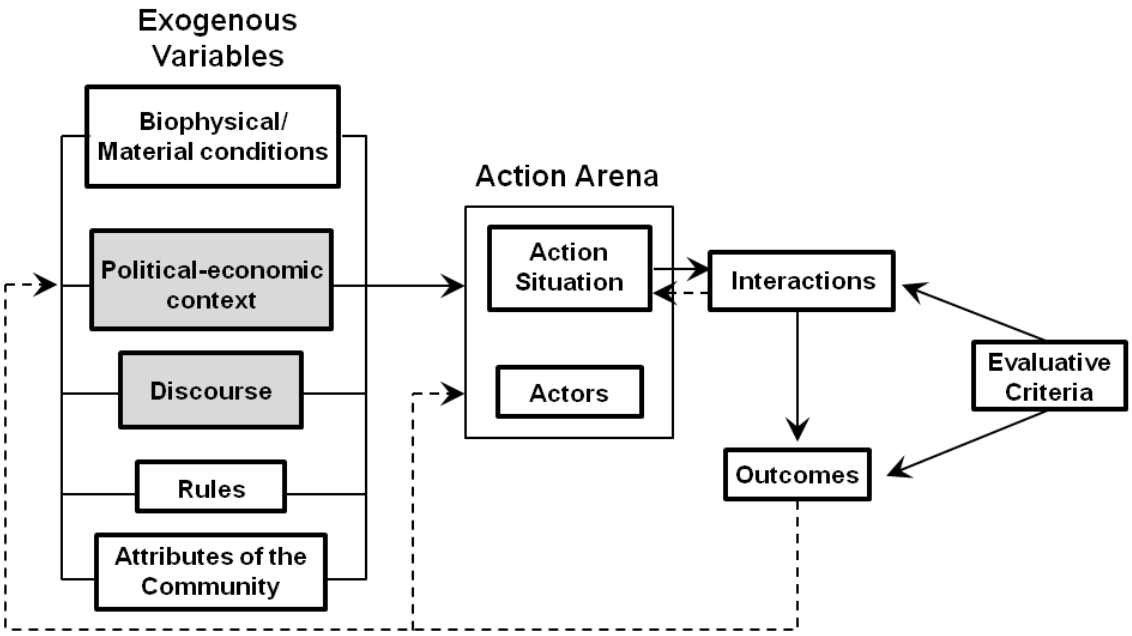
2.4.2 Enriching the Framework

Despite its many strengths the IAD Framework, and commons theory more generally, has been criticised for being both ahistorical and apolitical (Agrawal and Yadama, 1997; Agrawal, 2002; Mosse, 1997), giving too much precedence to rules and the way in which rules operate to mould and constrain human behaviour, whilst failing to

adequately account for power dynamics and context (Jentoft, McCay, and Wilson, 1998; Ribot *et al.*, 2006). McCay (2002) points out that although commons theory does consider contextual variables such as group size or resource complexity, a real appreciation of context must extend beyond such variables to an awareness of what she calls 'situation'. According to McCay, accounting for the situations in which people make decisions and undertake actions requires an understanding of how rules and property rights emerge from within particular historical, ecological and cultural traditions. As such, explaining how people relate to each other and to their environment "requires specification of those situations and their broader context" (McCay, 2002: 393), something the IAD Framework only partially addresses. Furthermore, scholars employing the IAD Framework generally posit that institutions emerge and develop as the result of rational or boundedly-rational decision makers whose behaviour relates to a set of incentives, and in so doing it they fail to adequately consider the power dynamics at work in a system of governance (Johnson, 2004).

Responding to these criticisms, Clement (2010) has proposed an adapted version of the IAD Framework that considers the role of power and the wider historical processes that come to bear on an action situation. To do this, the new 'politicised' IAD Framework explicitly recognises the need to consider discourse and the action of political and economic forces (Figure 2.4). In so doing, Clement has answered calls for more normative approaches to understanding the commons to take advantage of critical methods employed by those working in the field of political ecology (Armitage, 2008; McCay, 2002; Wilson, 2010). Whilst Clement has elaborated the rationale behind the revisions to the IAD Framework elsewhere (Clement and Amezaga, 2009; Clement, 2010), in this paper we shall focus on how power and the wider context have been incorporated into the IAD Framework by discussing the two additional variables proposed by Clement: 'discourse' and the 'political-economic' context. These variables affect both the 'action situation' - in particular the ways in which participants are positioned – as well as the 'actors' component of the action arena, where they shape values, norms and preferences (Clement, 2010).

Figure 2.4 The politicised IAD Framework, with the additional variables shaded in grey. Adapted from Clement (2010).



Discourse

Discourse is a term which can be construed in many ways. In everyday parlance the terms discourse and discussion are often considered to be synonymous (Taylor, 2001). When analysing discourse, however, the two terms must be distinguished from each other so that the 'discussion' (or debate) becomes the focus of analysis, whilst 'discourse' is understood to be a shared way of apprehending the world that is embedded in language and which "enables those who subscribe to it to interpret bits of information and put them together into coherent stories or accounts" (Dryzek, 2005: 9). Hajer and Versteeg (2005: 175) define discourse as "an ensemble of ideas, concepts and categories through which meaning is given to social and physical phenomena, and which is produced and reproduced through an identifiable set of practices." Thus whilst an independent reality exists, we make sense of that reality and attribute meaning to it through the use of particular discourses. To this extent, discourse plays a fundamental role in the social construction of the world we inhabit. Ontologically, this perspective is associated with critical realism (Bhaskar, 1975; Harre, 1972) and provides a philosophical bridge between the natural sciences and more interpretive strands of the social sciences.

The inclusion of discourse into the IAD Framework brings with it a number of important developments. Of significance from an institutional perspective is the consideration of power. Whilst in the original IAD Framework Ostrom recognized power as a relevant factor, she nonetheless does so in a highly instrumental manner by taking the power of a participant in an action situation to be the range of outcomes they are able to affect multiplied by the control they exercise over these outcomes (Ostrom, 2005). A far more dynamic conception of power can be found in the work of the social philosopher Michel Foucault, who considered power, knowledge and discourse to be bound together. For Foucault, power "is not an institution, and not a structure; neither is it a certain strength we are endowed with; it is a name one attributes to the complex strategical situation in a particular society" (Foucault, 1978: 92). The power of social actors in this situation is relational, where the various positions and functions are defined and negotiated through particular discourses (Hall, 2001). Hajer (1995: 49) notes therefore that "in this view the power of the institution is permanent in so far as it is a constant feature of the discourses through which the role of that institution is being reproduced." Thus discourses and institutions are intrinsically bound up in one another. Dryzek (2005: 20) observes that certain discourses become embodied in institutions, where they "constitute the informal understandings that provide the context for social interaction, on a par with formal institutional rules."

Also of interest to our discussion of discourse and the IAD Framework is the notion of a 'position'. In the Framework's action situation all participants are assigned positions (Figure 2.2), where the standing of a person in any given position relates to the authorised actions available to them in this position or the way in which the position they assume limits their actions. Positions are conceived of as "anonymous slots" into which participants can move, and may include judges, defendants, buyers, sellers, resource users, regulators, and so on (Ostrom, 2005: 41). This definition of a position is akin to what social psychologists have traditionally termed a 'role'. In critiquing the static and largely formal concept of role as a way of understanding the self in social interactions, Davies and Harre (1990) have instead proposed that people actively position themselves and those they are interacting with in a situation by employing ideas, concepts and categories that derive from particular discourses or that relate to particular storylines that actors draw upon in making sense of the world. Thus

positioning theory invokes a far more dynamic understanding of social encounters where people are involved in an argumentative exchange, and where identity is continually negotiated as actors attempt to position themselves and others, often subconsciously, in relation to a particular issue or set of issues.

Political-economic context

The political-economic variable in the politicised IAD Framework draws the analyst's attention to contextual factors that not only require one's analysis to expand outwards to take account of the wider political and economic factors that directly or indirectly influence the behaviour of participants in the action situation, but also to expand backwards in time so as to understand the events and processes that have given rise to present-day conditions. As with discourse analysis, this approach resonates strongly with the field of political ecology where political-economic analyses hold a central position. For these scholars, "a focus on the respective roles and interactions of the state and the market and the influence on environmental outcomes is critical" (Neumann, 2005: 6). Without an understanding of both the local and wider political and economic situation it is not possible to appreciate the distribution of power among social actors, and how such a power dynamic affects the behaviour of individuals. The consideration of political and economic factors also draws attention to the issue of scale by acknowledging that "the design and sound implementation of adequate rules at the local level is significantly constrained by decisions made at higher governance levels and by the structure of the economy" (Clement, 2010: 137). According to Agrawal and Yadama (1997), explicit inclusion of the political-economic context is a necessary addition to mainstream commons research which has tended to focus on local communities without regard for political and economic forces and the ways in which they structure interactions within and between groups and organisations.

What's more, despite the fact that institutional design is historically contingent or 'path dependent', work on the commons has tended to be remarkably ahistorical (Stern *et al*., 2002). And yet, appreciation of how the political-economic context structures power dynamics in a system requires one to consider not only present-day conditions but also the activity leading up to them. Mosse (1997: 470) has therefore argued that historical analyses must be incorporated into standard models of community resource

management on the grounds that "historically-specific structures of power, rather than simply calculated pay-offs (or traditional wisdom) underlie the norms and conventions of collective resource use, and account for the occurrence and persistence of local institutions of resource use. These do not only manage resources, they also serve to reproduce relations of dominance and dependence, and provide the context for political strategy and status competition."

In concluding then, although the original IAD Framework has many strengths, not least of all its analytical clarity, applicability, and capacity to account for nested levels of decision-making, its insights have failed to include critical approaches that recognise that "the interplay of power, the positioning of various actors within nested hierarchies and the role of context all exert a powerful influence" (Armitage, 2008: 24). The two variables Clement (2010) has included in the IAD Framework develop this critical dimension by drawing attention to the significance of the discursive and political-economic context in which individuals, groups, and systems of resource governance are embedded and in so doing bring an added awareness of 'situation' to the analysis, as argued for by McCay (2002). Before proceeding, it must be noted that the IAD Framework has subsequently been modified by Ostrom and her colleagues so as to develop a more complex framework for analysing social-ecological systems (SES), where the emphasis has been on unpacking the 'biophysical' variable of the original IAD Framework (Ostrom, 2007, 2011). Whilst this emerging SES Framework promises much, here we are instead interested only in the politicised IAD Framework proposed by Clement (2010) because of its applicability to analyses of (adaptive) comanagement, as detailed below.

2.5 Applying the Framework to (adaptive) comanagement

In this section we discuss how the politicised IAD Framework is well suited to "a systematic evaluation of [the comanagement] experience grounded in commonly framed approaches" (Plummer and Armitage, 2007b: 841). One of the great strengths of the Framework derives from its ability to bring all the relevant factors of a situation to the attention of the analyst. Whilst not all of the five exogenous variables discussed above will necessarily carry the same weight from one study to the next, the politicised IAD Framework nonetheless ensures that each is considered and that those variables which

play an important role in the behaviour of the situation under consideration are not overlooked. Similarly, whilst the various components of the action situation (Figure 2.2) highlight the basic elements that must be incorporated into an analysis of the interactions between actors in any situation, it can also serve to guide an investigation into specific aspects of that situation, such as the ability for certain individuals or groups to participate in decision-making, the ways in which actors position themselves and others, the values they attribute to particular outcomes that can be achieved, and so forth.

In keeping with those writers who have argued that understanding comanagement more fully will require the incorporation of both normative and critical methods of analysis, here we shall discuss how the politicised IAD Framework can be used to analyse the various dimensions of comanagement as outlined previously. Given the methodological breadth on offer to users of the politicised IAD Framework, the many interests of scholars working in the field of comanagement, and the many different elements and components that have come to be associated with the term itself (see Plummer and Fitzgibbon, 2004; Plummer, 2009), the intention here is not to provide an exhaustive account of the ways in which the Framework can be employed to investigate comanagement. Instead the discussion is intended to be suggestive; to point to the relationship between the Framework and comanagement whilst demonstrating a logical progression someone attempting to undertake a comprehensive comanagement study may wish to follow. In Table 2.1 we provide a generalised account of the relationship between comanagement and the politicised IAD Framework.

Table 2.1 Relationship between the politicised IAD Framework and (adaptive) comanagement.

Exogenous Variable	Description of variable	Relationship of Variable to (adaptive) Co-management
Biophysical and Material	Ecosystem conditions, resource attributes, and forms of technology. In the action situation this variable affects what actions are possible,	Environmental feedback caused by changes in ecosystem or resource dynamics can trigger collective action, where certain properties of the resource and the presence of technology are known to affect the ability of actors to self-organise. Particular

	what outcomes can be produced, and what is contained in the actors' information sets.	forms of infrastructure - e.g. large and centralised or decentralised on an appropriate scale - are also indicative of the type of governance arrangement – e.g. top-down or polycentric - and thus the potential for comanagement to emerge.
Political-economic	A contextual variable concerned with the overall political economy of the system in which the action situation is embedded. In particular this variable positions participants in the action situation, and shapes their values, norms, and preferences. It strongly influences the distribution of power between stakeholders.	Comanagement networks are embedded in the wider political economy, which shapes power relations, structures cross-scale interplay and network characteristics, and influences the forms of power sharing, trust building, and rule crafting that emerge. These attributes in turn affect processes of problem solving and social learning. The structural influences of the political economy do not affect local environmental conditions directly but are mediated through the institutions and organisational characteristics of the co-management arrangement in question. The political economy is a 'slow variable' that strongly shapes overall system trajectory.
Discourse	Gives meaning to the physical and social world, and can be used to sustain or challenge existing power structures. In particular this variable positions participants in the action situation, and shapes their values, norms, and preferences.	Environmental crises, which often serve as a trigger for comanagement, are not an objectively definable state of the world but instead are constructed and negotiated by stakeholders through the use of particular discourses. Discourses also operate to sustain or challenge power relations between participants as certain discourses become normalised or are undermined, and by positioning the actors in the action situation according to particular storylines. They are also vital for developing and maintaining the institutions that enhance collaborative and learning-based approaches. Discourses therefore provide a critical approach to understanding power-sharing arrangements between participants in the co-management process.
Rules-in-use	The set of rules "to which participants would make reference if asked to justify and explain their actions to fellow participants" (Ostrom	Rules can operate to make a system of resource governance rigid and vulnerable to change, or flexible and dynamic by facilitating communication, negotiation, conflict resolution, problem solving, and joint learning within and between scales of

	2005: 19). Rules-in-use both enable and constrain human behaviour by stating what actions are required, permitted, or forbidden. They affect all elements in the action situation.	organisation. Enabling legislation at higher levels can encourage self-organisation and the process of adaptive comanagement, whilst locally devised rules can enhance social learning, tighten environmental feedback loops, and increase the adaptive capacity of resource users. Rule changing allows participants to alter a system's trajectory and to institutionalise social memory.
Attributes of Community	Physical attributes of the community, such as the number of participants, and their gender, race and age. And cultural attributes, including the systems of norms, values, and beliefs that structure the participants' understanding of the world.	Physical attributes of the community affect the ability of stakeholders to self-organise; for example, the size of a group alters stakeholders' incentives to act collectively, and differences in race and gender may affect power relations and levels of trust between participants. Particular functions of individuals, including acting as leaders, knowledge carriers, or networkers, are known to affect the process of adaptive comanagement. Furthermore, cultural differences or similarities can greatly influence the ability of a comanagement arrangement to emerge by undermining or enhancing trust and social capital, and the ability of participants to communicate, jointly learn about, and act in response to changes in social or environmental circumstances. This variable also allows the analyst to explore the relationship between co-management networks and the larger cultural systems they are embedded in.

The first step an analyst takes when employing the politicised IAD Framework is to define the action situation (Figure 2.2). In considering comanagement, one may be interested in such instances as a government organisation and a community of resource users, a geographical area, or a particular resource. Given Carlsson and Berkes' (2005) argument that comanagement should be studied in terms of function and process, here we follow them in suggesting a good option for defining the action situation is to start with the management activities associated with the resource in question and the actors whose job it is to carry them out. In doing so it may be useful to consider the seven

broad management activities comanagement can enhance, as outlined by Pinkerton (1989b: 6). Thus whilst the resource - be it a region of forest or a river corridor – is geographically located, the action situation may include actors located outside of the resource boundary if their decisions affect the management of that resource (Imperial, 1999).

Defining the action situation according to management activities - or function - emphasises the importance of scale by bringing attention to the organisational levels across which management decisions are located. This is significant to analyses of comanagement where there is a focus on cross-scale interplay (Berkes, 2009; Carlsson and Berkes, 2005; Pomeroy and Berkes, 1997), and where it has been recognised that "the connections between governmental and nongovernmental actors themselves are ripe for examination using IAD" (Blomquist and DeLeon, 2011: 5). Furthermore, by ascertaining who the relevant actors involved in a given management activity are, and the relationship of these actors to one another in the action situation, the Framework allows the researcher to develop a network approach to analysing process and function, a line of enquiry which is currently receiving much attention and which serves to promote an understanding of "comanagement as governance" (Bodin *et al.*, 2006; Carlsson and Berkes, 2005; Janssen *et al.*, 2006; Newman and Dale, 2005). The politicised IAD Framework can then be used to critically analyse the connections and interactions within these networks and the outcomes that occur as a result, including processes of problem solving, social learning, power sharing, and the development of trust and newly devised rules-in-use. The Framework can also be used to investigate how a particular network "is embedded in a system of political economy, and embedded in greater cultural or normative systems" (Brown, 2001: 2 *in* Plummer and Fitzgibbon, 2007). In the end, whichever way the action situation is defined what is important is to appreciate that in many respects comanagement is concerned with the participation of actors at the collective-choice level (Pinkerton, 2003) as this is where management decisions take place (Ostrom, 1990; Schlager and Ostrom, 1992).

Having decided upon the action situation, a general strategy is then to identify which aspects of the biophysical, political-economic, discursive, institutional, and community setting influence the various elements of the action situation as detailed in Figure 2.4. In effect, how do the exogenous variables affect who is allowed to participate in the

situation, what actions they can take and the costs associated with them, what outcomes they can affect, how actions are linked to outcomes, what information they have access to, and the extent to which they have control over outcomes they can affect (Ostrom, 1990). To do this, one may first wish to enquire into the biophysical conditions by considering the characteristics of the resource. Here commons scholars have identified particular resource attributes, such as complexity, size, and productivity that affect the likelihood that resource users will self-organise (Ostrom, 1999b, 2009). Self-organisation is also a concept that is considered important in both resilience thinking, where the focus is on how systems re-organise in the face of change, and political ecology, where the interest is in understanding how environmental systems can form or shape self-organising, self-sustaining power relationships (Armitage, 2008). Furthermore, self-organisation may connote institution building as rules are crafted to structure new forms of collective action between participants (Hodgson, 2006; Pinkerton, 1999). Another important aspect of the biophysical conditions relates to the presence of technology in the system of interest. For example, Pahl-wostl *et al.* (2007a) observe that large, centrally designed infrastructure is indicative of single sources of design, power and delivery; system attributes that characterise a command-and-control approach to resource governance. Alternatively, technology on an appropriate scale is typical of diverse sources of design, power, and delivery and may therefore represent a system that is better primed for more pluralistic forms of decision-making such as comanagement.

Analysis of the political-economic context reveals ways in which power is distributed among the actors in a management arrangement and provides a critical appreciation of the potential for concepts such as trust or power sharing to emerge and develop. For example, in questioning the fact that "virtually every comanagement case study encountered in the literature [on the circumpolar North] is a success story," Nadasdy (2003: 368) critically examines the case of a comanagement sheep-steering committee in southwest Yukon and shows that despite the fact that this particular case has been branded a model of success by many, the indigenous Kluane First Nation members and some of the biologists on the comanagement committee considered the process to be a "complete failure". Nadasdy demonstrates that although there are a number of contributing factors that led to this outcome, the roots of the problem are in fact political

and in the end the comanagement process only served to reinforce existing power imbalances between the various parties. In a separate analysis on forest use in the Kumaon Himalaya in India, Agrawal and Yadama (1997) argue that socio-economic forces can significantly influence the condition of renewable resources and the ways in which these resources are managed. However, the authors discuss how such forces are always mediated by local institutions; findings which they conclude have significant implications for the role of comanagement between the market, state and the community. Adger *et al.* (2006) also highlight the importance of considering the political-economic variable in the politicised IAD Framework through a discussion of how the structure of the political economy, which reflects the distribution of power between stakeholders, strongly influences cross-scale interactions in comanagement networks. Here "cross-scale interactions by powerful stakeholders have the potential to undermine trust in resource management arrangements," where "the structure of cross-scale interplay, in terms of relative winners and losers, determines its contribution to the resilience of social-ecological systems" (Adger *et al.*, 2006: 9).

Understanding political and economic events and how they have come to structure the action situation draws attention to the evolutionary nature of the process. Graham and Ernstson (2012) show how an historical analysis of a comanagement agreement in Macassar Dunes, Cape Town, reveals that the political approach that characterised decision-making prior to the introduction of the comanagement arrangement tended to be top down and exclusionary. The authors conclude that "the formative stages of the comanagement process represent a fundamental comanagement barrier for some interviewees, and have implications in the contemporary setting for who should now 'take responsibility.'" Thus an historical account of political and economic drivers provides an insight into the factors that have come to determine the current system trajectory as well as those factors that may constrain or enable the pathway it takes in the future. Here again then, a critical perspective unearths contextual details pertaining to core concepts in resilience thinking and adaptive comanagement - in this case 'system trajectory' and 'pathways of change' – therefore grounding abstract theoretical constructs within the specifics of a particular study.

Discourse analysis offers up many fruitful avenues of enquiry for the study of comanagement. For example, Degnbol (2003) draws attention to the gap between

mainstream discourses in fisheries science and the discourses of local users. He argues that if comanagement arrangements are to become truly inclusive this gap must be bridged. It is therefore of interest to the researcher to understand the different ways in which users and government officials talk about the resource system in question, including its use and its management. Alternatively, examining the ways in which the various actors in the comanagement process talk about each other can also provide valuable insights into issues such as trust, power sharing, problem solving, and social learning. In discussing an agreement to comanage shellfish in the Dutch Wadden Sea, Steins (1999: 139) reveals how the imagery participants draw upon in describing the character and activity of the other actors in the agreement has tended to "cloud the discussions over resource use in the negotiating and decision-making process at the collective-choice and constitutional level".

Discourse analysis therefore provides a means of understanding how participants in a comanagement arrangement draw upon particular discourses and storylines to position themselves and others in relation to the challenge of resource management, and the developments that occur as these positions are negotiated and renegotiated over time. An inherent feature of such analyses are the power dynamics operating within and across nested scales of organisation, be it relating to the link between humans and their environment or between networks of actors in a collaborative setting. And so whilst power sharing is often portrayed as an outcome in the literature, the Framework also highlights how the balance of power between participants in the action situation intrinsically influences their behaviour and the sorts of outcomes that can be achieved, including the degree to which an equitable power-sharing arrangement may feasibly be reached. Furthermore, understanding how an environmental issue becomes a crisis through the meanings attributed to it by social actors is also important because a pre-condition for comanagement is the recognition of a crisis of some sort (Pinkerton, 1989b; Plummer and Fitzgibbon, 2004; Selin and Chavez, 1995). The point at which an environmental issue is deemed to be a crisis is not an objectively defined state of the world but instead emerges as a result of the ways in which the problem is discursively constructed and the particular storylines employed to make sense of the many competing discourses different actors bring to the issue, be they government officials, scientists, resource users, citizens, or whoever (Hajer, 1995).

Analysis of the rules-in-use provides an understanding of the incentives an individual or group face in a given action situation. Actors make decisions within a system of rules and appreciating how such rules constrain or enable a comanagement arrangement is therefore of much importance to the analyst, where changes in the rules towards a more inclusive system of governance reflects a process of institution building for comanagement (Pomeroy and Berkes, 1997). Such changes may take the form of wider enabling legislation which recognises a community of resource users as legitimate participants in particular arenas of management decision-making and which is known to encourage self-organisation and the emergence of adaptive comanagement (Olsson et al., 2004a), or alternatively rules might be crafted that aim to facilitate collective action between resource users at the local level or between local institutions and government bodies (Ostrom, 1990, 1999b). In their process-oriented model of comanagement, Borrini-feyerabend *et al.* (2000) discuss how before entering a learning-by-doing phase, rules must be devised that allow participants to enter into negotiation and discussion with one another. Identifying barriers or opportunities to rule changes such as these requires an understanding of the system's trajectory and the power dynamics at play, which comes about through a critical analysis of the political-economic and discursive landscape.

The final variable available to the analyst relates to the community within which the action situation is located. In many ways this variable represents the cultural dimension of the analysis, and can prove an especially significant feature of attempts to comanage a resource as in many cases comanagement arrangements have emerged from the coming together of disparate cultural perspectives. Sometimes the difference may lie between the organisational culture of a bureaucratic government administration whose guiding principles are predicated upon a rational scientific tradition and the indigenous value-system of a community of resource users (Castro and Nielsen, 2001; Nadasdy, 2003a). At other times the differences may be less pronounced but perhaps still challenging if the political culture in the country reflects a tradition of non-participation from citizens, leans heavily towards a different form of governance such as market rationalism, or favours some kinds of comanagement arrangements over others (Sen and Nielsen, 1996). Ostrom (2005: 27) makes clear the importance of considering the cultural aspect of the comanagement process when she states that "if the participants in

a situation come from many different cultures, speak different languages, and are distrustful of one another, the costs of devising and sustaining effective rules are substantially increased." However, the variable 'community' need not refer only to a consideration of culture but may relate to other attributes, such as the size and composition of a community of resource users, the race, gender, and age of participants, or the degree of inequality in the distribution of basic assets among the participants (Ostrom, 2005). From an adaptive comanagement perspective, the analyst may also benefit from thinking about the key functions that participants perform in the action situation – where these functions include leaders, followers, knowledge carriers, networkers, innovators, interpreters, and entrepreneurs – and how the prevalence, distribution, and relationship between the various individuals performing such functions affects the development of the comanagement process (Berkes, 2009; Folke *et al*., 2005; Plummer, 2009).

Thus each variable associated with the politicised IAD Framework in turn relates to a suite of questions that are of relevance to the study of comanagement. What variables and which questions emerge as the focus of any given study will depend upon their relevance to the case under consideration and the interests of the researcher. However, by bringing attention to all the relevant exogenous variables that affect an action situation and the components that comprise it, the Framework ensures that an analyst identifies those aspects of the situation that are most relevant to the objectives of their study and ensures that no critical element is overlooked. Furthermore, the Framework is also well placed to structure cross-disciplinary team studies, where the analytical clarity it provides can be used to guide and organise the work threads of the various members in the team. Having conducted the analysis, the researcher may be in a position to make predictions as to the outcomes of the comanagement process. However, given the large degree of uncertainty and procedural openness usually associated with comanagement, it is unlikely that any attempt at making predictions can move beyond informed estimations of what is more or less likely to occur in a particular situation, or a general appreciation of what the consequences of changing the rules would be (Ostrom, 2005).

Alternatively, the analyst may wish to evaluate the outcomes that have transpired as a result of the comanagement process. As discussed previously, transaction-cost analysis

provides a means of evaluating the performance of an inter-organisational network at different junctures in time, by considering information costs, coordination costs, and strategic costs (Imperial, 1999). The advantage of this kind of assessment is that no bias exists concerning the appropriate form of governance for a given situation. Thus it may be that comanagement proves to be inappropriate or that another governance arrangement is better suited to the particulars of the case. Furthermore, when crafting a new institutional arrangement, it may be common for one set of transaction costs to decrease and another to rise. For example, in the early stages of the comanagement process one may observe an increase in coordination costs as a greater number of participants become involved in decision-making and new procedures to which they are not accustomed. However, over time, information costs may decrease as levels of communication improve, decision-making becomes routine, and information asymmetries between the various actors become less pronounced. Thus transaction costs can be divided up according to whether they are long-term or short-term by nature (Carlsson and Berkes, 2005).

Beyond the analysis of transaction costs, one may also wish to evaluate the overall performance of the system after a sustained period of time. Although many evaluative criteria are compatible with the politicised IAD Framework, some are more relevant to comanagement than others. For example, improving equity has always been one of the central premises for implementing comanagement (Ingles *et al*., 1999; Pinkerton, 1989a; Plummer and Fitzgibbon, 2004). Here a distinction must be made between equity relating to: 1) the proportionality between what an individual pays and the benefits they receive (fiscal equivalence), and 2) a system based on an individual's ability to pay (redistributional equity) (Ostrom, 2005), where the relative weight placed on either of these two forms of equity will be case specific. With the adaptive turn in comanagement, attention must also be given to the adaptive capacity and resilience of the system. With respect to adaptability, Ostrom (2005: 67) raises such questions as "do individuals learn from experience within an action situation?" and "Do they adapt to new circumstances as they arise or do they become rigid in their response over time?" More recently, Plummer and Armitage (2007b) have proposed a comprehensive resilience-based framework for evaluating adaptive comanagement, where they have developed scale-specific parameters for three broad categories of assessment criteria:

ecosystem conditions, livelihood outcomes, and process and institutional conditions. The framework they provide emerges from a complex adaptive systems perspective and offers a systematic means for assessing adaptive comanagement in accordance with the various elements that have come to define it.

In summary, the discussion in this section has demonstrated that the politicised IAD Framework is a useful tool for guiding analyses and evaluations of (adaptive) comanagement according to an integrated methodological approach. By referring to particular examples from the literature, we have shown how the five exogenous variables of the Framework draw attention to the various faces of comanagement as outlined by Berkes (2007, 2009) and emerging concepts from resilience thinking and political ecology such as scale, self-organisation, path dependence, and system trajectory (Folke *et al.*, 2005; Neumann, 2005; Olsson *et al*., 2004b). At the same time, the variables permit the analyst to ground these concepts in a critical awareness of "situation" (McCay, 2002). Furthermore, by considering rules-in-use, aspects of the political-economic context, and evaluative criteria such as transaction costs and efficiency, the politicised IAD Framework remains relevant to policy makers through the identification of the socio-economic the institutional components of an action situation. Thus the Framework overcomes perceived weaknesses of approaches in political ecology which have been criticised for failing to produce useful policy recommendations (Neumann, 2005), an issue which has also been recognised as a challenge for adaptive comanagement scholars (Armitage *et al.*, 2007b).

2.6 Conclusion

In this paper we have proposed that Clement's (2010) "politicised" version of the Institutional Analysis and Development (IAD) Framework is well suited to the study of (adaptive) comanagement. In doing so we have answered calls from scholars to develop or adopt a common framework that facilitates a systematic study of comanagement across different settings, and which is able to ground the normative concepts associated with the subject in critical approaches that recognise context and the power dynamics at play in a system of resource governance. Over the last three decades comanagement theory has come to be seen in a number of different ways. The general tendency has been to move from a perspective which views comanagement in terms of a formal

power-sharing arrangement between a homogenous government and a community of resource users, to a focus on function, process and the appreciation that social-ecological systems are complex, adaptive, and characterised by an inherent degree of uncertainty. Thus comanagement has "many faces", and can be thought of in terms of power sharing, institution building, trust building, process, problem solving, social learning, and governance (Berkes, 2007, 2009; Plummer and Armitage, 2007b).

We have shown here how the politicised IAD Framework is an appropriate tool for guiding an analysis of the many faces of comanagement by drawing attention to the various dimensions of the process and the sorts of questions that arise when considering them. The Framework is also unbiased in that it does not favour one form of governance, such as comanagement, over another but instead evaluates each situation on its own merits (Imperial, 1999). Thus the Framework serves as a point of crosspollination between the field of comanagement and scholars working in other areas of environmental governance by providing a consistent means of analysing and evaluating the many institutional arrangements that exist across differing geographical and social contexts. At the same time, the politicised IAD Framework provides the specificity and structure needed to conduct a comprehensive analysis of comanagement, one that critically assesses the potential for normative concepts such as power sharing, trust, and social learning to emerge from within the biophysical, political-economic, discursive, institutional, and cultural milieu of a particular study. Such analyses provide a solid foundation upon which to make sound policy recommendations.

Epilogue

In the above paper I touched upon several evaluative criteria that are commensurate with the politicised IAD Framework. Although some explanation was given, this did not provided an adequate account of the criteria I employ in this thesis. Therefore, before proceeding to Chapter 3 where I discuss the overall research design, here I will first detail the evaluative criteria that I apply later in the thesis. As noted above, the politicised IAD Framework is consistent with a range of criteria, relating both to transaction costs and to broader concerns. The criteria I have utilised relate to both. Firstly, following (Imperial, 1999), I evaluate the interactions and outcomes observed

in each of the case studies in Chapter 7 using three forms of transaction costs: information costs, coordination costs, and strategic costs. These criteria are useful for examining the performance of a system of water governance at different points (snapshots) in time.

Information costs are incurred when individuals and groups expend time and resources searching for and organising information. When considering water management, participants require both scientific and time-and-place information. Furthermore, water management problems are typically "trans-science" problems, and require the integration of different sorts of information. This is achieved through the development of low-cost mechanisms designed to "facilitate communication, make decisions, and resolve conflicts between scientists, agency officials, interest groups, and the public in order to minimise information asymmetries" (Imperial 1999: 456). Coordination costs "are the sum of the costs invested in negotiating, monitoring, and enforcing agreements" relating to the management of the resource in question (*ibid*). Finally, strategic costs are concerned with the ways in which "asymmetries in information, power, or other resources" allow for some actors to obtain benefits at the expense of others (*ibid*).

Of the broader evaluative criteria mentioned in the above paper, the ones I have opted to use are adaptability, efficiency and equity. The criteria of adaptability is of particular significance because of my interest in understanding how comanagement between farmers and water managers may contribute to the resilience of the system under future conditions of change and uncertainty. To evaluate adaptability I follow Ostrom (2005: 67) in asking: 1) Do individuals learn from experience within an action situation? And, 2) Do they adapt to new circumstances as they arise or become more rigid in their responses over time?

To evaluate efficiency, I considered both how the actions of the groups contributed to economic efficiency, and to efficiency of water use. In the context of water governance, economic efficiency is concerned largely with the allocation of water to its highest value use (Chong and Sunding, 2006). Clearly, other criteria, such as equity or

adaptability, may have to be traded off if such an outcome were to be achieved (Bakker, 2007). Efficiency of water use is more straightforward, and relates to the amount of water needed to perform a particular function compared with the amount of water used or provided (Vickers, 2001).

Finally, Ostrom (2005: 66) observes that equity can be assessed in two ways: 1) on the basis of the equality between individuals' contributions to an effort and the benefits they derive, and 2) on the basis of differential abilities to pay. The first option relates to what is known as fiscal equivalence, and assumes a relatively level playing field where "those who benefit from a service should bear the burden of financing that service" (*ibid*). On the other hand option two, which is sometimes called redistributional equity, is instead concerned with redistributing resources to poorer individuals (*ibid*). In this thesis I focus on the extent to which the case studies I analyse exhibit fiscal equivalence. This is a more appropriate criterion to apply in the context of this research, where, as I shall discuss, the participants involved tend to be medium to large-scale industrial farmers.

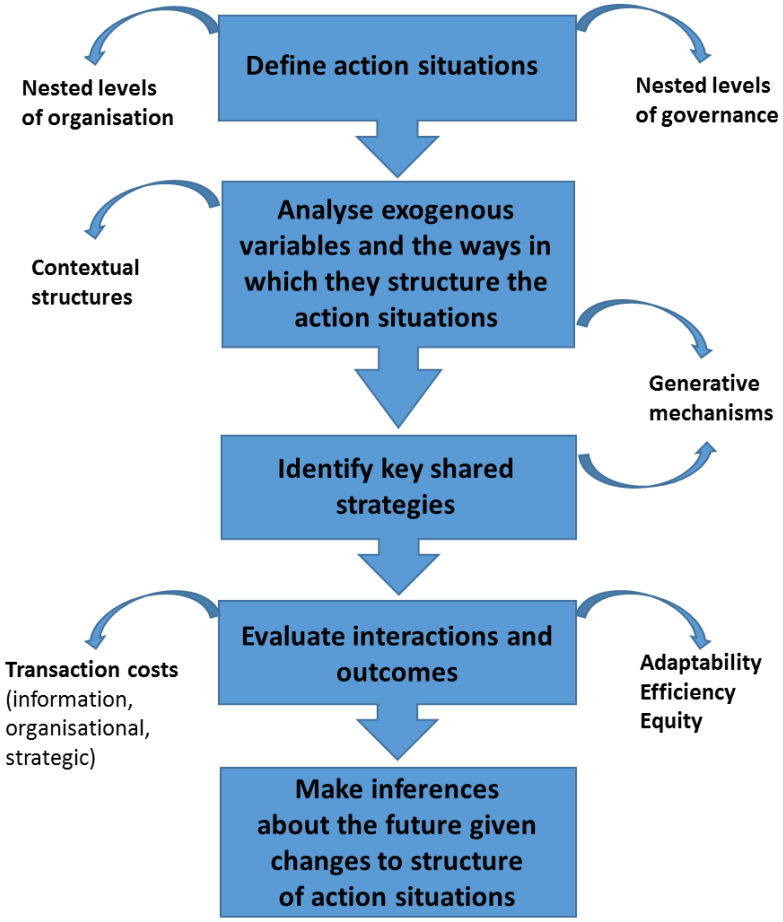
Chapter 3: Research Design

3.1 Introduction

The previous chapter introduced the politicised IAD Framework and demonstrated how, from a theoretical and methodological perspective, it is well suited to studies of (adaptive) comanagement. In doing this I have laid down some of the groundwork for the structure of the research design. In particular, I provided an extended discussion (Section 2.5) of the process I have followed by employing the Framework to conduct an analysis of potential (adaptive) comanagement situations (Figure 3.1, overleaf). The stages that make up this process include defining the action situation(s) of interest, investigating the five exogenous variables of the Framework and how they structure the action situation(s), identifying the shared strategies participants adopt within this structure, and evaluating the interactions and outcomes according to the criteria discussed in the epilogue of Chapter 2. Below I will discuss how the Framework fits in with the broader research design, including how it can be used to identify the structures and generative mechanisms that give rise to (adaptive) comanagement (also depicted in Figure 3.1).

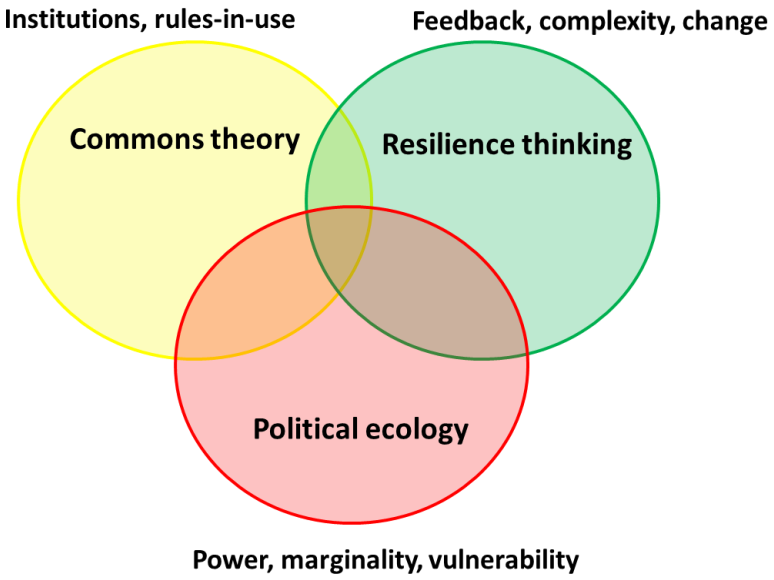
This chapter therefore builds upon the last one, by outlining the overall research design. Following Blaikie (2007), I start by situating the work within a broad meta-theoretical tradition, or research paradigm, known as critical realism, before going on to discuss the research strategy I have employed, my position as the researcher in this study, and finally the methods used to collect and analyse the data. Given that the various analyses in this thesis are presented in paper format, a discussion of the methods is also provided in each of the relevant chapters. Therefore, whilst it is not necessary to go into great detail about each of the methods employed at this stage, it is nonetheless important to provide an overview and to demonstrate the general logic they conform to in the context of the research design.

Figure 3.1 The process of employing the politicised IAD Framework in this thesis.



As Chapter 2 has alluded to, in this thesis I work at the interface of three bodies of knowledge: commons theory, resilience thinking, and political ecology (Figure 3.2). This approach allows me to critically analyse normative (adaptive) comanagement concepts associated with commons theory and resilience thinking, through a focus on power and the use of methods often linked with political ecology (Armitage, 2008), including analyses of discourse, history, and the political economy (Neumann, 2005). As I have demonstrated in the previous chapter, the challenge posed by this synthesis is well addressed by the politicised IAD Framework.

Figure 3.2 The cross-disciplinary nature of the research, which works at the interface of commons theory, resilience thinking, and political ecology. Adapted from Armitage (2008).



3.2 Research paradigm: Critical realism

This research is situated within a critical realist paradigm (Bhaskar, 1975, 1979), a philosophy that argues not only *for* ontology (and thus against the tendency of modern philosophy to reduce ontology to epistemology), but for a *new* ontology (Bhaskar, 1975). Put simply, whilst critical realism maintains there is a reality (both natural and social) independent of the human mind[7], knowledge of this reality "is filtered through language and concepts that are relative and changeable in time and space" (Danermark *et al*., 2002: 39). Of course, natural and social reality differ in fundamental ways, and this has significant implications for the methods we can use to understand them. One important distinction is made by Giddens (1976) between the one-way interpretation, or the "single hermeneutic", of studies concerned with the natural world, and the two-way interpretation, or "double hermeneutic", of attempts to

[7] For me the significance of adopting a realist position is well summed up by Popper (1979: 32), who writes: "In my opinion, the greatest scandal of philosophy is that, while all around us the world of nature perishes - and not the world of nature alone - philosophers continue to talk, sometimes cleverly and sometimes not, about the question of whether this world exists".

understand the social world. In essence, whilst studies of natural objects are a one-sided concern of the natural scientist, the job of the social scientist is to "'interpret other people's interpretations, since other people's notions and understandings are an inseparable part of the object of study" (Danermark *et al.*, 2002: 32).

Critical realism therefore embraces both a realist ontology - a world beyond ideas - and an interpretive epistemology. Yet the significance critical realism attributes to language, concepts, and interpretation is precisely the foundation upon which many idealist positions have been built (see Blaikie 2007). There are at least two arguments which counter idealist positions concerning the ontological standing of the social world. The first, as Bhaskar (1979) suggests, is that although social structures only exist to the extent that they are produced, maintained, and changed through the continuing activity of social agents (*sensu* Giddens 1984), they nonetheless form a "social totality" that persists largely in spite of the action or inaction of the individual.[8] Furthermore, these structures, or what Bhaskar calls the "intransitive objects" of science, are imbued with powers and tendencies that affect the behaviour and choices of individuals. Examples of intransitive objects include gravity or the process of photosynthesis in the natural sciences, or "class" and "peer group influence" in the social sciences.

The second argument for a realist interpretation of the social world is provided by Sayer (1992), and relates to an understanding that social and material reality are enmeshed. Thus objects which in effect are meaningless, nonetheless gain meaning – are ascribed a concept-dependent or symbolic function – in society. Sayer uses as examples the material objects gold and diamonds. On the other hand, systems of language and concepts[9] often have a bearing on the structure of material reality, and when dominant tend to solidify into particular institutional and organisational practices (Hajer, 1995). For example, the concepts of "public" and "private" have for a

[8] This is a point that has resulted in two somewhat different versions of critical realism. On the one hand, Bhaskar (1979) proposes a structuralist conception of social structures, whilst on the other, Harre (1972), Bhaskar's former supervisor at Oxford, argues instead for a constructivist interpretation.

[9] What I will later refer to as "discourses".

long time informed actions in our society, in turn becoming "objectified in its material organisation, most obviously and simply in the enclosed and locked spaces which are interpreted as confirming the conceptual distinctions on which the actions producing material arrangements depend" (Sayer 1992: 33). Therefore, according to Sayer (1992: 33):

> The point to be made here is that although, in one sense, material objects are intrinsically meaning*less*, their use and functioning in society is concept-dependent. Conversely, although systems of meaning and beliefs are not themselves material, they usually require some material mode of objectification if they are to communicate and function socially in a stable manner. In other words, practices, material constructions and systems of meanings are reciprocally confirming…Given this 'reciprocal confirmation', we usually find changes in meaning and practices go hand in hand.

It is not correct to think that the intransitive objects of social science remain constant,[10] but rather that change is typically a slow process: "The structures and relational character of social practices in connection with their being fundamentally linked to the material world gives stability and durability to particular formations of society" (Danermark *et al.*, 2002: 34). In contrast to the intransitive objects of science, "transitive objects" of science refer to the concepts, theories, and models developed by scientists in attempts to understand and explain aspects of reality (Blaikie, 2007). Unlike extreme relativist/postmodern positions that claim all statements and theories are equally valid,[11] and unlike a strong positivist outlook that confidently assumes that what we observe is all that can be known,[12] critical realism instead endorses the notion that although all knowledge (the transitive objects of science) is fallible, it is not equally so (Neumann, 2005). Thus although facts are socially produced and inherently

[10] In apparent contrast to the structures and mechanisms of the natural sciences.

[11] And by extension, that this claim is itself no more valid than any other. A paradox which has been called the "inward collapse" of relativism (Danermark *et al.*, 2002).

[12] What Bhaskar (1979) has termed the "epistemic fallacy", whereby reality is reduced to empirical observation: it is commensurate with empirically-grounded conceptions of it.

theory-dependent, they are not theory determined (Danermark *et al.*, 2002). Within particular contexts, it is possible to produce strong arguments for preferring one set of beliefs or theories about the world to another. This is because humans are able to exercise what Bhaskar calls "judgemental rationality" (Bhaskar, 1979).

The ontological and epistemological positions Bhaskar propounds in his exposition of critical realism led him to the key claim that reality is stratified into three levels or domains (Bhaskar, 1975). At the most "shallow" ontological level is the domain of the empirical, where events are experienced by humans; at the "middle" level is the domain of the actual, where events take place regardless of whether anyone is there or not to experience them; and at the "deepest" level, the domain of the real, exist the generative structures and mechanisms which give rise to events in the world (Table 3.1). The fact that reality has "ontological depth" (Bhaskar, 1979: 15) moves the focus of science beyond an empiricist position which always reduces the world to the observable.[13] Consequently, the central aim of science is to instead discover the relationships between the things we experience at the empirical level and the structures and mechanisms that generate them, but which we cannot observe (Bhaskar, 1975; Danermark *et al.*, 2002).

Table 3.1 The three ontological domains for scientific investigation. Adapted from Bhaskar (1975).

	Domain of real	Domain of actual	Domain of empirical
Mechanisms	X		
Events	X	X	
Experiences	X	X	X

Another important development that follows from a critical realist stance concerns the nature of cause (Harre, 1972; Bhaskar, 1975; Bunge, 1979). Whilst empiricist social science has tended to ascribe cause to observed regularities or co-variance between

[13] Which in Bhaskar's schema limits the production of knowledge to a descriptive activity at the most shallow domain of reality.

objects or events,[14] critical realism instead proposes that causes must be thought of as the tendencies of structures and generative mechanisms to produce concrete events (in the domains of the actual and empirical). An important point here is that the powers and tendencies of these intransitive objects are able to cancel each other out, or alternatively to reinforce one another, with the result that an event may or may not be produced despite the presence of mechanisms with the power to produce it. In reality, concrete phenomena are typically the result of a multitude of contending structures and mechanisms acting in consort. This explains the great variety of actions, events, processes, and objects we observe in the world (Danermark *et al.*, 2002).

Now I wish to briefly outline ways in which a critical realist paradigm links well both with my decision to adopt the politicised IAD Framework to guide the research, and the decision to use adaptive comanagement as a theoretical foundation. As I noted in the previous chapter, the politicised IAD Framework ties in well with a critical realist approach to social science (Clement, 2010). Of particular relevance is the way the five exogenous variables of the Framework (see Figure 2.4) allows the analyst to investigate the different structures and mechanisms that influence the behaviour of participants in an action situation. In effect, the Framework provides a means of structuring an analysis of the intransigent objects of science as they relate to the phenomenon in question, which in the case of this research programme is farmer cooperation and participation in water governance. By including "discourse" as one of the five exogenous variables, the Framework, like critical realism, gives special attention to the place of language, concepts, and categories, thus accommodating the "double hermeneutic" (Giddens, 1976) nature of social science research (see above).

There is also good congruence between critical realism and resilience thinking, one of the core bodies of knowledge underpinning adaptive comanagement. In particular, critical realism appears well suited to addressing the challenges of complex adaptive systems theory, which has informed much of the thinking around resilience (see

[14] Or to put it another way, to invoke a causal law through the constant conjunction of atomistic events.

Chapter 1). The first point to note is the way critical realism addresses the notion of emergence, which is a key concept from a resilience perspective (Gunderson and Holling, 2002; Levin, 1999). For critical realism, emergence is also vital given the "laminated" ontology it propounds. Whilst I have discussed one form of ontological stratification above - that is the delineation of reality into the domains of the empirical, actual, and real (Table 3.1) – another is the assertion from a critical realist perspective that systems and powers operating at one level are in fact an emergent property of a more basic power or property and thus are unilaterally and existentially dependent upon them (Bhaskar, 1975; Bunge, 1979). A classic example is the existence of the mind as an emergent property of the body. As a result of this, it is clear that both critical realism and adaptive comanagement are concerned with the concept of emergence.

The second point to note is the attention critical realism gives to open systems in the social sciences (Bhaskar, 1979). This involves the last of three ways in which ontological stratification is incorporated into a critical realist philosophy, with the other two having now been dealt with above. The natural sciences tend to deal with aspects of reality at lower strata, for example at the level of atoms in the case of physics, or molecules and chemical bonds in the case of chemistry. In these instances it is often possible to impose closure on the system of interest, and in doing so to study the effects of particular structures or mechanisms in isolation. However, as the subjects of the social sciences operate at higher strata, where there are typically a greater number of structures and mechanisms operating at different levels of emergence and in a multitude of combinations, these systems are always open systems (Bhaskar, 1979; Danermark *et al.*, 2002). This makes the sort of control and prediction sometimes achievable in the natural sciences largely irrelevant in the social sciences (Sayer, 1992). This also implies that social systems are therefore complex systems.[15] Again then, we can draw a parallel between the concerns of critical realism

[15] As are natural systems - such as ecosystems - that exist at higher levels of emergence; and, by extension, "social-ecological systems", which have become a core concept in the adaptive comanagement literature (Armitage *et al.*, 2009).

and adaptive comanagement because of the way both accept complexity as an inherent feature of the systems of interest (Blaikie, 2007).

3.3 Research Strategy

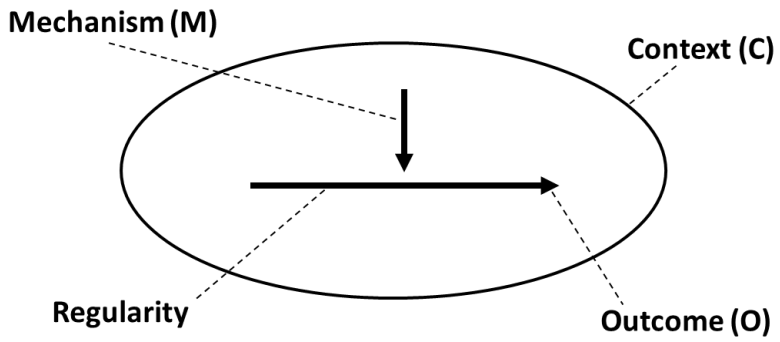
Having fleshed out some of the central tenets of a critical realist philosophy and its relevance to this thesis, I will now discuss the research strategy, or logic of enquiry, I have employed to address the four objectives outlined in Chapter 1. As the previous section discussed, the core aim of science should be to discover the relationship between the actual events and processes we observe in the empirical domain, and the structures and mechanisms that generate them. The research strategy which is able to address this requirement is Retroduction,[16] a mode of inference for discovering "the conditions fundamental to the existence of phenomena" (Meyer and Lunnay, 2013: 3). Although not often explicitly recognised as such, retroductive reasoning appears to be a vital aspect of the scientific process, underpinning such well-known discoveries as planetary motion, the structure of the atom, and viruses (Blaikie, 2007; Danermark *et al.*, 2002). In accordance with a Retroductive research strategy, Pawson (2000: 298) outlines the logic of realist explanation as follows (and illustrated in Figure 3.3):

> Explanations focus on interesting, puzzling, socially significant outcome patterns (O). Explanation takes the form of positing some underlying mechanism (M) that generates the outcome, which will consist of positions about how structural resources and agent's reasoning have constituted the regularity. The workings of such mechanisms are always contingent and conditional, and hypotheses will also be constructed in respect of which local,

[16] It is necessary to make the distinction between a particular mode of reasoning (e.g. induction), and its related research strategy (e.g. the Inductive Strategy). The key distinction is that a research strategy is broader, and whilst its overall logic of enquiry conforms to the mode of reasoning it takes its name from, it may also be compatible with other modes of reasoning at points in the research process (Blaikie, 2007). For example, although the Retroductive Strategy is based on retroductive logic, it is able to incorporate inductive, deductive, or abductive modes of reasoning (*ibid*). In this thesis, I differentiate between the two by writing modes of reasoning in lower case, whilst capitalising their related research strategies.

institutional and historical contexts (C) are conducive to the action of the mechanism.

Figure 3.3 Basic elements of a realist explanation. Adapted from Pawson and Tilley (1997, 2004) and Pawson (2000).



The Retroductive Strategy can be broken down into various stages. Whilst this process is relatively flexible, cyclical, and open to interpretation, I have followed Blaikie (2010: 87) by firstly describing the regularity to be explained, which in this case is farmer cooperation in lowland England. Following this, I then investigated the characteristics of the context (C) in which lowland farming and water governance takes place. Then I moved to a consideration of possible contending mechanisms (M) that appeared to encourage the development of (adaptive) comanagement (O) between farmer groups and water managers within the context identified, and an investigation of the relevance of these mechanisms and the ways in which the different features of the local and wider context facilitates or inhibits their operation. In doing this, I paid attention to the fact that it is "the combination of the context and the mechanism that is central to the explanation" (Blaikie, 2010: 88). This is an important point because "in the notion of 'context' lies the realist solution to the panacea problem. For realism it is axiomatic that certain contexts will be supportive to the [generative mechanism or mechanisms] and some will not. And this gives realist evaluation the crucial task of sorting one from then other" (Pawson and Tilley, 2004: 7).

A point of contention concerning the Retroductive Strategy relates to how the generative mechanisms postulated by a critical realist ontology are discovered. As Blaikie (2010: 87) puts it:

> The central problem for the Retroductive research strategy is how to discover the structures and mechanisms that are proposed to explain observed regularities. Is there an appropriate mode of reasoning that will assist the researcher to find these ideas? Is there a logic of discovery? This issue has been a matter of some dispute. However, there is general agreement that it requires disciplined scientific thinking aided by creative imagination, intuition, and guesswork.

I propose that this "logic of discovery" can be significantly aided by the politicised IAD Framework. As I have already noted, this is because the Framework provides breadth, clarity, and structure, drawing the researcher's attention to the range of variables and questions to be considered when attempting an investigation of both potential mechanisms (M) and context (C), and the way in which they act upon the various components of the action situation to condition (as distinct from determine) the behaviour of participants, resulting in particular outcome patterns (O).

The Framework cannot be used to identify a mechanism directly, as mechanisms tend to be more abstract concepts (Danermark *et al.*, 2002). Yet it can help pinpoint particular factors or measures from which mechanisms can be inferred. For example, Pawson and Tilley (2004) give the example of the introduction of breakfast clubs at schools as a means of boosting early education performance. Although the breakfast club itself is not a mechanism but rather a measure, the authors note how its introduction triggered a range of (postulated) mechanisms. The mechanisms for aiding classroom attentiveness that the authors propose are triggered by the introduction of the breakfast club include "offering kids a 'nutritious kick-start' (M1) to the day...or [the breakfast club] may act as a 'summoning point' (M2) to prevent kids loitering or absconding or misbehaving in the chaotic period before school…and/or it may act as

an ‘energy centre’ (M3) so soak up gossip and boisterousness before formalities commence”…etc. (Pawson and Tilley, 2004: 7).

My approach follows the logic of discovery I have outlined above, where particular measures and contextual variables, or what I will later call “factors of success”, are identified using the politicised IAD Framework. From these factors of success I then postulate underlying causal mechanisms. As will become apparent, these factors of success are in themselves important findings of the research as they lie at the more concrete, empirical level. This level of analysis is a useful component of the thesis, which seeks to provide practical recommendations for water governance.

Having identified possible contending structures and mechanisms that appear to explain the occurrence of a given regularity, there remains the difficulty of discerning which are necessary conditions (the constituent properties) and which are contingent. As I noted when discussing critical realism above, social phenomena exist as aspects of open systems, which makes the classic natural science experiment whereby causal mechanisms are investigated in a closed system virtually impossible. To overcome this issue, Danermark *et al.* (2002) have put forward five complementary strategies the researcher can employ as powerful alternatives to the traditional experiment, where these are: counterfactual thinking, social experiments, studies of pathological cases, studies of extreme cases, and comparative case studies. Of the five strategies, in this thesis I have employed three of them, namely counterfactual thinking, an analysis of an extreme case, and a comparative case study approach. I discuss these further in Section 3.4 below.

As is typically the case, a research project seldom relies upon one kind of logic alone, and this thesis is no different. Whilst the overall research strategy I have adopted is one of Retroduction - specifically the model proposed by Pawson and Tilley (1997) and Pawson (2000) in Figure 3.3 - I complement this process with other analyses that utilise different forms of logic in order to analyse the context surrounding farming and water governance in lowland England. To do this, I have employed two commonly recognised forms of logic, namely induction and deduction, as well as a less well known form of

logic called abduction. Here I draw upon Blaikie (2007: 56-107) to provide a brief outline of each of these. However, it must be noted that the descriptions represent relatively idealised depictions, which have been defended, contended, and amended many times over.

Induction entails an empirical approach whereby data is collected and, through a process of inductive reasoning, generalisations are derived that relate to patterns observed in the data. These patterns are then subjected to further testing in order to develop law-like statements about natural or social life. This form of logic therefore starts from the particular and moves to the general. On the other hand, deduction starts from the general and moves to the specific. According to deductive logic, a hypothesis or set of hypotheses which together form a theory are put forward, and one or more conclusions that result from the proposed theory are deduced. The conclusion(s) is then tested by gathering appropriate data. If the data is not consistent with the conclusion the theory is false. Alternatively, if the data is consistent with the conclusion(s) then the theory has been corroborated. Finally, abduction starts with everyday accounts from which expert accounts are then derived. Typically, these everyday accounts relate to the talk of social actors in which underlying meaning is often hidden. Through a hermeneutic process the researcher then attempts to "piece together the fragments of meaning that can be gleaned from these accounts" (Blaikie, 2007: 107) as they move from lay language to technical language.

Below I discuss at what points these different forms of logic have been employed when I consider the individual studies that make up the overall analytical component of the research programme. It is worth noting that this combining of different logics of enquiry is complementary, and can be used to strengthen the research process as long as none of the strategies conflict with its meta-theoretical position (Blaikie, 2007). In the case of this thesis there is no conflict, given the "maximally inclusive" epistemological approach critical realism allows for, whereby all forms of logic are seen to be relevant (Owens, 2011).

3.4 Methods

As I have discussed so far in this chapter, the research paradigm and related research strategy I employ relies upon an investigation of how a particular regularity (farmer cooperation) lead to a particular outcome pattern (comanagement between farmer groups and water managers), and the structures and mechanisms that cause it. Given that the various separate analyses I have undertaken to achieve this are written in the form of journal articles, making up Chapters 4 through 7, each of these chapters are self-contained and therefore already include an outline of the methods employed. Nonetheless, it is still necessary here to provide an overview of the different methods as they relate to each of the studies, including the various forms and sources of data, and how the data was selected, collected, and analysed. I will also discuss which forms of logic were used at each stage.

Using a predominantly qualitative approach, the research draws upon a mixture of primary, secondary, and tertiary data from a range of sources. The primary and secondary data consists of information provided by farmers and other key informants in semi-natural settings, participant observation through my attendance in several abstractor group meetings, as well as documentation relating to EU and national water, environment, and farming policy and legislation; international conventions and conference outputs; relevant reports, briefings, newsletters, and position statements from a range of sources; and historical artefacts from the National and Lincolnshire archive offices. The tertiary data consists of published research in academic journals and books. It is necessary to point out that with respect to the use of this data, there is a degree of overlap between several of the studies. Most notably, the same set of interview data has been analysed in Chapters 6 and 7, and in places this information also supports the analysis in Chapter 5. In both of these studies, the content of the interviews are analysed in relation to a different set of research questions and objectives.

Before considering the various methods I have employed to address each of the individual analyses in this thesis, it is worth providing an overview of how these

analyses relate to the research objectives, the politicised IAD Framework, and the Retroductive research strategy discussed above.[17] The analysis in Chapter 4 has been used to address Objective 2 (an investigation of the broader policy context from the perspective of the "rules" variable of the Framework); the analyses in Chapters 5 and 6 are used to address Objective 3 (an investigation of the broader context from the perspective of the "political-economic" and "discourse" variables of the Framework); and the analysis in Chapter 7, in conjunction with the findings from the preceding two analyses, addresses Objective 4 (the relationship between farmer abstractor groups and the comanagement of water resources). Together these analyses account for the various components of the Retroductive Strategy I am employing (Figure 3.3), where the regularity is described, the context (C) is investigated, generative mechanisms (M) are identified that give rise to a particular outcome pattern (O), which is interpreted through the conceptual lens of (adaptive) comanagement. The methods pertaining to each of the analyses (Chapters 4-7) are now considered in turn.

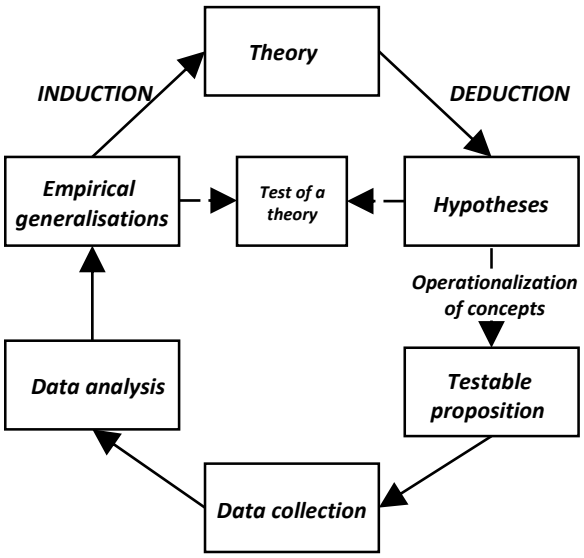
Chapter 4: Comparative analysis

In Chapter 4 I analyse the water policy context in England, in order to assess the extent to which it serves as an enabling environment for the emergence of adaptive comanagement. This entails the use of both induction and deduction, in a process that can be located on Wallace's (1971) inductive-deductive cycle (Figure 3.4). The approach begins at the "data collection" phase of the diagram. Here inductive logic is employed, where from a review of the literature five policy categories ("empirical generalisations" on Wallace's diagram) are derived that appear to be conducive to adaptive comanagement. Then deduction is employed as the five general categories are compared to recent water policy documents in England using a directed content analysis (Hsieh and Shannon, 2005) and conclusions are drawn about the extent to which English water policy provides an enabling policy environment for adaptive comanagement. The data for this study consists of the academic literature on adaptive comanagement and seven key policy documents dating from 2008 onwards, which I

[17] See Figure 1.1 for an illustration of the relationship between research objectives and the analyses in Chapters 4-7.

identified from a broader review of English water policy documents. The documents, and a short synopsis of each, are provided in Chapter 4 (Table 4.2).

Figure 3.4 Wallace's inductive-deductive cycle. Adapted from Blaikie (2007).



Chapter 5: Political economy analysis

Chapter 5 is concerned with power, and relies upon an historical analysis of water governance and farming in lowland England from World War II until the present day. The intention is to chart the evolution of the power dynamic governing farming and water management in order to understand how this dynamic affects the ability of lowland farmers to cooperate and participate in water governance. I employ a political economy analysis that relies upon a review of primary and secondary documents, which were listed in the introduction to this section. A form of abductive logic is employed, where the data was recontextualised in accordance with the conceptual schema of approach known as the Power Cube. The Power Cube itself can be described as an analytical tool for thinking about the interplay between different forms of power operating in different types of spaces and at different levels of governance (Gaventa, 2006a, 2006b). The analytical process in this chapter evolved as a dialectical relationship between the data and the concepts associated with the Power Cube.

Chapter 6: Discourse analysis

In this chapter I employ two discourse analysis concepts from the field of critical discursive psychology – interpretive repertoires and subject positioning – in order to analyse how farmers talk about the relationship between farming and water resources management. All participants are farm owners, tenants, and managers of medium to large-scale farming businesses that rely upon irrigation to a greater or lesser degree. Furthermore, all participants are members of farmer water abstractor groups or are farmers thinking of farming a group. In total 25 interviews and two focus groups are conducted, and transcribed and analysed using the computer software package NVIVO (Bazely, 2007). The analysis employed an abductive research strategy, following a process outlined by Edley (2001). This process, along with the theoretical foundation of my approach, is described in more detail in Chapter 6.

Both interviews and focus groups were semi-structured, and took the form of a guided conversation where the emphasis is on building a good rapport with the interviewee/s and on maintaining fluidity throughout the interview process (Rubin and Rubin, 1995). In the case of the two focus groups, I was part of a team of three researchers representing Cranfield University, where the other two members of the team were conducting research for a separate project looking at the formation and function of farmer water abstractor groups in England. Given the crossover in the context of our research programmes, I used this opportunity to gain access to the farmers in question.

The interview questions were not consistent throughout the whole data collection phase. Rather, each interview evolved as a dialectical process between interviewer and interviewee(s), where on different occasions and at different stages in the interview certain issues became more relevant than others. Nonetheless, the majority of questions took their lead from the predefined list of interview topics (See Appendix 1 for an extended example of an interview question sheet). These topics are: 1) the structure and function of the abstractor group in question, 2) the reasons for forming or wanting to form an abstractor group, 3) the relationship between the members of the group, as well as the relationship between farmers more generally, 4) the

relationship between the group (and farmers more generally) and statutory water managers and government advisors (in particular representatives from the Environment Agency, Natural England, and the Internal drainage boards), 5) the relationship between the group (and farmers more generally) and environmental NGO's involved in or concerned with water management issues, and 6) the relationship between the group (and farmers more generally) and the water environment itself. A separate research information sheet and consent form were provided to each participant prior to the interview or focus group, and any questions the interviewee(s) has about the research were discussed. Then, if the interviewee was satisfied, the consent form was signed and dated by both parties before proceeding (see Appendix 2 for a copy of the research information sheet and interview consent form).

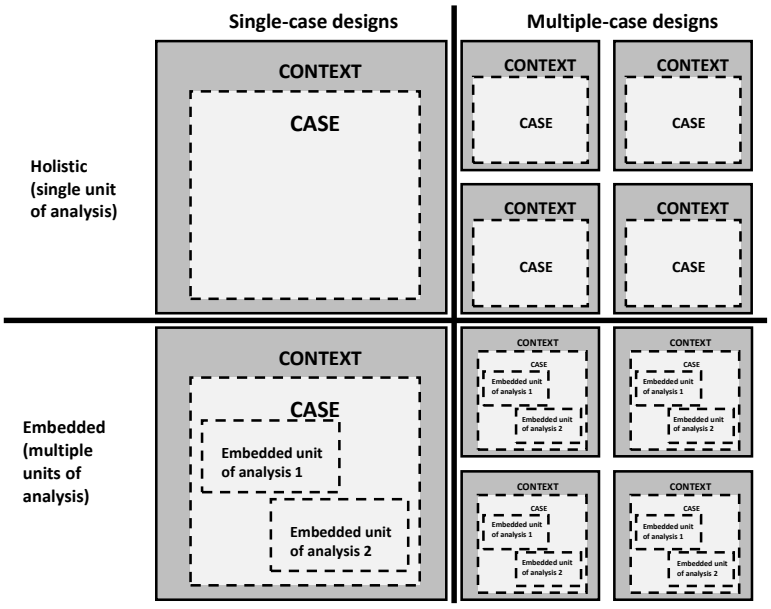
Chapter 7: Multiple case study analysis

The final analysis specifically considers the relationship between water abstractor groups and the comanagement of water resources in lowland England. It incorporates the findings of the previous wide-ranging analyses relating to the rules-in-use, political-economic, and discourse variables of the politicised IAD Framework - which serves as the broader context in Figure 2.4 – and undertakes an embedded multiple case study analysis (Yin, 2009) of five water abstractor groups in the east of England by using the Framework. This involves complementing the broad contextual analysis with a more fine-grained analysis of the five exogenous variables of the framework and the way in which they structure the action situations of interest. When analysing the rules-in-use variable, Ostrom and Crawford's (1995) grammar of institutions is used to define and differentiate between rules, norms, and shared strategies. Rules themselves are classified according to the element of the action situation they most directly affect (Ostrom, 2005).[18] The reason why I opted for an embedded case study design is to account for the focus on action situations (Figure 2.2) at different theoretical and

[18] Further discussion on how I analysed the rules-in-us and norms that structure action situations, and the strategies participants adopt within these situations, is provided in Appendix 3.

organisational scales of analysis (Figure 2.3). For example, an action situation relating to an abstractor group, and then a second internal action situation relating to the group's committee, which is embedded within the first situation.

Figure 3.5 The different approaches to case study design. Adapted from Yin (2009).



Case studies attempt "to keep together, as a unit, those characteristics which are relevant to the scientific problem being investigated," (Goode and Hatt, 1952: 4) and as such are appropriate in attempting to understand the abstractor groups under investigation in this study. Furthermore, a case study approach is well suited to a single researcher with a limited budget and time-frame and is therefore appropriate for someone undertaking a PhD (Blaikie, 2000).

In keeping with the research strategy I have adopted, in this chapter retroductive logic is employed to discover those generative mechanisms that appear to cause the development of comanagement arrangements between water abstractor groups and statutory water managers. This is achieved by firstly identifying the key factors of success – which may point both towards potential mechanisms as well as local

contextual conditions - that link the groups to different comanagement activities. Each case study is then assessed according to the evaluative criteria discussed in the epilogue of Chapter 2, namely three forms of transaction costs (information, organisational, and strategic) and three overall criteria (adaptability, efficiency, and equity). The relevance of the findings for the future of water governance in England is then discussed.

To assist with identifying the most important mechanisms and contextual factors from the more contingent criteria the analysis employs three of Danermark *et al.*'s (2002) "strategies" noted above, namely counterfactual thinking, an analysis of an extreme case, and a comparative case study approach. Counterfactual thinking asks questions like "Is it possible to imagine X without…?", and can be considered a process whereby "we use our stored experience and knowledge of social reality, as well as our ability to abstract and to think about what it is not, but what might be" (Danermark *et al.*, 2002: 101). This form of thinking is clearly of much use when attempting to understand which structures and causal mechanisms are of most importance for producing the outcome pattern of interest.

Extreme cases are those instances where mechanisms appear to "manifest themselves in purer form than usual" (Danermark *et al.*, 2002: 104); thus, where the preconditions for comanagement appear to be much clearer. In Chapter 7 I include one extreme case among the five case studies. This is an abstractor group that, unlike the other four groups, is involved in what can be considered a genuine comanagement arrangement with statutory water managers. Finally, by employing a multiple case study approach it was possible to compare different factors between the five cases in light of the outcomes produced. This strategy assisted with distinguishing "the necessary, constitutive conditions from more accidental circumstances"…because it provided "an empirical foundation for retroduction, a foundation to sort out contingent differences in order to arrive at the common or more universal" (Danermark *et al.*, 2002: 105).

3.5 Researcher's stance

As the researcher, the stance I adopt is important because it reflects my relationship with both the research process and participants. This in turn has implications for the sort of knowledge I claim the work is producing (it is of epistemological significance). Blaikie (2010) proposes six different positions a researcher might adopt, where these are the "detached observer", "empathetic observer", "faithful reporter", "mediator of languages", "reflective partner", and "dialogic facilitator". A brief account of each position is provided in Table 3.2.

Table 3.2 The six positions a researcher may adopt (Blaikie, 2010).

Researcher stance	Explanation
Detached observer	Researcher regarded as an uninvolved spectator. As values and preferences of researcher are seen to threaten objectivity of research, detachment is a requirement for producing reliable knowledge.
Empathic observer	Objectivity still the focus, but the ability for researcher to place themselves in social actors' position seen as necessary. Actions can only be understood by grasping subjective meanings used by social actors.
Faithful reporter	Much less detached than empathic observer, where the aim is to report a way of life by allowing participants to "speak for themselves". May require researcher to become immersed in way of life of participants in order to grasp meanings.
Mediator of languages	This position rejects the notion of detachment. Instead, studying social life is akin to studying a text, which involves interpretation on the part of the reader; the researcher actively constructs an account based on accounts of participants, where social, geographical, and historical locations, as well as the researcher interests and assumptions, have a bearing on the account produced.
Reflective partner	This position is committed to the emancipation of the participants from oppression and is associated with critical theory. It accepts the premises of Interpretivism, and that

	the process of understanding socially constructed reality is dialogic.
Dialogic facilitator	A culmination of the previous two positions that reflects a post-modern stance. The researcher relies upon their understanding of a situation, but where they attempt to minimise the authority of their position by letting the participant speak for themselves. The researcher is regarded as just another actor in the social context being investigated.

According to Blaikie's schema, it is not clear that my position fits neatly into only one category. In part this may be due to the methodological breadth of the research. It is also because different commentators will provide different interpretations, of which Blaikie's categories in Table 3.2 are only one. I argue that my position as the researcher in this thesis is best seen as a combination of "empathic observer" and "mediator of languages". Blaikie (2010) equates the position of empathic observer with a quality called "*verstehen*". This term highlights the hermeneutic nature of human understanding. As discussed in Section 3.2, when it comes to understanding the social world, the interpretive process is founded upon a double hermeneutic relationship between the researcher and the social object of study. Sayer (1992) argues that *verstehen* encapsulates the stance of a critical realist researcher, and uses the analogy of reading a book by way of illustration:

> We do not understand a book…by observing and analysing the shape of words or their frequency of appearance, but by interpreting their meaning. *To* this reading, we always bring interpretive skills and some kind of pre-understanding (although not necessarily a correct one) of what the text might be about. In other words there is an interpenetration and engagement of the 'frames of meaning' of the reader and the text. We cannot approach the text with an empty mind in the hope of understanding it in an unmediated fashion, for our own frame of meaning is an indispensable tool or resource for understanding. (Sayer, 1992: 35-36).

Later, the analogy is qualified:

> The 'text' of actual social processes is usually highly disjointed and often highly contradictory, and whereas it is not generally necessary to know how a book was produced in order to understand it, little sense can be made of social interactions…without exploring the production of particular actions. (Sayer, 1992: 36)

Yet Sayer's analogy of *verstehen* as being like reading a book confuses the categories in Table 3.2. This is because it appears to conform better to Blaikie's (2010: 51) description of the mediator of languages position, where he writes that "studying social life is akin to studying a text, and this involves interpretation on the part of the reader". Therefore, whilst my position shares common ground with that of the empathic observer, whereby I agree that "only by grasping the subjective meanings used by the social actors can their actions be understood" (Blaikie 2010: 51), I also have much in common with the mediator of languages position. This is clear from Sayer's illustration of the concept of *verstehen*. The stage of the research where I most clearly adopt the mediator of languages position is Chapter 6. During this stage, the form of discourse analysis I employed was used to "actively construct an account based on the accounts provided by the participants," where "this process of construction [was] not neutral" because "researchers have to invest something of themselves into this account" (Blaikie, 2010: 51).

From this description, and in contrast to the position of empathic observer, it is clear that I am rejecting the claim that any form of neutrality or objectivity can be attained. This is because my concern is with "exploring the production of particular actions" (Sayer 1992: 36) through an analysis of both context and mechanisms, whilst recognising the double hermeneutic nature of the research process (see Sections 3.2 and 3.3). Such a recognition draws attention to the need to be reflexive, to acknowledge my role in the research process and to be critical of it and the knowledge (the transitive object of science) that is produced. In effect, I am arguing that my research findings and conclusions constitute a "situated knowledge" (Harraway, 1988).

Given the stance I have adopted, I therefore view this thesis as a "situated contribution" to the theoretical and methodological challenges of studying (adaptive) comanagement, as well as the more practical issue of farmer cooperation and participation in English water governance.

3.6 Ensuring the quality of the research design

Yin (2009) describes four tests that can be applied in order to improve the quality of the research design when conducting case study research. In what follows I discuss these tests and the ways in which I have addressed them. I can also add that several of the chapters written in the format of a journal article have undergone the peer review process on their way to publication (Chapters 2, 5, and 6), and in these cases quality has been improved by having to respond to the comments of the reviewers.

The first test is *construct validity*, which seeks to ensure that a sufficiently operational set of measures have been developed in order to guarantee that the "subjective" nature of the research remains robust. I attempted to address this by, 1) a triangulation of methods, 2) developing a chain of evidence, which involved storing and organisation all data on NVIVO, including observational notes of interviews, and by keeping a (sometimes sporadic) diary of the research process, 3) discussing my impressions and interpretations of events and processes with key individuals (typically representatives of water abstractor groups) in order to assess the extent to which they felt this information is representative of their situation, and 4) defining the key terms and criteria employed in the research, and operationalizing key concepts like comanagement, as well as the various evaluative criteria I have chosen to apply to the case studies in Chapter 7.

The second test is *internal validity*, "which is mainly a concern for explanatory case studies, when an investigator is trying to explain how x led to event y" (Yin 2009: 42). It is clear by this description that internal validity is a test that is of much relevance to this thesis, given my intention to understand how particular generative mechanisms ("x_n") give rise to a comanagement outcome ("y"). Internal validity tests require that

the researcher performs various instances of “pattern matching” between the study results and the results of other related studies, or between the process under investigation and related logical models. I have addressed this validity check in two ways. Firstly, through the use of counterfactual thinking, an extreme case study, and a comparative case study approach, where the intention is to identify those mechanisms which are vital to the development of comanagement. In effect, these strategies are a way of establishing that “x”, and not “z”, causes “y”. And secondly, through pattern matching, where I can demonstrate that my findings are consistent with the findings in the literature more generally. This will become clear in Chapter 7.

The third test is *external validity* and relates to how the results of a particular case study can be generalised. Here the important distinction is between “statistical generalisation”, which “makes a statement about the confidence we may have that the surface relationships observed in our sample will in fact occur in the parent population” (and which I have not employed), and “analytic generalisation”, where “the validity of the extrapolation depends not on the typicality or representativeness of the case but upon the cogency of the theoretical reasoning” (Mitchell 1983: 207). This requires that the case study results are analysed according to a well-developed theoretical framework (Bliaikie, 2000). I have attempted to demonstrate this in both this chapter and the last. In Chapter 2 I grounded the research in adaptive comanagement theory, and demonstrated how the politicised IAD Framework is well placed to analyse the concept by providing structure, clarity, and breadth to the study. Then, in this chapter, I have detailed the research design, which is consistent with the Retroductive research strategy utilised by others working in a critical realist tradition.

The final test is *reliability,* and is concerned with the ability of later researchers to follow the same procedures described in the methodology, where by conducting the same study they would arrive at similar findings and conclusions. Yin (2009) states that the way to increase reliability is to make all steps in the research process as operational as possible. This study has attempted to document the different steps taken in enough detail that the reader is able to follow and understand the logic of the research process from its inception through to its conclusion. However, the extent to

which a different researcher following these steps could arrive at similar findings and conclusions, must of course be framed in terms of the arguments of the previous section concerning the stance of the researcher.

3.7 Limitations

Even with the above quality tests in place, there is of course a range of common limitations with any social science study, and this one is no exception. I will discuss these in terms of researcher bias, availability of data, access to data, constraints on time and resources, and thesis structure. Where limitations with method exist, these have been addressed in the relevant chapter. The first, researcher bias, has to some extent been addressed in Section 3.5 above where I discuss my position as the researcher. Here I make it clear that, unlike researchers working in a positivist tradition who strive towards the notion of objectivity, I instead recognise the situatedness of the researcher and the research by drawing attention to the concept of *verstehen*, as well as the need to remain reflexive throughout. Nonetheless, beyond this position, there is still the potential for bias which manifests itself through a lack of academic rigour. I have attempted to address this form of bias by conducting the validity and reliability tests outlined in the previous section.

Limitations also relate to the availability of and access to data. In this research programme this applied in particular to the process of securing interviews with farmers (sample size). Here one issue related to the availability of farmers during several key periods throughout the year, either because it was an important and time consuming part of the farm calendar (such as planting or harvesting), or because it wasn't and as a result many farmers were away on holiday. Secondly, even during periods when farmers where more available, accessing them proved very difficult in some instances. In large part, this is because farmers in the UK tend to be the object of a myriad government, academic, and other studies and as a result do not always feel inclined to participate in yet one more research project. The issue was overcome in part because Cranfield has strong links with members of the farming community, and this acted as a way in, as well as through my efforts to befriend key farmers by

attending meetings and discussions where they were present. Face-to-face contact proved far more successful than sending impersonal email requests.

Another key limitation of the research concerns the constraints on time and resources. Most important of these variables was time, given the relatively wide-reaching and comprehensive nature of my research design. Although I feel the latter stages of the research programme have been addressed adequately, several of the analyses could have benefitted both from more data, and from a more exhaustive analysis of all the data. One notable observation is that, of the five water abstractor groups included in the study in Chapter 7, one of these – called LWT – received more attention than the other four. With limited time available, the decision to focus on this group in more detail concerns the fact it appeared to be significantly more involved in comanagement activities. In terms of the discussion above, this LWT proved to be the "extreme case" whereby a number of structures and mechanisms could be observed in their "purer form". This is not to say a full analysis was not applied to the other groups, but rather that it lacked the more exhaustive approach that LWT received. Access to resources proved to be much less of a constraint, although at points this issue became problematic because for the last two years of the thesis I have been working off campus and on occasion would have benefitted from having easier access to Cranfield University's library and related research resources.

Finally, a minor point to note is the structure of the thesis, and in particular the decision to submit five of the chapters in journal article format. Whilst writing the various analyses as journal articles has a number of clear benefits, it has meant that additional information, in the form of prologues and epilogues, has had to be provided in order to bring the various papers together. Furthermore, because each paper conforms to the standard journal article structure there tends to be a degree of repetition in the thesis, especially with respect to the introduction of several of the papers. These issues have tended to disrupt some of the flow one may expect from a thesis submitted in the more traditional format.

Chapter 4: Policy Analysis

Prologue

This chapter forms the first of three analyses, written in the format of journal articles, which investigate the wider context surrounding farming and water governance in England. As noted in Chapter 1, the paper below (Paper 2) sets out to explore the "rules-in-use" variable of the politicised IAD Framework from a broad policy perspective. Later, in Chapter 7 I will also explore this variable, by instead conducting a fine-grained analysis of local rules-in-use and how they structure the various action situations pertaining to five water abstractor groups. However, in this paper I am concerned specifically with the extent to which water policy in England serves as an enabling environment for adaptive comanagement.[19] Although the focus of the thesis is on farmer cooperation and participation, here my scope encompasses the system of water governance in England as a whole. In Chapter 1 I discussed how the scope of the analysis will increasingly narrow as the thesis progresses (Figure 1.1). The paper in this chapter addresses Objective 2 of the research agenda. It is currently under review by the journal Ecology and Society.

[19] See also the discussion in Section 2.5.

Paper 2 - Managing Water through Change and Uncertainty: Comparing Lessons from the Adaptive Comanagement Literature to Recent Policy Developments in England

Luke Whaley and Edward K. Weatherhead

Abstract

The challenges of managing water are set to become increasingly variable and unpredictable, in particular because of climate change. So as to better cope in the future, it is imperative that approaches that enhance the resilience of the system are encouraged. In this paper we investigate the extent to which water policy in England provides an enabling environment for the emergence of adaptive comanagement, a novel approach to natural resource management which its proponents claim can achieve the dual objective of ecosystem protection and livelihood sustainability under conditions of change and uncertainty. We do this by undertaking a review of the literature, from which we distil five policy categories, the presence of which appear important for facilitating the emergence of adaptive comanagement. We then use these criteria to conduct a directed content analysis of seven key water policy documents in England from 2008 onwards. Our findings reveal that in a number of ways decision makers are putting in place policy objectives that are amenable to the emergence of adaptive comanagement. Yet at the same time, we also observed a level of discrepancy between substantive aspects of the five policy categories and water policy in England. Addressing these discrepancies will be important if English water policy is to allow for the emergence of management processes, like adaptive comanagement, which are capable of coping with the challenges that lie ahead.

Key words: adaptive comanagement; England; policy; water governance

4.1 Introduction

Widespread water quality issues, regional and localised periods of water scarcity, a growing population, and a more variable and uncertain future climate means that in the coming years water governance in England faces a stern test (Barker and Turner, 2011; Collins and Ison, 2009; Weatherhead and Howden, 2009). Whilst we know that change will occur, it is not possible to accurately gauge the extent and precise nature of the challenges that lie ahead. As a result, enhancing the capacity of England's system of water governance to cope with future uncertainties becomes a crucial objective. This contrasts starkly with the rigid and bureaucratic approach that came to characterise water management in England during the last century, "founded on the assumption of a stable and certain operating environment in which discrete policy problems could be addressed rationally and objectively by neutral officials acting alone" (Watson and Treffny 2009: 450).

One approach that is receiving increasing attention as a way of achieving the dual objective of ecosystem protection and livelihood sustainability under conditions of change and uncertainty is adaptive comanagement, a field of enquiry that combines the linkages dimension of comanagement with the learning dimension of adaptive management (Armitage, 2007; Armitage *et al.*, 2009, 2007a; Olsson *et al*., 2004a). Given the requirement to enhance the resilience of the system, here we propose that adaptive comanagement is a particularly appropriate lens through which to interpret the direction water management is taking in England.

The establishment of adaptive comanagement is seen to depend in part on a government that fosters the conditions to both encourage and sustain the process, in particular through the creation of an enabling policy environment (Berkes *et al*., 2007; Olsson *et al*., 2004a; Pomeroy and Berkes, 1997). As a result, in this paper we attempt to assess the extent to which water policy in England provides a receptive context for the emergence of adaptive comanagement. While it is not explicitly stated in the documents examined that the UK Government is intentionally attempting to encourage adaptive comanagement, we are interested in the coincidental relationship between government policy and the factors that appear to facilitate this process. It is notable that the need to

adapt to such issues as climate change and a shrinking national budget has resulted in government objectives which could find fertile ground in a more direct consideration of adaptive comanagement. To this end, the findings of this paper are of use to policy makers in England.

The analysis begins with a review of the literature, charting the development of adaptive comanagement from its academic origins and broadly outlining the major claims and contentions relating to the field. From the review we distil five important policy conditions that appear to provide a suitable enabling environment for the emergence of adaptive comanagement, and compare these findings to recent water policy developments in England. Our approach relies upon a directed content analysis (Hsieh and Shannon, 2005) of seven key government water policy documents, dating from 2008 onwards. We conclude the article by summarising the findings of our analysis, and offer proposals that would favour the emergence of adaptive comanagement from a policy perspective.

4.2 Adaptive comanagement: Origins and developments

Broadly speaking, adaptive comanagement is viewed as the merging of the field of comanagement with adaptive management (Armitage *et al*., 2007c). Comanagement, as an academic concept, has its roots in commons theory, a body of scholarship that emerged in reaction to the famous "Tragedy of the Commons" dilemma (Hardin, 1968). According to that perspective, only intervention by the government or the market can stop users of a common resource from acting in their individual short-term self-interests and in so doing destroying the resource they collectively depend upon in the longer run. However, researchers working in the commons tradition have instead reported on a large number of case studies, both past and present, that reveal how communities of resource users, acting without assistance or intervention by a larger government, have been able to collectively devise rules that enable them to sustainably manage natural resources, and the conditions that facilitate this outcome (Wade 1988; Ostrom 1990; Baland and Platteau 1996; Agrawal 2002).

Moving on from analyses based solely on community management, the earliest attempts at analysing comanagement tended to focus on formal power-sharing arrangements

between a community and the government (Berkes *et al.*, 1991). Whilst the degree of power sharing and joint decision-making varies considerably from case to case, researchers have found that in nearly all successful cases comanagement depends upon the crafting of new institutions that confer more advanced property rights at the local level and that are able to link the actors involved in the management of the environment or a natural resource across scales of organisation (Jentoft, 1989; Pomeroy and Berkes, 1997). They also depend upon adequate levels of trust between participants, and the development of social capital more generally (Daniels and Walker, 1996; Leach and Pelkey, 2001; Pinkerton, 1989b; Plummer and FitzGibbon, 2006).

For its proponents, comanagement has always been seen as a way of implementing a management process that more equitably includes the interests of the less powerful in decisions surrounding the use of natural resources (Pinkerton 1989b; Pomeroy and Berkes 1997; Borrini-feyerabend *et al.*, 2000). It has also been shown to improve the legitimacy and transparency of the process in some cases, as well as develop greater capacity at the local level through community empowerment (Borrini-feyerabend *et al.*, 2000, 2004; Plummer and Fitzgibbon, 2004). Therefore, comanagement "is not merely about resources; it is about managing relationships" (Berkes 2009: 1692). Other authors have pointed out the risks associated with comanagement, and in particular the potential for local elites to dominate the situation in order to forward their own interests, or for the government to use the term as justification for their actions whilst continuing with a business-as-usual approach (Castro and Nielsen, 2001; Conley and Moote, 2003; Nayak and Berkes, 2008; Plummer and Armitage, 2007b).

Whilst comanagement has traditionally been seen as a relationship between the government and a community or group of resource users, others have broadened this conception to include market-based management (Rose, 2002; Tietenbert, 2002; Yandle, 2003). From this perspective, "comanagement is not envisioned as a replacement for central government, nor is it incompatible with existing market-based systems; it is a supplement to these decision-making processes" (Plummer and Fitzgibbon 2004: 63). Another important development has come with the realisation that many of the attributes that characterise comanagement - such as power sharing, trust, and institution building - take time to develop and are ongoing (Borrini-

Feyerabend *et al.*, 2004; Gray, 1989; McCay, 2002). This understanding has turned attention towards the mechanisms via which the process of comanagement evolves. Here scholars have found fertile ground in merging the narratives of comanagement with adaptive management. Adaptive management is a concept which treats policy decisions as hypotheses to be tested (Lee, 1993) and which was originally derived from the work of the ecologist C. S. Holling (Holling, 1978) and a field of enquiry that recasts the relationship between humans and the environment in the light of complex adaptive systems theory and resilience thinking (Gunderson and Holling, 2002; Levin, 1999).

Amongst other things, this synthesis has highlighted the importance of social learning if the participants in a system of comanagement, who may have widely different perspectives and interests, are to jointly learn about and adapt to change (Armitage *et al.*, 2008; Berkes, 2009; Allen *et al.*, 2011). Thus comanagement's attention to power sharing and system linkages is complemented by adaptive management's concern with problem solving and learning-by-doing. The merger of these two fields, each with their own distinct disciplinary histories, has resulted in what has come to be called "adaptive comanagement" (Olsson *et al.*, 2004a; Armitage *et al.*, 2007a, 2009).

The logic underlying adaptive comanagement brings with it a conceptual shift away from thinking about "humans *and* nature" to thinking about "humans *in* nature" (Folke, 2006). From this perspective, social and ecological systems are understood to be coupled, not separate. Furthermore, these "social-ecological systems" are comprised of processes and interactions that are non-linear and characterised by an inherent degree of uncertainty, leading to shocks, surprises, and sometimes even to transformations in the basic structure and function of the system (Liu *et al.*, 2007; Moberg and Galaz, 2005; Olsson *et al*., 2004b, 2006). As a result, it is argued that management practices must shift from traditional attempts to achieve optimal solutions to resource problems, to the need to account for change and uncertainly in a multi-level world (Dietz *et al.*, 2003; Gunderson and Holling, 2002). In many circumstances this will require flexible institutions that operate within and across scales of organization, represent the multiple interests associated with the management and use of a resource, and facilitate adaptation through iterative cycles of problem solving and processes of dynamic learning

(Armitage *et al.*, 2008; Folke *et al.*, 2005; Pahl-wostl *et al.*, 2007a). Thus, in addition to the evaluative criteria traditionally attributed to comanagement, the adaptive turn brings with it a strong focus on resilience (Folke, 2006).

4.3 Key policy considerations for adaptive comanagement

Here we identify five key policy categories that have been distilled from our review of the literature. Although the categories represent general claims about conditions which are conducive to adaptive comanagement, each of them is highly context dependent. This realisation underscores the fact that there is no prescriptive recipe or blueprint that can be followed to instigate adaptive comanagement. Instead, the policy categories are indicative of a process which is most likely dependent not solely on human design or on emergence, but on the interaction of the two (Berkes *et al.*, 2007). It is also necessary to acknowledge that several of these categories are interlinked, as will be made clear. The five categories are listed in Table 4.1 and then discussed in more detail below.

Table 4.1 Five key policy categories for the adaptive comanagement of water.

Category	Conditions conducive to adaptive comanagement
Functions of water	Conceive of water as performing a diversity of functions in a catchment, and not just as a resource for humans
Change and uncertainty	Recognise that change and uncertainty are inherent features of social-ecological systems, and adopt an attitude of learning to live with them
Resilience and adaptive capacity	Focus on enhancing the resilience and adaptive capacity of the system, paying attention to the social dimension
Participation and scale	Promote cross-scale, participatory approaches to water management that operate in accordance with the subsidiary principle. Here support for local action is provided by higher-level institutions

Process and learning	View water management as a long-term social process that proceeds through iterative cycles of joint learning

Firstly, policy geared towards adaptive comanagement must account for both the economic and non-economic value of water and the diversity of functions it performs in a catchment - including its role as a source of social-ecological resilience - instead of viewing it purely as a resource for humans to draw upon (Folke, 2003). This shift in thinking brings attention to the dynamic and complex nature of social-ecological systems, in turn allowing for broader, more inclusive management approaches that better account for the highly interdependent nature of hydrological, ecological, and social issues (Folke, 2003; Ruitenbeek and Cartier, 2001). It also promotes a wider appreciation for the water environment, and is consistent with adaptive comanagement's emphasis on thinking about humans in nature, rather than humans and nature.

The second policy consideration involves a recognition that social-ecological systems are variable and prone to shocks and surprises (Fabricius *et al*., 2007; Olsson *et al.*, 2006). To this extent, policies that uncompromisingly attempt to maximise yield, control change, and reduce uncertainty appear misdirected (Holling and Meffet, 1996; Gunderson and Holling, 2002; Armitage *et al.*, 2009). Instead, policy makers should embrace an attitude of learning to live with change and uncertainly (Folke *et al.*, 2005; Plummer and Armitage, 2007a).

Thirdly, by acknowledging the place of change and uncertainty, the narrow goal of achieving efficiency – be it economic or organisational efficiency – must be broadened to encompass an intention to "manage the capacity of social-ecological systems to cope with, adapt to, and shape change" (Folke, 2006: 254). Thus policy should promote measures that enhance the resilience and adaptive capacity of the system, even at the expense of short-term efficiency gains (Pahl-wostl *et al.*, 2007a). In the case of adaptive comanagement, this must also entail a recognition of the importance of the social dimension for achieving this, rather than focusing solely on ecosystem resilience or on the ability of infrastructure to enhance capacity (Folke *et al.*, 2005). As a result, the

"resilience and adaptive capacity" category is strongly linked to our remaining two categories discussed below, which relate to the social dimension of water management.

Our fourth category, "participation and scale", states that policy aligned with adaptive comanagement theory must move away from centralised and bureaucratic forms of environmental and natural resource management. Such approaches tend to be rigid and reactionary, typically only seeking to inform, or at best consult, non-governmental agents about management actions and decisions (Glasbergen, 1998; Holling and Meffet, 1996). Instead, procedures should attempt to garner full participation of all key stakeholders in relevant decision-making processes and the co-production of knowledge, particularly resource users and those who directly affect the conditions of the water environment (Pinkerton, 2003; Pahl-wostl *et al.*, 2007a; de Loe *et al.*, 2009). This draws attention to the scale of activity. Here the focus is both on developing pluralistic procedures at the local catchment and sub-catchment level, and on facilitating linkages within and across levels of organisation from the local through to the national and international, but in accordance with the subsidiary principle (Carlsson and Berkes, 2005; Jentoft *et al.*, 1998; Plummer and Fitzgibbon, 2004; Plummer, 2006).

By doing this, and in moving beyond narrow, efficiency-oriented strategies, policy makers should therefore conceive of water management as a long-term social process and not just a technical challenge (Allen *et al.*, 2011). This fifth policy condition places much importance on the role of social learning as a key mechanism by which the process proceeds (Berkes, 2009; Dale, 1989; Pahl-wostl *et al.*, 2007b; Plummer and Fitzgibbon, 2007). Social learning allows the different participants in the management process to reflect upon their changing understandings and new ways of conceiving of the issues at stake, in response to both social and environmental signals (Keen *et al.*, 2005; Reed *et al.*, 2010). Thus the management system becomes better adapted to dealing with feedback. This feedback can be incorporated into policy by planning for iterative, multi-level management cycles designed to facilitate monitoring, learning, and adaptation (Pahl-wostl *et al.*, 2007a).

4.4 Water policy in England

4.4.1 Water governance

Before discussing the findings of the analysis, it is useful here to provide a brief overview of the system that governs water management in England. Broadly speaking, at the national level the Department for the Environment, Food, and Rural Affairs (Defra) is responsible for devising water policy and legislation, and for translating and enacting the various water directives emanating from the European Union (EU). The key Defra body charged with managing the water environment is the Environment Agency (EA), although other bodies such as Natural England also play important roles with respect to environmental protection and enhancement. European legislation has increasingly exerted power over water management in England; since the introduction of the Water Framework Directive (WFD) in 2000 the approach to managing water has changed radically. By focusing at the level of regional river basins and by encouraging greater stakeholder participation, the WFD attempts to raise all water bodies in the EU up to "good status", according to a new and more stringent set of ecological and chemical standards. The WFD requirement is to develop management strategies at the river basin scale, but in recent years England has also started to focus on the smaller catchment and sub-catchment scale, as a way of taking a more local and inclusive approach to water management.

Despite recent proposals within the EU Blueprint for Safeguarding Europe's Water Resources (EC, 2012) to better address water resources issues under the WFD, in England water quality and water quantity have historically been treated as two distinct policy domains. Whilst water quality management is now strongly governed by EU legislation, water resources has continued to be managed nationally by a licencing system that was introduced under the 1963 Water Act. Initially, water abstraction licences were granted in perpetuity and without due consideration of potential longer-term environmental impacts. Since then, legislation has been brought in to time-limit all new licences, and powers have been introduced to amend or revoke licences which are causing significant environmental damage. The EA undertake management decisions concerning water resources based upon water availability statuses for the various "resource management units" in each of England's roughly 100 designated catchments.

These statuses are derived from a process called the Catchment Abstraction Management Strategy (CAMS). Substantial reforms to the licencing system are now being consulted on, whereby the government is looking to time-limit all existing water licences, to better link licences to water availability, and to instigate a more sophisticated system of water licence trading. Therefore, whilst legislation and policy concerning water quality is leaning towards greater stakeholder participation and cooperation, some of the recent water resources management actions instead emphasises the importance of water as an economic good and the role of competition and profit making.

4.4.2 Findings of the policy analysis

Here we discuss the findings of the directed content analysis, detailing the ways in which the five categories that were identified from our review of adaptive comanagement compare to recent developments in English water policy. After an initial assessment, seven key documents were selected for detailed analysis; together these documents give a strong indication of government thinking and policy direction. A brief description of each of the seven policy documents is shown in Table 4.2.

Table 4.2 Seven key English water policy documents.

Document name and publication date	Reference in text	Synopsis
Future Water (2008)	DOC1	A 96 page document outlining the government's overall strategy for water up to the year 2030. The focus is on the "sustainable delivery of secure water supplies and an improved and protected water environment"
Water for People and the Environment (2009)	DOC2	A 77 page Environment Agency document outlining the water resources strategy for England and Wales up to the year 2050. The central premise of the document is the need to manage water in such a way that there is "sustainable, reliable water supplies for people and businesses, whilst also protecting the environment"

Water for Life (2011)	DOC3	A government water white paper laying out a vision for future water management through measures to tackle water pollution using the catchment-based approach; water abstraction reform; increased competition in the water sector; and details on how the government will encourage and incentivize water efficiency measures
The Natural Choice (2011)	DOC4	A 77 page environment white paper setting out the government's intention to "mainstream the value of nature" across society. It proposes to achieve this by developing local action for nature protection and improvement; creating a green economy; strengthening the connections between people and nature; and demonstrating leadership at EU and international levels. As a critical component of the environment, water and its management are an important topic in the document
The Catchment Based Approach (2013)	DOC5	A 28 page document detailing a policy framework to encourage the wider adoption of an integrated catchment management approach for improving the quality of the water environment
Water for Life and Livelihoods: Challenges and Choices (2013)	DOC6	A 42 page document on the "challenges and choices" relating to England's waters. The document is a summary of the results of a consultation on significant water management issues which are outlined from the perspective of the government, along with potential measures to address these issues
The National Adaptation Programme (2013)	DOC7	A 181 page, wide-ranging document concerned with "making the country resilient to a changing climate". The two cross-cutting issues that dominate the list of priorities (as identified in the Climate Change Risk Assessment) are flooding and pressure on water resources

Functions of water

Current English water policy adopts the ecosystem services approach to understanding how water functions within a catchment. In Future Water (DOC1), a healthy water environment is explicitly linked to social, economic, and environmental resilience, where a "joined-up approach" is advocated due to the interrelated nature of the different

issues affecting the water environment. The range of ecosystems goods and services are outlined in the environment white paper, The Natural Choice (DOC4). Then, following the UK National Ecosystems Assessment (2011), the most recent policy documents detail a wide list of benefits that a healthy water environment provides for the different sections of society. These benefits relate to both economic outcomes and to human health and wellbeing, including resilience to droughts and short and long-term resilience to "market changes and global changes, and climate change" (DOC6: 12). Beyond the services the water environment provides for human society, in several of the documents mention is also given to the intrinsic value of a healthy water environment that conserves and enhances biodiversity, as well as the "strong moral responsibility to protect it" (DOC4: 7).

Change and uncertainty

The documents reveal that the Government recognises that a degree of change is unavoidable when managing water, and that this is set to increase in the future. Whilst the challenges associated with climate change are regularly mentioned throughout all but one of the documents, other sources of change that are addressed relate to demography, lifestyle choices, and water demand. Natural variability is also recognised, where the water environment is viewed as "a dynamic system, constantly changing as a result of natural forces and human activity" (DOC6: 8). This understanding appears to have resulted in an appreciation that new ways of thinking about dealing with these challenges is required, one which adopts the notion of "preparing for and accommodating inevitable change" (DOC7: 76).

On the other hand, in most of the documents uncertainty is discussed far less often than change is, and in some of them is not mentioned at all. Yet in Water for People and the Environment (DOC2) and The National Adaptation Programme (DOC7) it is better addressed. Here there is a two-fold emphasis on both reducing uncertainty and also on managing for it, given that in the future there is likely to be "a far less stable operating environment with a higher degree of uncertainty and a greater potential for shocks" (DOC2: 62). Thus policy should "encourage options resilient to climate change to be chosen in the face of uncertainty" (DOC2: 3).

Resilience and adaptive capacity

Throughout our analysis of the seven policy documents we observed a focus on developing resilience and adaptive capacity, where resilience is defined as "the ability of a social or ecological system to absorb disturbances while retaining the same basic ways of functioning, and a capacity to adapt to stress and change" (DOC7: 111). However, despite the definition's recognition that the social system is an important feature of resilience - which is the focus of adaptive comanagement - this dimension receives very little attention in the documents. Instead, they tend to focus on resilience and adaptive capacity as they relate to ecosystems and the natural environment or to infrastructure and technology. This is most telling when considering DOC5, which never makes this connection despite promoting measures that according to the adaptive comanagement literature are likely to enhance the resilience and adaptive capacity of the system. These measures include the devolution of management rights and the sharing of power with a wider range of stakeholders within the catchment. Only once, in DOC7, is the link between the structure of the social system and overall system resilience clearly made. Here the document states that the Catchment Based Approach "is the sort of innovative approach that the regulatory framework can enable to help deliver long-term resilience, including to climate change" (DOC7: 73).

Participation and scale

With respect to participation and scale, there is a change in emphasis from the earlier documents in 2008 and 2009 to the most recent documents. Although collaboration between different stakeholders is stated as being of importance in the earlier policy documents, this is typically framed more in terms of government consultation at the national or regional level, rather than joint decision-making and power sharing in accordance with the subsidiary principle. Thus although the catchment is discussed as a relevant scale in the earlier documents – for example in terms of the CAMS process and government programmes such as "catchment sensitive farming" – this typically does not then go on to discuss the merits of fuller stakeholder participation and cooperation at this level, and nor how the catchment level is linked to levels below and above it.

In contrast, in the later documents the issue is reframed so that "local businesses, citizens, and interest groups will play a significant part in determining and

implementing the measures needed to achieve long-term improvements" at the scale of the catchment and local sub-catchment (DOC4: 30). Furthermore, these local scales are more coherently linked to the "strategic" regional and national levels, in particular through the process of river basin management planning. Yet at the same time, the policy framework sets out to allow a degree of local autonomy for catchment-based groups as the government is "deliberately not trying to prescribe how and when local initiatives should work" but rather provide a "framework to support local action [where] much of what is described sets out the 'bridge' between local actions and the much larger scale actions described in the River Basin Management Plans" (DOC5: 2).

Whilst these policy developments concerning participation and scale apply largely to water quality management, water resources policy is also placing more of a focus on the decision-making of resource users within catchments. This is being achieved through the development of a system that more closely links water abstraction licences to real-time availability of water, as well as the trading of these licences. Both the farming and conservation sectors have observed that these reforms have the potential to encourage greater cooperation between resource users (NFU, 2013; ENDS, 2013).

Process and learning

Again, a progression can be seen between the earlier and the most recent documents, this time in how English water policy relates to process and learning. In particular, this can be observed by the way in which water management has come to be conceived of more as a long-term social process. Thus in The Catchment Based Approach (DOC5) the government state that their "level of ambition is not just for the short term. It is a long-term commitment" (DOC5: 14). Whilst this conception of water management as a long-term social process is not explicitly stated in many of the documents, the process of river basin management - including the participatory and cross-scale approach that is now being encouraged by the government, as discussed above - necessarily entails a social and process-oriented governance structure. This represents a substantial change from the centralised, bureaucratic, and expert-dominated management strategy that preceded these developments.

Several of the documents discuss the importance of learning but from a top-down perspective, where this usually refers to ways in which government bodies and different academic institutions can learn from "current research, pilot studies, and monitoring of existing and new mitigation and restoration activities" (DOC6: 39); or, as in the case of the Catchment Based Approach, the importance of "starting to test and assess different ways of working, learning initial lessons around engagement, collaboration, and catchment planning first hand" (DOC5: 1). There is also reference to the adoption of adaptive management plans by the EA for managing water resources, which again suggests a place for learning in the thinking of policy makers.

Yet whilst there is clearly a recognition of the need to learn from experience, these policy documents do not explicitly frame learning as the mechanism by which processes like the Catchment Based Approach develop and evolve over time. Nonetheless, again the process of river basin management planning must be considered because of the way in which it requires participants at different scales to periodically develop management plans at six-year time intervals. As mentioned previously, this iterative and cyclical approach to water management encourages social learning when the different actors involved in the process are able to jointly learn from and devise actions in response to social and environmental feedback. Thus whilst in these policy documents the government does not fully recognise the central role of joint learning in developing adaptive and resilient management strategies, to some extent at least it is captured by the river basin management process, which is mandated for under the WFD.

4.5 Discussion

From our findings it is clear that in England national water policy is increasingly adopting a position which, according to the five policy categories we detail above, provides a reasonably conducive policy environment for fostering adaptive comanagement. Given the ways in which these more recent developments differ from water policy in the latter half of the twentieth century (see Section 4.1), this represents a notable shift. In particular, the key features of water policy in England that we identified as facilitating adaptive comanagement are: 1) a recognition of the many economic and non-economic functions that water and the water environment perform, using the

framework of the ecosystem services approach, 2) an acceptance that change is an inherent feature of water management that is only likely to become more prominent in the future, 3) a desire to enhance the resilience of the system, 4) the promotion of participatory and locally-based management approaches that are linked across scales of organisation, 5) a growing awareness of water management as a long-term social process.

Despite these correlations between the policy categories and current water policy in England, it was also clear from our analysis that some aspects of these categories were less well addressed. In particular, learning received relatively little attention. This is significant given that learning, and in particular social learning, is one of the core principles of adaptive comanagement because of the way in which it supports the development of collaborative processes and contributes to the sustainability of social-ecological systems (Armitage *et al.*, 2008; Keen *et al.*, 2005). As with learning, uncertainty is also a concept which does not always receive much attention - in four of the documents it is not mentioned at all - and although at times there is a recognition of the need to develop strategies to effectively manage uncertainty, there is also a tendency to promote the idea that uncertainty is something to be eliminated or reduced. Whilst this is not in itself problematic, it is nonetheless suggestive of a mindset that tended to characterise the "command-and-control" approach to managing water in the last century.

As we noted above, to a certain extent the different policy categories are interlinked. From the findings of our analysis it is apparent that although a new policy framework has been adopted for encouraging participatory approaches at catchment and sub-catchment levels, the ways in which this recent approach to "participation and scale" ties in with the "resilience and adaptive capacity" of the system, and its ability to deal with "change and uncertainty", is not explicitly linked. This is a significant omission in the context of adaptive comanagement. Thus we find that whilst participation and scale as it relates to adaptive comanagement is best addressed in the document The Catchment Based Approach (DOC5), this same document makes no mention of uncertainty, resilience, or adaptive capacity. Furthermore, it only mentions change on three occasions, but where this relates to how the Catchment Based Approach is

expected to change over time, and not how it may be a valuable approach to managing water under changing circumstances. This omission suggests that government decision makers do not yet fully appreciate the importance of the social dimension for reducing vulnerability, and thus enhancing the resilience, of complex social-ecological systems.

Finally, it is necessary to recognise a key limitation concerning the approach we have taken in this paper. That is, using a directed content analysis does not reveal the sorts of insights that a more critical understanding of water policy in England might provide, where there may be a significant difference between the discourses adopted in the policy documents and the reality of water management on the ground. For example, as Cook *et al.* (2013: 755) have discussed when exploring the concept of participation in integrated catchment management: "while statements *about* legislation promise symmetric engagements, the mechanics *of* legislation frame participation as asymmetric consultation". In contrast, by critically examining the various proposals and statements we identified in the policy documents from a discourse analysis perspective, or by embedding these documents within the wider political economy of water governance in England, it would be possible to discover something about the ways in which power operates to constrain or facilitate the adoption and implementation of the stated policy objectives. Increasingly, these factors are being recognised by the adaptive comanagement literature, which now pays attention to the importance of understanding how power shapes issues such as trust building, conflict resolution, and social learning (Armitage *et al.*, 2009; Doubleday, 2007; Nadasdy, 2003a, 2007; Whaley and Weatherhead, 2014) which are vital for fostering the success of the process.

4.6 Conclusion

In this paper we have examined current water policy in England through the lens of adaptive comanagement, an emerging approach to environmental and natural resource management that is claimed to enhance the resilience of complex social-ecological systems under conditions of change and uncertainty. Given the sorts of challenges that issues such as climate change and a growing population pose to water governance in England, encouraging the development of approaches like adaptive comanagement becomes an important policy consideration. Our review of the literature revealed five

key policy categories which were identified as being necessary for providing a suitable enabling environment for the emergence of adaptive comanagement. We then used these criteria to conduct a directed content analysis of key English water policy documents from 2008 onwards. Our findings have revealed that in a number of ways decision makers have put in place policy objectives that are amenable to the emergence of adaptive comanagement. Yet at the same time, we also noted a level of discrepancy between key aspects of the five policy categories and water policy as laid out in the seven Government documents. In particular, we identified: 1) a failure on the part of policy makers to adequately prioritise the place of social learning as a central mechanism by which water management in England can progress and adapt to changing circumstances, 2) only a weak focus on uncertainty and the need to live with it, instead of simply attempting to reduce or eliminate it, 3) a failure to link resilience and adaptive capacity to the social dimension of water management.

In order to facilitate the development of an enabling policy environment for the emergence of adaptive comanagement, here we put forward two proposals. Firstly, water policy should give special attention to the place of social learning within existing management processes such as river basin management planning and the Catchment Based Approach. It should also promote new objectives especially designed to facilitate joint learning as a way of developing a more adaptive system of water governance in England, and to recognise that this is necessary because of the inherent levels of uncertainty decision-makers face from a range of sources (Pahl-wostl *et al.*, 2007a). Secondly, attempts to enhance the resilience and adaptive capacity of water management in England must explicitly link this objective to the social dimension. In the documents we analysed, although resilience and adaptive capacity were stated aims of the government, this typically related to the design of infrastructure and regulatory systems, or the healthy functioning of natural ecosystems. Whilst these are important considerations, from an adaptive comanagement perspective the participatory, multi-level, learning, and process aspects of water governance are seen as key social attributes of a more resilient and adaptive system. Embracing these concepts so as to achieve this aim could prove vital in the coming years, if policy makers are to allow for a system of governance that is able to cope with the challenges that lie ahead.

Chapter 5: Political Economy Analysis

Prologue

This chapter sets out to investigate the broader context in which farming and water governance occurs in England, through an analysis of the "political-economic" variable of the politicised IAD Framework. The paper below (Paper 3) has been accepted for publication in the journal Water Alternatives (Whaley and Weatherhead, 2015b). Along with Chapter 6, it addresses Objective 3 of the research agenda.

Paper 3 - Power Sharing in the English Lowlands? The Political Economy of Farmer Cooperation and Participation in Water Governance

Luke Whaley and Edward K. Weatherhead

Abstract

Participatory and cooperative forms of water governance have become regular features of government discourse and stated policy objectives in England. We consider this aspiration from the perspective of farmers in the English lowlands, by analysing the current power dynamic that exists among these farmers, and between them and the key stakeholders involved in water management. To do this we undertake a political economy analysis that places lowland farming and water governance within the evolution of historical processes that over time have influenced the ability of farmers to participate in the governance of their water environment. These historical developments are interpreted through the lens of the Power Cube, an analytical tool for thinking about the interplay between different forms of power operating in different types of spaces and at different levels of governance. Our findings reveal that despite there now being a number of structural changes that provide lowland farmers with the opportunity to cooperate and participate in water governance, three distinct barriers stand in the way. These relate to the power "within" these farmers, which continues to align with a productivist ideology founded on individualism and competition, often at the expense of the environment; the power that government water managers still exercise "over" farmers instead of "with" them; and the relationship between lowland farming and environmental interests, where historically the two sides' power "to" act has been diametrically opposed. The findings point to the importance of developing suitable programmes designed to support and incentivise farmer cooperation and participation.

Keywords: Power Cube; Cooperation and participation; Water governance; Farming; lowland England

5.1 Introduction

In England, as elsewhere, the challenge of managing the water environment in the face of competing demands is often complex and uncertain (Wallace *et al.*, 2003; Pahl-wostl *et al.*, 2007b; Fish *et al.*, 2010). Added to this is a growing list of future pressures – climate change, population growth, shifting lifestyle preferences – that threaten to exacerbate the situation (Collins and Ison, 2009; Weatherhead and Howden, 2009; Barker and Turner, 2011). As a result, the dominant management discourse of the twentieth century is being revised, with much greater emphasis now placed on enhancing resilience and adaptive capacity (DEFRA, 2008; DEFRA, 2011a). In particular, there is a growing awareness of the need to move beyond centralised, bureaucratic, and technocratic forms of governance (Hodge, 2007; DEFRA, 2013b), to recognise the politicised nature of water use (Watson, 2005), and to appreciate the intrinsic value of freshwater ecosystems (DEFRA, 2011b). Part of this change in emphasis has entailed a focus on developing more participatory and cooperative forms of water governance. This is reflected, for example, in the EU Water Framework Directive (2000/60/EC), which makes room for the "active involvement" of all "interested parties" and "the public, including water users", and in newly instigated national water programmes, such as the Catchment Based Approach.

The success of people-centred approaches to water governance requires the participation of farmers. Farming covers almost 70% of England, and has the potential to significantly damage or improve the water environment, for example through pollution, physical modification, and water abstraction (Strosser *et al.*, 1999). The low-lying areas of England, situated predominantly in the south and east of the country, have witnessed the biggest changes to agriculture in modern times and it is here that the water environment is under most pressure from a combination of these threats. Yet normative claims to develop pluralistic forms of environmental governance often fail to take into account the difficulties: there are no panaceas when it comes to developing water institutions (Meinzen-Dick, 2007). Instead, attention must be given to the appropriateness of the intended approach in light of the particular institutional, cultural, and historical context (Wesselink *et al.*, 2011), which tends to be more important than the "purity" of the approach itself (Ingram, 2008; McCay, 2002). This implies that

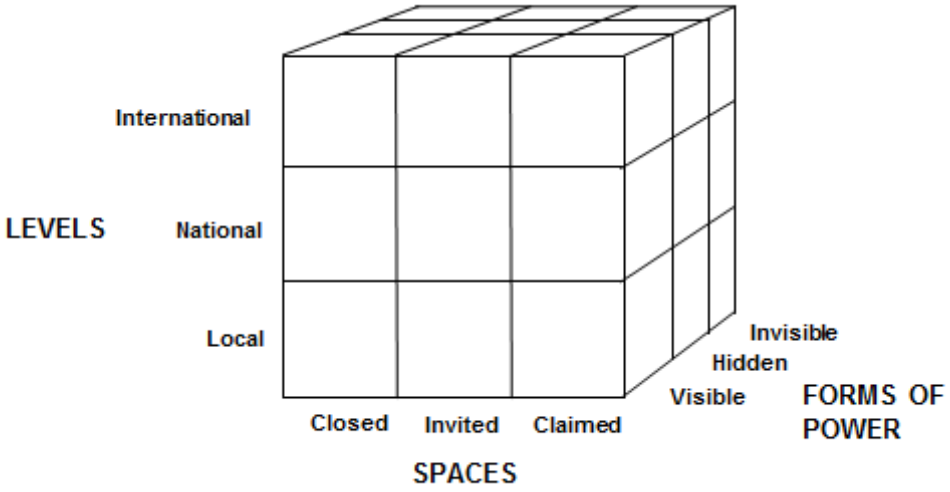
notions of farmer cooperation and participation in water governance are highly situation dependent, and points to a need to understand the wider systems of power in which they are embedded.

With this in mind, our intention is to understand how, over time, the interplay of power has come to influence the ability of farmers in England to cooperate and participate in the governance of their water environment. We are therefore concerned with "the complex configuration of power relations in which planners and participants are enmeshed" (Tewdwr-Jones and Allmendinger, 1998: 1988), and what this implies for the future role of farmers in England's system of water governance. To do this, we undertake a political economy analysis that examines lowland agriculture and water governance from World War II until the present day. We interpret these historical developments through the lens of the Power Cube, an analytical tool for thinking about the interplay between different forms of power operating in different types of spaces and at different levels of governance. The research is based on an analysis of government documents and other primary texts, and an extensive review of secondary sources. The work is part of a broader programme examining farmer cooperation and participation in English water governance.

5.2 Analysing power using the Power Cube

In this paper we adopt an approach to thinking about and analysing power known as the "Power Cube" (Gaventa, 2006a; Gaventa, 2006b). Simply put, the Power Cube is a heuristic for analysing the levels and spaces in which different forms of power operate, as well as how these dimensions interact (Figure 5.1). The changing structure of these interactions and the system's overall pathway or trajectory provides an insight into the power dynamics at play, as well as pointing to possible strategies for implementing change. Each dimension – levels, spaces, and forms - comprises three sub-components, though in reality all three dimensions operate along a continuous scale.

Figure 5.1 The Power Cube. Adapted from Gaventa (2006a).



In its most basic arrangement, the "levels" dimension of the Power Cube is subdivided into the "local", "national", and "international". The "spaces" dimension is broken down into "closed spaces", where decision-making goes on behind closed doors, undertaken by politicians, experts, managers, and other elites; "invited spaces", which are those fora that have come about, often through pressure from outside influences, in order to provide other interests with the opportunity to participate in governance processes; and "claimed spaces", which are those spaces that groups of people create for themselves. These may be more formal structures such as NGOs or community associations, or they may be more informal. The last of the Cube's three dimensions concerns the different forms that power takes. "Visible power" is understood by the adage "A has power over B to the extent that he can get B to do something that B would not otherwise do" (Dahl, 1957). "Hidden power" relates to the ability of actors to control the agenda by influencing the sorts of issues that can be debated and who can participate in the debate in the first place. Finally, "invisible power" is understood by the adage "A may exercise power over B by getting him to do what he does not want to do, but he also exercises power over him by influencing, shaping, or determining his very wants," where this may be achieved by such activities as "the control of information, through the mass media, or through the process of socialization" (Lukes, 2005: 27).

Proponents of the Power Cube often make one further distinction. Although power might typically be conceived of as a means by which one actor or group is able to exhibit control over another, this is a restricted definition which does not easily allow for the "productive aspect of power" (Foucault, 1980: 119). Alongside the common conception of power "over", which typically relates to control and coercion, three alternative "expressions" of power have been proposed by Veneklasen and Miller (2002). These are power "with", power "to", and power "within". Power "with" is the capacity for actors to work together; power "to" concerns an actor's ability to influence their world through agency; and power "within" relates to an actor's sense of identity and self-worth. Broadly speaking, for farmers to cooperate and participate more fully in water governance, certain relationships of power "over" must be transformed into relationships of power "with". For this to happen, potential participants require a strong enough sense of identity and purpose (power "within") to instigate change (power "to") by coming together with likeminded individuals as well as with other interests, including the government (power "with"). Alternatively, the ability to act that accompanies power "within" and "to" may result in the pursuit of purely selfish ends by some actors, in turn disrupting the process.

We posit that the Power Cube is a useful tool for guiding this analysis of farming and water governance because of the way it draws attention to the wider multi-level and cross-scale processes which make up governance arrangements in our modern, globalised world. At the same time, it allows the analyst to reflect on what this wider dynamic implies for farmer cooperation and participation in water governance at more local levels, which is the focus of this study. Following Huitema *et al.* (2009), when speaking of "governance" we adopt Pierre and Peters' (2000: 1) definition, namely that governance is "the whole range of institutions and relationships involved in the process of governing". This includes both formal and informal institutions, and, importantly for this paper, "the power relations and practices that have developed" over time (Huitema *et al.*, 2009: 27). It is also key to recognise that in speaking of a system of water governance, it is necessary to appreciate that this system "is part of broader social, political and economic developments and thus is also affected by decisions outside of the water sector" (UNDP, 2014). Again, the Power Cube approach appears well suited to addressing this broader conception of the issues relevant to water governance.

5.3 Lowland farming and the water environment: An historical perspective

In this section we undertake an historical analysis of farming and water governance in England from World War II until the present day through a largely political economy approach. We do not intend to capture in detail all the developments we discuss, but instead attempt to reveal the broad processes and prominent events that have affected the present-day power dynamic. In accordance with the Power Cube, we pay attention to the different forms and expressions of power, and the levels and spaces they operate in. Due to the nature of the study, it is more difficult to analyse "invisible power" and the expression of power "within" when compared to the other forms and expressions of power because to do so typically requires a more fine grained and exhaustive approach, for example through the use of in-depth interviewing techniques and discourse analysis. Nonetheless, we do reflect upon invisible power and power "within" during the analysis and discussion, although this inherently involves a degree of conjecture. The central focus of the analysis is on the relationship between farmers and the key actors involved in water management in the English lowlands, with particular emphasis given to government and environmental interests.

5.3.1 Post-war policy (1939 to 1959): The reconstruction of the English countryside

The onset of World War II dramatically changed English farming. Since the 1870s agriculture had suffered chronic depression due to the government's decision to support low-cost food imports. However, the blockade from German U-boats resulted in the urgent prioritisation of greater self-sufficiency. What most characterised the massive overhaul that agriculture underwent from this time onwards was the visible and hidden power the government wielded in closed spaces at the national level to intervene in almost every facet of food production, as farmers relinquished their independence in return for greater stability and support (Brassley *et al.*, 2012) (Table 5.1).

Table 5.1 The key actors and most prominent elements of the Power Cube's three dimensions for the period 1939-1959

Actors	Levels	Spaces	Forms of power	Comments on expressions of power
MAF and NFU	National	Closed	Visible and hidden	Corporatist relationship exercising power "over" farmers in pursuit of efficient, intensive production
Agribusinesses	National and regional	Closed	Hidden	Gain power "over" farmers through industrialisation of farming practices and processes
River Boards	Regional / catchment focused	Closed	Visible	32 Boards with power "over" land drainage, fisheries, and navigation
Government extension workers	Local	Invited	Hidden and invisible	Extension workers form close relationships of power "with" farmers to induce behaviour change
Farmers	Local	Closed	Invisible	A new power "within" farmers emerges based on productivist ideology

The drive towards efficient production laid out in the 1947 Agricultural Act paved the way for a marked transition to modern commercial farming through a system of guaranteed prices, subsidies, grants, advice, education, coercion, and the widespread adoption of science and technology in the countryside, often characterised as a move "from agriculture to agribusiness". In this new system, a highly rationalised farming sector geared towards profit maximization was integrated vertically into a system of food production that controlled "all processes from seedling to supermarket" (Newby, 1987: 193).

Of particular note was the intimate relationship, founded on the wartime dynamic, that developed between the Ministry of Agriculture and Fisheries (MAF) and the National Farmers Union (NFU), who together were responsible for deciding the minimum annual prices of food commodities in a system of deficiency payments (Winter, 1996).

Furthermore, a close relationship developed between many farmers and government agricultural extension agents. The job of these agents was to ensure "changes in the attitude and behaviour of individuals and the efficient uptake of grant aid," where "these relationships with farmers were often characterised by mutual trust and respect developed through face-to-face meetings and farmer groups over lengthy periods of time" (Hall and Pretty, 2008: 394).

Other post-war Acts were also significant. In particular, the Town and Country Planning Act 1947 singled out industrial development and urban sprawl as the major threats to the countryside, whilst embracing the prevailing stewardship ethic whereby farmers and landowners, left to their own devices, would continue to manage the countryside in a favourable manner consistent with the interest of the wider public (Marsden *et al.*, 1993). This custodial interpretation of the role of farming in the countryside harked back to the ideological relationship between the landed classes and their estates in the 19th Century (Newby *et al.*, 1978). As will become evident, the agricultural stewardship discourse is an enduring feature of the post-war period, which has been deployed by different actors at different points in time. Today, the notion of "stewardship" still shapes how cooperation and participation in land and water management is understood by English farmers.

These developments were most dramatic in the arable farmlands in the low-lying east of the country. The farmers here stood to gain most from increasing their farm's size, adopting new practices and new technology, and intensifying inputs such as fertilizers and pesticides to boost production (Grigg, 1989). Referring to the Power Cube, we infer that the visible and hidden power exercised in a corporatist closed space at the national level by MAF and the NFU, and the rapport between agricultural extension agents and farmers on the ground in turn resulted in the emergence of an invisible form of power and a particular sense of power "within" lowland farmers that was in keeping with the productivist ideology (see Table 1).

5.3.2 Conflicts in the countryside (1960 to 1983)

In this section we look at key aspects of the power dynamic that developed between 1960 and the early 1980s, as shown in Table 5.2.

Table 5.2 The key actors and most prominent elements of the Power Cube's three dimensions for the period 1960 - 1983

Actors	Levels	Spaces	Forms of power	Comments on expressions of power
EC	European	Closed	Visible	From 1973 the EC begins to exert considerable power "over" agricultural policy through the CAP
MAFF, farming lobby, Land Drainage Committees, IDBs	National, regional, and local	Closed	Visible, hidden, and invisible	The "MAFFia" exercise power "over" land drainage to further modern, intensive farming
Supermarkets and Agribusinesses	National and regional	Closed	Visible and Hidden	Alongside industrialisation of agriculture, power "over" food retail is located increasingly in hands of a select number of supermarkets
Environmental NGOs	National and regional	Claimed	Visible	Strengthening of groups at national level and emergence of county-level wildlife trusts with power "to" act
Urban newcomers	Local	Claimed	Visible and Hidden	New village inhabitants with power "to" oppose modern farming practices

A crucial factor in the success of commercial agriculture from the post-war period onwards concerned water management, and in particular land drainage in low-lying parts of the country. By the start of the 1960s, power over water management policy was located firmly at the national level in closed spaces occupied by the reformed Ministry of Agriculture, Fisheries, and Food (MAFF) on the one hand, and the Ministry of Housing and Local Government (which from 1970 became the Department of the Environment) on the other. After the Water Resources Act 1963 this separation of decision-making power was consolidated, with the Ministry of Housing and Local

Government retaining responsibility for all aspects of water management apart from drainage and fisheries, which belonged to MAFF (Parker and Sewell, 1988). As we shall see, land drainage became one of the key issues underlying the countryside conflicts that followed.

By the late 1950s the government had become concerned that growing demand for water by farmers, chiefly for irrigation, "might seriously deplete the natural flow of many rivers and streams" (CAWC, 1960: 4) and called for statutory powers to control the abstraction of surface water. These recommendations were also legislated for in the 1963 Act, which replaced the longstanding common law system of riparian water rights (Getzler, 2004) with a permitting regime whereby most users of surface and groundwater required a water abstraction licence. From an organisational perspective, a move towards the integration of management functions had been taken in 1948 when the 47 existing Catchment Boards were replaced by 32 River Boards charged with overseeing land drainage, fisheries, and navigation. Another function of the 1963 Act was to replace the 32 River Boards with 29 multi-purpose River Authorities that incorporated agricultural land drainage, flood alleviation, pollution prevention, fisheries, and navigation under the jurisdiction of a single administrative structure.

While advances in modern agriculture continued apace throughout the 1960s, this was also a decade that witnessed a considerable rise in environmental awareness at both international and national levels. In 1949, the National Parks and Access to the Countryside Act had been introduced, formally ushering in the "environmental movement" in England (Sheail, 1995). Locally, the power of this movement was being strengthened by the large numbers of middleclass city dwellers who were buying property in the countryside and who brought with them a set of values and expectations about how the countryside should be, based at least in part on a romantic conception of "rural idyll" (Howkins, 2003). The first half of the decade also saw a spate of county-level Wildlife Trusts form "claimed spaces", which were represented at the national level by the Society for the Protection of Nature Reserves.

It was in the 1970s though that this environmental power base began most forcibly to come into conflict with farming interests through a series of local confrontations whose political significance often reached well beyond the geographical boundaries of the

disagreements themselves (Lowe *et al.*, 1986). Not least were cases concerning water management where drainage activity threatened to destroy primary and secondary wetland sites through conversion to intensive agriculture (Purseglove, 1988). However, the first and perhaps most significant conflict from a political perspective was not related to land drainage but to the encroachment of modern farming methods on the heather moorlands of Exmoor National Park in southwest England (Brotherton, 1990; Lobley and Winter, 2009). The issue drew attention to important national questions concerning agricultural regulation versus environmental protection, including the appropriateness of the voluntary approach for achieving conservation measures, the relationship between agriculture and formal planning legislation, and the efficacy of National Parks for securing Britain's landscapes (Newby, 1979; Lobley and Winter, 2009).

As we have seen, after World War II most decision-making power concerning agriculture was concentrated at the national level within a closed space occupied by MAF and the NFU. Together these parties were responsible for directing farming along its productivist trajectory by exercising visible and hidden forms of power over farmers (Table 6.1). However, in 1973 the UK entered into the European Community (EC), and much of the power held at the national level was itself to become subsumed by decision-making at the European level. During the 1970s, while the battle for Exmoor was rumbling on, other disputes between farming and conservation interests were emerging. In part the intensity of these disagreements was being fuelled by Britain's succession into the EC and its adoption of the Common Agricultural Policy (CAP), which by keeping the price of wheat and other grains artificially high provided a strong incentive for farmers to convert to intensive forms of arable production, especially where this involved a change from low-intensity livestock grazing (Grigg, 1989). Key to such changes in wetland sites like the Norfolk Broads, the Fens, and the Kent Marshes of the southeast, or the Somerset Levels of the southwest, was artificial drainage to lower water levels, often replacing wetland ecosystems which had evolved with farming over hundreds of years (Cook and Williamson, 1999).

The power that farming interests held over land drainage at this time is evident when considering the changes that accompanied the Water Act 1973, which replaced the 29 River Authorities with 10 truly multifunctional Regional Water Authorities responsible

for every facet of water management in England. Despite attempts during the run-up to the Act to concentrate all aspects of water policy within the Department of the Environment (DoE), the powerful network of public and private agricultural interests fronted by MAFF - and coined the "MAFFia" by its critics - successfully campaigned to retain control over the administration of land drainage, including the system of central government grant aid subsidies (Purseglove, 1988). This achievement by the farming lobby resulted in the formation of separate Regional Land Drainage Committees, made up of landowners and farmers, with the power to administer land drainage finance (Parker and Sewell, 1988). At a more local level, internal drainage boards (IDBs), created under the Land Drainage Act 1930, were still playing an important role in undertaking drainage schemes that supported the advance of commercial agriculture in the most low-lying and flood prone areas of the country. The origins of IDBs date back to at least the twelfth century (Reeves and Williamson, 2000), and for almost all of their history these authorities have had strong ties with landowners and farming, although this relationship and the hidden power structures it embodies has been the focus of criticism in more recent times (Purseglove, 1988; Bankoff, 2013).

It is therefore clear that in the 1970s commercial farming interests were able to exercise both visible and hidden power in implementing land drainage schemes by deciding both how funds were allocated and who could participate in decisions concerning the nature and operation of such schemes. Land drainage designed to bring about intensive forms of farming was strongly supported at all levels by a well-resourced agricultural department in conjunction with the Regional Land Drainage Committees, the farming lobby (with the NFU also holding an office in Brussels), and the local IDBs. Furthermore, despite the financial rewards such undertakings might provide for agriculture as a whole, the gains were often disproportionately allocated in favour of the larger farmers who had the capital to undertake the necessary changes and who were able to benefit from economies of scale, oftentimes at the expense of small farmers (Lowe *et al.*, 1986).

In a similar fashion, these large commercial farmers were able to dictate matters through the hidden power they exerted over the decision-making of Regional Land Drainage Committees and IDBs, where representation and voting procedures tended to be weighted heavily in their favour (Purseglove, 1988). Thus the countryside disputes of

the 1970s not only pitted productive agriculture against environmental interests, but also large, often arable farmers against smaller farmers who had fewer options available and less of an incentive to adhere to the productivist ideology espoused by MAFF and the farming lobby, but where a failure to do so could result in continued economic marginalisation and even bankruptcy.

5.3.3 A shift in power (1984 to 1989)

In Table 5.3 we summarise the key aspects of the power dynamic that was to emerge after the countryside conflicts of the 1960s, 70s and early 80s. This period, discussed in the next two sub-sections, extends until the start of the new millennium.

Table 5.3 The key actors and most prominent elements of the Power Cube's three dimensions for the period 1984-1999

Actors	Levels	Spaces	Forms of power	Comments on expressions of power
UN	International	Closed and invited	Visible and hidden	International conferences and conventions championing more decentralised and participatory approaches to water management and contributing to a new sense of power "within"
EU	European	Closed and invited	Visible and hidden	Power "over" CAP reforms and introduction of single-issue water directives. Opening up of policy processes to develop a degree of power "with" other actors
Central Government	National	Closed	Visible	Power "over" national water legislation and implementation of EU water legislation
EA	National and regional	Closed	Visible	Charged with power "over" water management in England

Supermarkets, agribusinesses	National	Closed	Visible and hidden	Growing power of supermarkets "over" farmers and corporate power "over" large-scale, industrial farming
Environmental NGOs	National and regional	Claimed	Visible and hidden	Formation of Wildlife Link Committee to coordinate environmental lobby's power "to" act
Rivers trusts	Regional and local	Claimed	Visible	Power "to" protect and enhance the water environment in certain catchments
Farmer water abstractor groups	Regional and local	Claimed	Visible	Power "to" defend rights of irrigators against changes to water legislation

The balance and operation of power at the beginning of the 1980s can be seen by considering the positions and contrasting influence of the various farming and environmental interests during the passage of the Wildlife and Countryside Act 1981, covered in detail by Lowe *et al.* (1986). The process revealed the hidden power of the farming lobby at the national level, where they maintained a relatively close relationship with agricultural and environmental ministers. This was in contrast to the relative powerlessness of the government's own conservation bodies (Winter, 1996). A key outcome of the Act was the ability of landed and farming interests to secure a system of "voluntary cooperation, encouraged where necessary by management agreements based on full financial compensation" (Marsden *et al.*, 1993: 95). Again, the farming lobby had played to the enduring discourse of agricultural stewardship and farmer goodwill in securing these gains (Lowe *et al.*, 1986).

Overall, the Wildlife and Countryside Act only appeared to further polarise the debate. With its introduction in 1981 the disputes between farming and conservation that had arisen in the previous decades took on a new significance, with all parties realising that it was how the Act was to be interpreted in its first few years that would decide how it would be implemented going forwards. In this context the relatively remote set-piece conflicts in wetland sites like Romney Marsh, the Halvergate Marshes in the Norfolk

Broads, and West Sedgemoor in the Somerset Levels (where at the height of the conflict effigies of conservationists hanging by their necks from a makeshift gallows were burnt by local farmers) were to set precedents which would affect exactly how the Act was applied in National Parks and SSSIs all over the country (Purseglove, 1988).

However, other factors were now beginning to derail the progress of intensive agriculture in England, as the positive public image of farmers that had emerged after the war (Griffiths, 2012) was being replaced by one far less flattering. In part this reflected the public's growing awareness of the damage farming was causing to the country's landscapes and wildlife, which was given added momentum by a string of scientific and popular publications (e.g. Shoard, 1980; Body, 1981; Cheshire and Bowers, 1983). And, just as importantly, the economic logic underlying the direction agriculture was taking appeared outdated and even nonsensical. The most visible sign that something was awry was the stockpiling of "food mountains" and "milk lakes" throughout Europe, caused by massive overproduction brought on by the CAP's productivist orientation, and the huge costs of storing and disposing of these surpluses (Marsden *et al.*, 1993). These factors were shifting the balance of power. The shift was further aided by the neoliberal policies of the Thatcher government (Harvey, 2005), which tended to favour free-market principles in place of the traditional support shown by Conservatives towards the agricultural sector (Flynn *et al.*, 1996).

It was this political shift which was to once more change the structure of water management in England. As Parker and Sewell (1988: 767) observed, the Water Act 1973 developed a new conception of water as "an economic good rather than a subsidized public health service…based upon a managerial philosophy, upon a philosophy that 'bigger is better' and upon increased administrative efficiency and greater economic efficiency - in short, upon 'business' imperatives." This new attitude towards water combined with the wave of privatizations under the Thatcher government in the 1980s. By 1989 the functions of the Water Authorities were pared down to the delivery of public water supply and sewage treatment and they were floated on the stock market. The remaining water management functions were brought under the jurisdiction of a newly formed National Rivers Authority, which in 1996 became the Environment Agency (EA) when it was merged with Her Majesty's Inspectorate of Pollution and the country's waste regulation authorities.

5.3.4 Implementing change in the 1990s

If the 1980s was a decade when the tide of opinion began to turn away from the productivist regime and in favour of the environmental movement and wider social and economic objectives in England's countryside, then it was in the 1990s that this change in emphasis resulted in more fundamental alterations to the rules governing agricultural production and environmental protection. Influenced by the Uruguay round of GATT (Lowe *et al.*, 2002), at the European level this took place in part through a series of major revisions to the CAP (EC, 1991a, 1991b; Kay, 1998), starting in 1992 and ending with Agenda 2000, which created a second pillar for the CAP budget designed specifically to fund rural development initiatives, including agri-environment schemes (Swinbank, 1999; Dobbs and Pretty, 2008). These schemes – of which the Environmentally Sensitive Areas and Countryside Stewardship were the most prominent - where to further strengthen the relationship between the concept of agricultural stewardship and the expectation of financial compensation in the minds of English farmers.

The power of international conventions to influence the policies and discourses within nations was also becoming apparent. Building upon themes first developed during the Conference on the Human Environment held in Stockholm during 1972, the UN Conference on Environment and Development in 1992 in Rio brought international attention to issues of environmental degradation, environmental justice, and the need to adopt policies for achieving "sustainable development" as proposed by the Bruntland Commission (WCED, 1987). One key theme to emerge concerned the requirement for governments to pursue more decentralised and inclusive forms of decision-making for managing the environment. In Agenda 21, a key output, these ambitions are related directly to water governance where it states that "integrated water resources management, including the integration of land- and water-related aspects, should be carried out at the level of the catchment basin or sub-basin…based on an approach of full public participation" (UNCED, 1992: para 18.9). Public participation in environmental decision-making was given further support by the Aarhus Convention (UNECE, 1998), which was adopted in 1998 and came into force in 2001.

Despite the growing international consensus to promote decentralised and participatory forms of environmental governance, it would be some time before these developments began to have any effect on national policy. In 1991 a raft of water-related EU and state legislation was introduced, including the EU Nitrates Directive, addressing the harmful effects of nitrogen runoff from agriculture, and the Water Resources Act 1991, where Section 57 gave the EA the power to reduce or halt water abstraction for spray irrigation during periods of "exceptional water shortage or other emergency". This singling out of farming during times of shortage was to rile many irrigators and their representatives in the NFU who felt the system was unfairly prejudiced against them (Hamett, 2013). Yet it was indicative of the wider attitudinal shift outlined above, where after years of unquestioning support productive agriculture was now being legislated against in favour of other interests and objectives in the countryside.

Although decision-making power concerning water management remained concentrated at the national and European levels, environmental and agricultural interests were nonetheless claiming their own spaces at the regional and local levels in the form of rivers trusts and farmer "water abstractor groups". In the southwest of England the first rivers trust gained charity status in 1995 with the aims of protecting and enhancing the rivers of the Westcountry. With time more groups formed, and today there are over 40 operating in different catchments across England under the overall coordination of a national body, The Rivers Trust. At the same time, in the southeast a different form of local organization oriented towards the defence of farmers' water abstraction rights was emerging. The first of these water abstractor groups formed in 1992 in response to a Section 57 order. Since then other groups have formed, often as a result of changes to environmental legislation, or the onset of drought and the resulting threat of a Section 57 (Leathes *et al.*, 2008). Although the groups have tended to have a strong lobby focus, they have also offered wider benefits including the promotion of water efficiency measures and best practice among their members, and improved communication between the EA and farmers in a catchment (Barker and Turner, 2011).

5.3.5 Lowland farming and water governance in the new millennium

By the turn of the new millennium, the power dynamic that had emerged to govern lowland farming and water in England after World War II had been significantly

challenged. The changing political context was reflected at the national level by the merging of MAFF with the Department of the Environment, Transport and the Regions to create the Department of the Environment, Food, and Rural Affairs (DEFRA). As Lowe *et al.* (2002: 16) have noted, this reform meant that "for the first time since the establishment of the Board of Agriculture in 1889 there is now no UK central government department with the word 'agriculture' in its title". Furthermore, under new EU legislation, in 2000 the first round of the England Rural Development Programme was introduced, providing amongst other things a range of agri-environment schemes which farmers could participate in. Yet at the same time, it is clear that despite these organisational and institutional changes modern commercial agriculture continues to be one of the dominant forces structuring the landscapes of lowland England. Here important macro factors - including changing global dietary patterns and the unpredictability of food supply resulting from climate change - have played their part by bringing to the fore new narratives and concepts like "sustainable intensification", whilst reviving old ones, such as "food security" (Marsden, 2010). These narratives are perhaps paving the way for a "new productivism" that threatens to eclipse previous "old environmental" concerns centring on landscapes and biodiversity (Lobley and Winter, 2009).

One distinctive feature of the current dynamic governing farming in England relates to the power of the retail sector, where by 2013 the top four supermarkets enjoyed 75% of the market share (Kantar, 2013). This market power, located predominantly at the national level but often also spanning the international, allows the supermarkets to exert considerable downward pressure on prices at the farm gate (Marsden, 2010). Coupled with stringent food quality standards, this has encouraged the development of large, efficient farms at the expense of small producers who find it particularly challenging to comply with supermarket conditions and still make a profit. The trend has been exacerbated by the increasingly specialised nature of farming, which often requires sophisticated and expensive machinery suited to expansive, homogenised farm units (Mazoyer and Roudart, 2006). Such developments have been reflected in changing farm sizes, where there has been a move towards fewer but larger production-oriented farms (Walford, 2003). For example, between 1995 and 2005 the average farm size in eastern England fell in all size categories apart from holdings of between 5 and 20

hectares which rose by nearly 10% (indicating the growth of niche or "hobby" farms) and farms in the largest category of 100 hectares or more which rose by 13.4% (DEFRA, 2014a).

Another symptom of the structure of the food supply chain in England is the strong competition which often exists between farmers attempting to capture a share of the market, potentially making cooperation harder to achieve. Those examples of where farmers do work together revolve largely around producer coops and machinery groups designed to increase bargaining power with processors and supermarkets, and to spread financial risk (Youngs, 2013). Furthermore, as Hall and Pretty (2008) have demonstrated with their study of farming in the eastern county of Norfolk, the close ties which developed between many farmers and the government in the post-war period have been significantly undermined in more recent times in response to political shifts and the changing demands placed on farmers. The authors conclude that there is now "a striking degree of physical and social distance, professional disrespect, divergent agendas and distrust between government delivery agencies and farmers, findings that are clearly revealed by many of the government's own investigations" (Hall and Pretty, 2008: 411).

It is with these features of the agricultural sector in mind that we will consider the developments that have occurred in water governance in England since the year 2000, and in so doing move towards an understanding of the current power dynamic affecting farmer cooperation and participation. The way in which power has come to be structured since 2000 is shown in Table 5.4.

Table 5.4 The key actors and most prominent elements of the Power Cube's three dimensions for the period 2000 until the present

Actors	Levels	Spaces	Forms of power	Comments on expressions of power
UN	International	Closed and invited	Visible and invisible	Continuing power "over" European and national policy and influencing power "within"

WTO	International	Closed	Visible	Power "over" key aspects of CAP reform
EU	European	Closed and Invited	Visible and hidden	Increasingly power "with" a range of interests to develop water and environmental policy. Introduction of WFD and continuing CAP reforms
DEFRA	National	Closed and invited	Visible	Subsumed MAFF, Power "over" government water policy and implementing EU legislation
Supermarkets, agribusinesses	National and international	Closed	Visible and hidden	Power of supermarkets and corporations "over" farmers, with agriculture integrated into global supply chains
EA	National and regional	Closed	Visible and hidden	Power "over" WFD process and water resources management.
Environmental NGOs	European, national and regional	Claimed	Visible and hidden	Increasing influence of groups such as RSPB, WWF, and Wildlife Trusts with the power "to" act
River basin liaison panels	Regional	Invited	Hidden	Group of invited "co-deliverers" operating at scale of 10 large River Basin Districts purportedly to share power "with" EA
Catchment-based groups	Local	Invited	Hidden	Offspring of WFD process, providing opportunities for private interests and water users to share power "with" government water managers
Rivers trusts	Regional and local	Claimed	Visible	Expansion of trusts to cover 40 catchments across the country, with power "to" act to protect

				water environment. Under WFD now sharing some power "with" other water managers as "co-deliverers"
Farmer water abstractor groups	Regional and local	Claimed	Visible	Several nascent groups, with some starting to express a willingness to develop relationships of power "with" other actors

In the following subsections we detail developments that run alongside one another, but which are separated out here for the sake of clarity.

Water Framework Directive

In 2000 the EU Water Framework Directive (WFD) was introduced, becoming part of UK law in 2003. This new piece of legislation tied together various existing single-issue EU Directives concerning water management under a broad and inclusive approach, whilst setting the ambitious aim of improving all of Europe's water bodies – to raise them up to "good status" – by the year 2015. By promoting the participation of non-state actors in planning and implementation, the Directive also made room for a fundamentally different system of water governance to that which had developed in England over the course of the twentieth century (Page and Kaika, 2003; Collins *et al.*, 2012). This was to provide a new impetus for non-governmental organisations like the rivers trusts who now positioned themselves as "one of the primary co-deliverers" in efforts to improve England's water environment (RT, n.d.). The change in emphasis brought about by the WFD also entailed a restructuring of power due to its requirement for the adoption of pluralistic procedures – "invited spaces" - operating at the scale of ten river basin districts. Each of these hydrological units requires the periodic development and implementation of River Basin Management Plans (RBMPs) by a "competent authority or authorities" in conjunction with the various interests represented in each river basin. In England sole responsibility for delivering the objectives of the WFD was given to the EA as the only competent authority.

However, as Watson and Treffny (2009) have shown, the process of developing the RBMPs prior to the first six-year cycle of the WFD, which runs from 2009-2015,

largely served to maintain the status quo, as decision-making power and overall control continued to reside with the EA and central government. Despite a rhetoric of decentralisation and collaboration, by functioning at the broad scale of the river basin where a Regional Liaison Panel made up of an invited list of "co-deliverers" was largely consulted on decisions which had already been decided by the EA, local issues and interests represented by the likes of environmental groups, municipalities, or farmers failed to enter into the process. In this way the government was able to exercise hidden power to control the water management agenda in spite of an apparent change in structure and process as mandated for by the WFD. At the time Watson and Treffny (2009: 458) concluded that:

> Overall…a modestly reformed bureaucracy continues to be a fundamental element of the institutional approach for water management in England. Whilst...more non-state actors are now engaged in aspects of water management, they have tended to be assigned to the job of 'rowing' within the reformed governance arrangements, while the task of 'steering' remains firmly in the hands of powerful government departments and technically oriented public agencies.

Responding to the threat of a legal challenge from WWF-UK and the Angling Trust concerning a perceived failure on the government's part to implement the WFD in accordance with the terms defined in the Directive, in March of 2011 DEFRA released a position statement in which they outlined their commitment to implement a Catchment Based Approach (DEFRA, 2011c). Following on from an initial pilot project, in 2013 the Catchment Based Approach was rolled out nationwide. Publications by DEFRA during and after the pilot phase would suggest the government has taken a substantial step towards facilitating a more pluralistic approach to managing England's water environment, with repeated references to the value of collaborative and partnership working on the ground, the importance of retaining the autonomy of local catchment groups, and the need for the government to relinquish absolute control over water management and instead embrace change and uncertainty (DEFRA, 2012b; DEFRA, 2013b; DEFRA, 2013d; DEFRA, 2013e).

Substantiating these claims will require time and critical analyses of the situation as it develops. Yet as the government's own pilot-phase evaluation indicated, the participation of farmers in the scheme has been difficult to secure. Work by the government suggests that while around a quarter of the participants in the catchment groups were EA staff, farmers only made up 7% of the numbers, and here it is likely that at least one reason for becoming involved in the first place was to ensure their interests were being represented (DEFRA, 2013d). Although Catchment Based Management is clearly in its early stages, statistics like this hint at a situation whereby farming remains a sector largely acted upon, even if by a more diverse and localised group of interests, rather than one that constructively participates in collaborative decision-making processes intended to bring about positive environmental change.

Water resources management

Water resources management has become an issue of increasing significance in England, although as we have seen most of the historical conflicts concerning farming have tended to revolve around land drainage. Under the overall direction of DEFRA, the power to implement and control water resources management lies almost entirely with the EA through a system of abstraction licencing. Although a resource assessment programme called the Catchment Abstraction Management Strategy (CAMS), developed in 1999, was later to orient water quantity management towards the objectives of the WFD through its focus on supporting the ecology of water bodies, this has not been accompanied by a shift to a more pluralistic stance on planning and implementation at the local level. Despite the fact that the CAMS process involved the participation of stakeholder representatives in its early stages, water resources management remains a highly technical affair conducted by experts situated in a hierarchical organisational structure (Warwick, 2012).

Yet the Government is currently pushing for an overhaul of the water licencing system, with two reform proposal being debated. Whilst they differ, both would better link water licences to the real-time flow in a waterbody and facilitate the development of water markets (DEFRA, 2013c). A potential upshot of reforming the system along these lines is that it could encourage water users to become more involved in a degree of cooperative management within catchments, a view suggested by the RSPB and

supported by the NFU (ENDS, 2013; NFU, 2013). Reforms of this sort also provide an opportunity for farmer water abstractor groups to involve themselves more in water resources management by acting as market intermediaries in a system of water trading, a function which similar groups already perform in other parts of the world (Kloezen, 1998).

The CAP

Alongside reforms to water legislation, the CAP has also undergone deep structural changes. Following on from Agenda 2000, in June 2003 new reforms were put in place to, a) further decouple subsidies from food production, b) make compulsory a system of cross-compliance whereby farm subsidies are dependent in part on farmers adhering to a set of Good Agricultural and Environmental Conditions (GAECs), including GAECs 18 and 19 which relate to measures for protecting the water environment, and c) to enforce the process of "modulation" whereby Member States are required to incrementally reallocated funds to the pot that finances rural development programmes, such as agri-environment schemes (Gay *et al.*, 2005). Since then the CAP has been simplified and streamlined in attempts to remove some restrictions on farmers and further align agriculture with price signals on the world market. These reforms have been driven in no small part by the international pressure placed on European decision makers by the Doha round of WTO negotiations (Nedergaard, 2006; Swinbank and Daugberg, 2006).

The extent to which the various environmental reforms that have been made to the CAP have changed farmers' underlying attitudes, values, and beliefs, as opposed to simply influencing their behaviour through financial incentives or coercion, is something that that remains open to much debate. Furthermore, despite the range of benefits that acting collectively is known to bring to environmental management (Ostrom, 1990; Wondolleck and Yaffee, 2000; Lubell *et al.*, 2002; Pretty, 2003), the CAP has largely failed to encourage cooperation among farmers for delivering environmental objectives. This is brought about at least in part because the areas targeted for cross-compliance measures or agri-environment schemes in England seek to promote individual farm or field-scale initiatives, as opposed to joint action (Franks *et al.*, 2011).

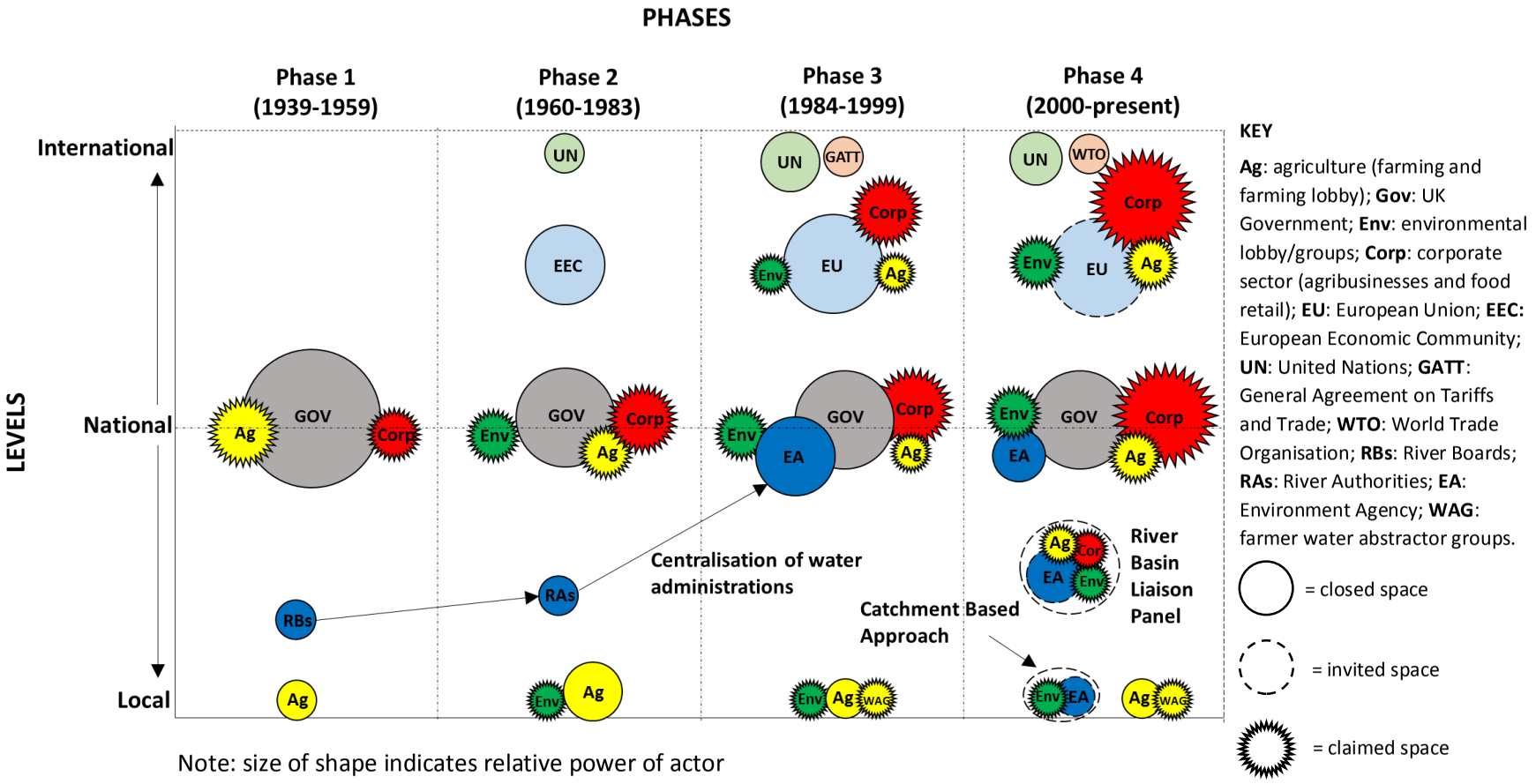
Yet modest developments are underway to support and encourage greater cooperation among farmers in instances where it appears benefit can be derived from doing so. In

particular, under two options in England's Environmental Stewardship Scheme (ESS), the largest initiative of the CAP's Rural Development Programme, farmers are provided with an incentive to collaborate under options UX1 (for upland farming) and HR8. HR8 is a voluntary option which can be adopted by farmers looking to undertake collective measures to achieve environmental benefits that extend beyond the more basic entry levels of the ESS (DEFRA, 2012d). Although HR8 was initially intended for situations relating to areas of common grazing land, Franks and Emery (2013: 851) have observed that in a handful of instances HR8 agreements have been adopted "on non-common lowlands where, in general, they have been used with great innovation and inventiveness." However, to date no HR8 agreement has been used to support the collective management of water-related issues, despite recognition by the government and academic community of the benefits a more joined-up, boundary-spanning approach could bring (Lubelle *et al.*, 2002; Wallace *et al.*, 2003; Fish *et al.*, 2010).

5.4 Discussion

Throughout the historical analysis of the previous section we reflected on the evolving interplay of three forms of power in different types of spaces at local, national, and international levels with respect to lowland farming and water governance in England. The intention has been to understand how the resulting power structure we identify has come to influence the ability of lowland farmers to cooperate and participate in water governance. By drawing on the language of the Power Cube, in this section we will highlight the major trends that have been observed, and what they imply for our objective. We consider these developments in light of four distinct phases which are encapsulated by Tables 5.1 through 5.4 above, and comprise the periods 1939-1959 (Phase 1), 1960-1983 (Phase 2), 1984-1999 (Phase 3), and 2000-the present day (Phase 4). The changes are represented in Figure 5.2.

Figure 5.2 Evolution of the power dynamic governing farming and water management from World War II until the present.



Note: size of shape indicates relative power of actor

5.4.1 Charting key trends in farming and water governance

During Phase 1 it is evident that the systems governing farming and water management were most distinctly characterised by relationships of power "over". This power was held by the government and farming lobby at the national level, who together oriented the sector along productivist lines. The country also witnessed the emergence of a nascent agribusiness industry and supermarket sector, with a power "over" farmers that would continue to grow with time. The visible and hidden forms of power exercised by the Government, the farming lobby, agri-business corporations, and other key actors in closed spaces resulted in a particular sense of power "within" farmers that came to shape their thoughts and behaviour. This sense of power "within" is best encapsulated by the concept of "productivism".

Phase 2 witnessed the consolidation of water management responsibilities into fewer, larger administrative units as the 32 Rivers Boards were replaced by 29 River Authorities, and then later, in Phase 3, by 10 Regional Water Authorities and finally the EA. Phase 2 was also the period when the UK joined the European Community (EC). At this point, some of the power "over" farming and water policy that had been held at the national level was subsumed by decision makers operating in closed spaces at the European level. One notable feature of the UK's succession to the EC was the adoption of the CAP, which helped incentivise farmers in England to convert to intensive forms of arable production. The productivist drive was also strengthened by the growth of the agribusiness industry, and the control that a powerful network of government and farming bodies held "over" land drainage in England, which was a key requirement for productive agriculture in many low-lying parts of the country. At the same time, the emerging environmental movement, with the power "to" act in favour of wildlife and landscape conservation, claimed spaces at the national, regional, and local levels. The result was a series of conflicts, as environmental and commercial farming interests were pitted against each other.

Throughout Phases 1 and 2 we can see that visible and hidden power exercised by decision makers in closed spaces at the national, and increasingly at the European level, tended to dominate the course of events in agriculture and water management. However, as Phase 3 progressed a number of these closed spaces started to open up under pressure

from a range of interests, including the power of institutions such as the UN and WTO operating at the international level, and by widespread public concern at the national level. In effect, the closed corporatist relationship between the government and the farming lobby in England, and the power of farming interests in Brussels, was being undermined on a number of fronts. The result tended to be the development of more inclusive decision-making arenas that allowed environmental groups to insert "green ideas" into policy making (Wilson, 2007). The influence of the environmental movement at this time is evident by the emergence of farmer water abstractor groups at the local level, who were forming in response to new environmental legislation that impinged on lowland farmers' ability to abstract water.

By the start of Phase 4, the range of actors with the power "to" influence farming and water governance in England was spread across levels spanning the local to the international. As this last phase has progressed, one observable characteristic has been the apparent opportunities that the farming community now has to cooperate and participate (to develop relationships of power "with") in the governance of their water environment. In large part, these developments have been a result of power exercised at the international and European level, in particular through the introduction of the WFD which in turn has facilitated the emergence of invited spaces at a more local level with the Catchment Based Approach. Another key characteristic of the current system is the power the corporate food supply chain exercises "over" farmers, having continued to expand and embed itself in global systems of production (Mazoyer and Roudart, 2006; Weis, 2007).

5.4.2 Developing relationships of power "with"?

Having outlined the major trends, here we shall consider what they imply for the ability of lowland farmers in England to cooperate and participate in water governance; or, to use the language of the Power Cube, to develop power "with" each other and with governmental and non-governmental water managers. Despite the structural progression towards more pluralistic forms of water governance, our power analysis highlights three distinct barriers that stand in the way of garnering the cooperation and participation of farmers.

The first barrier concerns the power "within" lowland farmers, which in turn affects their power "to" act. As we have seen, after the war the power "within" many of these farmers became strongly associated with productivism. Although this identity has in turn been challenged by "post-productivist" policies emanating in large part from the EU, other aspects of the system governing farmers have continued to nurture and develop it. These include the ongoing support from organisations like the NFU for an efficient, expansive, and productive farming sector, the ideological basis of agri-food politics in the UK, and the structure of the corporate agri-food chain in which farmers operate. As a result, today productivism remains an integral component of farming activity and culture in lowland England (Wilson, 2001; Walford, 2003; Burton and Wilson, 2006; Marsden and Sonnino, 2008), which has been given added impetus since the price rises on fuel and food during 2008 (Marsden, 2010).

The power "within" that the productivist identity bestows on many lowland farmers is likely to inhibit their power "to" participate in water governance because of its general failure to account for the environment and the often strong ideological strands of individualism and competition that accompanies this perspective (Marsden *et al.*, 1993). This would help to explain the general lack of involvement of farmers in voluntary initiatives like the Catchment Based Approach. This same power dynamic would appear to inhibit the ability of farmers to cooperate with each other in order to contribute to water governance objectives as part of a collaboration. The analysis did draw attention to the emergence of farmer water abstractor groups, and indicated that despite their focus on lobbying, over time they have also benefitted water management. Yet according to our findings, the degree to which these groups could "comanage" (Berkes *et al.*, 1991; Carlsson and Berkes, 2005) water resources appears limited at best. Instead, farmer cooperation is most obviously linked to the goal of increasing profit by removing obstacles to productive capacity.

The second barrier concerns the ability of government agencies, and in particular the EA, to move from exercising relationships of power "over" farmers to developing relationships of power "with" them. During the course of the last century, the technically-minded administrations in charge of managing water in England became increasingly consolidated and centralised. In this light, the organisational and cultural challenge posed by more recent developments in water governance that champion

decentralisation and a partnership approach, is a very real one. It is therefore not clear how easily the bureaucracies charged with managing the water environment are willing or able to relinquish power, despite adopting a discourse which would suggest otherwise. Perhaps the major difference now is that where once government water managers exercised visible power "over" farmers in order to regulate their behaviour, today the same outcome may require the use of hidden power instead. For example, in the case of the WFD we saw a tendency for the EA to exercise hidden power so as to maintain control of the management process in spite of a more pluralistic and dispersed governance structure. Furthermore, developing power-sharing arrangements between the government and farmers is also undermined by the distance and mistrust that has come to characterise their relationship (Hall and Pretty, 2008).

The third and final barrier concerns the possibility of farmers developing relationships of power "with" non-governmental stakeholders. In particular, this relates to groups such as the rivers trusts, wildlife trusts, and RSPB who under the WFD can now position themselves as "co-deliverers" in the management process. Yet the relationship between modern farming and the environmental movement is one founded on conflict and dispute. We have seen that both sides have tended to exercise their power "to" act in ways which are often diametrically opposed. Although the environmental movement has achieved a number of gains with respect to agri-environmental practices in lowland England, this has tended to be as a result of its ability to curtail (often peripheral) aspects of a production-oriented system. Now, with the possible rise of a "new productivism" (Lobley and Winter, 2009), the likelihood of lowland farmers and environmental groups finding the common ground needed to develop relationships of power "with" seems some way off.

5.5 Conclusion

The introduction to this paper brought attention to the importance of context for understanding both the relevance and feasibility of garnering the cooperation and participation of lowland farmers in English water governance. We have investigated this issue from a power perspective, by using an approach known as the Power Cube. Broadly speaking, this has revealed how since World War II the system governing farming and water management has witnessed a dispersal of power across different

levels of organisation from the local to the international, and in different types of spaces (Figure 5.2). One outcome is the establishment of "invited spaces" in which non-state actors, including farmers, have an opportunity to influence planning and decision-making.

Yet despite this opportunity, the power dynamic revealed by our analysis indicates that three distinct barriers stand in the way of involving lowland farmers in English water governance. These are, 1) the power "within" these farmers, which continues to be defined in large part by a productivist ideology that favours individualism, competition, and profit, often at the expense of the environment, 2) the ongoing power that government water managers exercise "over" farmers (and other non-state actors) instead of sharing power "with" them, and 3) the relationship between farming and environmental interests, which is characterised by a history of conflict and mistrust. As a caveat, we must also point to the broad political economy approach we have adopted. To this extent, despite the generality of these claims, the degree to which they apply in reality is of course far more nuanced and variable than our conclusions might suggest.

Nonetheless, the power dynamic highlighted in this paper appears to undermine any expectation that lowland farmers in England would willingly cooperate and participate in water governance. This realisation provides justification for the use of regulations and financial incentives designed to instigate behaviour change. The claim is strengthened by what our analysis has revealed about the evolving notion of "agricultural stewardship", which since World War II has become increasingly tied to an expectation of financial compensation. This points to the importance of the current system of agri-environment and water-related schemes and programmes. Encouraging farmer participation and developing a more cooperative approach to water governance will depend on the structure of such schemes. To this end, we suggest a greater integration of government programmes and a channelling of funding sources. Here CAP payments under ESS options such as HR8 (see above) could combine with initiatives like the Catchment Based Approach to provide an impetus for farmers and farmer groups to participate in collaborative catchment-wide objectives or joint action at the scale of the local waterbody.

Yet there is a limit to how far top-down incentives can induce substantive change in the identities underlying farmers' behaviour, at least in the short to medium term (Burton and Wilson, 2006). There are enduring discourses, ideologies, and power relations born out of the massive upheaval of war which remain entrenched in the collective psyche of the farming community, and are associated with notions of feeding the nation and what it means to practice "good farming". These have been strengthened and maintained by the structure and volatility of the global food system, and the economic pressures and incentives farmers face (Weis, 2007; Lobley and Winter, 2009b). Although many farmers have adjusted to the more recent "greening" of agricultural policy, timeworn divisions such as the distinction between productive agriculture and a picturesque and wildlife-friendly countryside (Pretty, 2002) will not be easily replaced.

Chapter 6: Discourse Analysis

Prologue

The paper in this chapter represents the last of the three analyses comprising the contextual phase of the research programme (Phase 2). Alongside the previous chapter, it sets out to address Objective 3 of the research agenda. It is also the most focused of the three analyses (see Figure 1.1) in that its subject matter specifically considers farmer irrigators who are members of water abstractor groups in lowland England. Yet, as will become clear, the findings of the research can be considered to be broader than this, in that they allude to ideological power structures that condition the thoughts and behaviour of medium and large-scale farmers in lowland England more generally. At the same time, this more focused analysis usefully accommodates the transition to the final phase of the research in Chapter 7 (Phase 3), where five water abstractor groups are considered. The paper below (Paper 4), has been accepted for publication in the journal Water Alternatives (Whaley and Weatherhead, 2015a).

Paper 4 - Competition, Conflict, and Compromise: Three Discourses used by Irrigators in England and their Implications for the Comanagement of Water Resources

Luke Whaley and Edward K. Weatherhead

Abstract

In this paper we use discourse analysis to explore the current dynamic that exists among farmer irrigators in England, and between irrigators and water managers in order to understand the potential for comanagement to develop. To do this we employ two concepts from the field of critical discursive psychology – "interpretive repertoires" and "subject positions" - and apply them to a qualitative analysis of 20 interviews with farmers who are members of irrigator groups and two focus group discussions with farmers thinking about forming an irrigator group. The findings reveal that the participants drew upon three interpretive repertoires when talking about the relationship between farming and water resources management, namely the "competition", "conflict", and "compromise" repertoires, with the latter being the least dominant. We situate the repertoires in their wider historical context to reveal the ideological forces at play, and conclude that the relative dominance of the competition and conflict repertoires serve as a barrier to comanagement. In particular, this is because they engender low levels of trust and reinforce a power dynamic that favours individualism and opposition. At the same time, the less dominant compromise repertoire challenges the power of the other two, providing some hope of achieving more participatory forms of water resources management in the future. To this end, we discuss how the restructuring of current agri-environment schemes and government water programmes may be used to promote the adoption and institutionalisation of the compromise repertoire in order to facilitate the emergence of comanagement.

Key words: Water resources, comanagement, farming, discourse, power, England

6.1 Introduction

The broader context within which water resources management in England operates is changing, and with it the task of managing water resources is becoming increasingly complex and uncertain. Not least among the causes is population growth, changing lifestyle preferences, and the effects of climate change, including more extremes (Weatherhead and Howden, 2009; Barker and Turner, 2011). Already there are signs of the sorts of weather-related challenges that may lie ahead: since 2010 the country has experienced a period of prolonged drought, unseasonal cold snaps, record levels of rainfall, and severe flooding. These changes are putting further pressure on water resources. At the same time, a shrinking national budget has resulted in cuts to the Environment Agency (EA), the organisation charged with managing water resources. This strongly suggests that the system governing water resources will need to become more flexible and adaptive in order to cope. Given limited government resources and new discourses that champion more local and collaborative approaches, it would appear there is now an onus on water users in England to play some part in managing change and sharing scarcity.

In contrast to many other countries, irrigated agriculture in England accounts for a small proportion – around 1.5% - of water use annually (Weatherhead, 2006). However, during the growing season water for irrigation can amount to 70% of the total used in some catchments (Holman and Trawick, 2011). This water is taken in the hotter summer months when it is scarcer and there is greater all-round demand, placing added strain on the environment. In more recent years there has also been increasing emphasis given to home-grown food production. This has been encouraged by volatile global food markets brought on by extreme weather events and changing dietary patterns in countries like the BRICS (Lobley and Winter, 2009). These trends and uncertainties suggest water for food is an issue in England that will only become more central in time.

In many low-lying parts of England there is strong competition for water both within and between different sectors. This has been heightened by a growing awareness of the needs of the water environment, which has resulted in more stringent regulations designed to protect it (Barker and Turner, 2011). Responding to the threat that greater demand and a changing regulatory context has posed to commercial agriculture, since

the 1990s a small number of farmer irrigator groups – known as "water abstractor groups" in England – have formed, with the aim of protecting their members' rights to abstract water. Despite a strong lobby focus, over time abstractor groups have contributed to water management by lowering transaction costs for the regulator, encouraging water efficiency measures, and voluntarily reducing water use during periods of scarcity (Leathes *et al.*, 2008). Yet the extent to which farmer groups like this may become more involved in water resource management is not well understood.

In this paper we investigate farmer cooperation and participation in water resources management in England, by focusing on water abstractor groups (including farmers considering forming an abstractor group). We adopt a discourse analysis approach, where the intention is to investigate the present-day power dynamic and levels of trust that exist among irrigators, and between irrigators and government water managers. Our approach is framed by the concept of "comanagement", defined as a process where "the government shares power with resource users, with each given specific rights and responsibilities relating to information and decision-making" (OECD, 2001). In the sections that follow, we firstly discuss the theory and method that underpins the research before outlining the findings of our analysis. We then situate these findings in their wider historical context in order to gain an understanding of the ideological forces at play, and discuss how this dynamic may constrain or enable the process of comanagement between farmer groups and government water managers. We end by outlining the main conclusions of the research.

6.2 Theory and method

In this section we locate the research topic within a body of knowledge known as commons theory, paying particular attention to the concept of comanagement and its relevance with respect to farmer abstractor groups and water resources management in England. We then go on to discuss the theoretical underpinnings of our discourse analysis approach, before concluding the section with an outline of the methodology employed.

6.2.1 Comanagement and water resources in England

From a theoretical perspective, the participation of farmer abstractor groups in water resources management is well framed by the field of commons theory. Scholars working in this tradition have documented a wide range of cases in which resource users have averted a "tragedy of the commons" scenario by devising self-governing arrangements in order to manage common pool resources such as water. A significant area of interest has been irrigator groups (Ostrom, 1990; Tang, 1992; Dietz *et al.*, 2002), where in countries like Nepal research has consistently demonstrated that "on average, farmer-managed irrigation systems outperform agency-managed irrigation systems on multiple dimensions" (Ostrom and Basurto, 2010: 320).

Several commons scholars extended the analysis beyond situations of local community governance, to a consideration of "comanagement" between a community or group of resource users and the government (Pinkerton, 1989a; Berkes *et al.*, 1991; Pomeroy and Berkes, 1997). It is proposed that this form of power-sharing arrangement is able to improve the legitimacy, equity, and effectiveness of natural resource management (Pinkerton, 1989b; Reed, 2008; Berkes, 2009), although such (often normative) claims have not been without their critics (Castro and Nielsen, 2001; Conley and Moote, 2003; Nadasdy, 2007). Seven broad management activities are considered commensurate with comanagement (Pinkerton, 1989b), including water allocation, resource protection and enhancement, and longer-term decision-making (Table 6.1). Furthermore, over time there is the potential for comanagement to evolve into "adaptive comanagement", through dynamic processes of networking, problem solving, and joint learning (Olsson *et al.*, 2004; Armitage *et al.*, 2009). Adaptive comanagement, which combines the linkages dimension of comanagement with the learning dimension of adaptive management, has been portrayed as a means of achieving the "dual outcomes of ecosystem protection and livelihood sustainability" under conditions of change and uncertainty (Armitage, 2007: 72). With respect to water resources management in England, the emergence of such a process would appear to be desirable, given the issues outlined in the introduction.

Table 6.1 Seven comanagement activities. Adapted from Pinkerton (1989b).

Comanagement activities						
1	2	3	4	5	6	7
Data gathering and analysis	Logistical decisions such as who can abstract water and when	Water allocation decisions	Protection of resource from environmental damage	Enforcement of regulations	Enhancement and long-term planning	Broad policy decision making

However, England is a country characterised by a strong regulatory regime and a history of increasing centralisation and bureaucratic water management (Parker and Sewell, 1988; Watson and Treffny, 2009). To this extent, comanagement represents a distinct challenge to water managers and users alike. Yet forthcoming institutional developments may provide a window of opportunity. In particular, the licencing system which was first introduced to regulate water abstraction in the 1960s is in the process of undergoing major reforms. The system has been modified previously; most recently with the Water Act 2003 which introduced several changes, including the time-limiting of new abstraction licences. Yet the current reform proposals are more radical. Although two alternative systems are being debated, key objectives of both are to link abstraction licences to the real-time availability of water and to allow abstractors to trade water more effectively (DEFRA, 2013c).

As a result, the reform proposals potentially confer a degree of decision-making power to water users, most obviously with respect to the task of water allocation. Several stakeholder representatives have suggested this could allow for a more participatory and cooperative approach. For example, the National Farmers Union propose that the new system should "encourage user groups, such as abstractor and water resources groups, to become more involved in collectively managing water" (NFU, 2013: 3). In a similar vein, the Royal Society for the Protection of Birds have stated that the reform has the potential to "encourage cooperative water management between shareholders in each catchment" (ENDS, 2013).

The comanagement literature provides theoretical support for the notion that farmer collaborations, such as water abstractor groups, could comanage water resources in a

system of licence trading. Rose (2002) discusses the possibility that in the future we may witness more examples where communities or groups of resource users become liberalised and evolve to operate by way of a tradable permits approach. Tietenberg (2002) echoes these sentiments, claiming that the properties of a common pool resource like water mean it is actually suited to arrangements of this sort. Yet as the literature also makes clear, the emergence of comanagement is dependent on communication, trust, and the prevailing power dynamic for partnership building (Berkes, 2009; Graham and Ernstson, 2012; Whaley and Weatherhead, 2014). In the following section we discuss the theory underpinning the discourse analysis approach used to investigate these issues.

6.2.2 Discourse analysis: interpretive repertoires and subject positions

Proponents of discourse analysis share the view that far from being a passive medium for conveying meaning and information, language is instead understood to be constitutive - to construct the meaning humans attribute to the social and physical world - as well as action-oriented, in the sense that language is capable of "doing things" (Taylor, 2001). The endeavour to study language through discourse analysis has resulted in a broad field encompassing a range of theoretical and methodological approaches (Wetherell *et al.*, 2001a, 2001b). In this paper we utilise two analytical concepts associated with critical discursive psychology, namely "interpretive repertoires" and "subject positions" (Wetherell, 1998; Davies and Harre, 1990; Edley, 2001; Harre *et al.*, 2009). A central premise of a critical discourse analysis approach is that people are both the products and producers of discourse (Billig, 1996). That is, discourses exert power over the speaking subject by delineating what can be said and thought, and at the same time the subject exhibits agency by drawing upon the discursive resources a culture makes available to them to negotiate and construct meaning, exercise power, and thus produce effects in the world: humans are both slaves to and masters of language (Barthes, 1982).

It is this dual understanding of how language operates which leads us in this paper to speak not about "discourses" but "interpretive repertoires". Although the two terms share much in common, in some analytical traditions a discourse is conceived of as having a broad, structuring effect which tends to marginalise the agency of the subject:

"the 'subject' is produced within discourse" (Hall, 2001: 79). In contrast, interpretive repertoires are conceptualised as smaller and less overbearing; they are ensembles of ideas, categories, and concepts "used for characterising and evaluating actions, events and other phenomena" where "often a repertoire will be organised around specific metaphors and figures of speech" (Potter and Wetherell, 1987: 149). Edley (2001) discusses how interpretive repertoires largely contribute to a community's common-sense understanding of the world. They can be thought of as being like books on a library shelf which are always ready to be borrowed during the course of social interaction. This metaphor also stresses the point that "when people talk (or think) about things, they invariably do so in terms already provided for them by history" (Edley 2001: 198).

The second concept we draw upon in this paper, subject positioning, was developed by social psychologists in an attempt to move beyond the restrictive notion of "roles" and to instead consider "positions", and how they help to "focus attention on dynamic aspects of encounters in contrast to the way in which the use of 'role' serves to highlight static, formal, and ritualistic aspects" (Davies and Harre, 1990: 43). From this perspective, people are involved in an ongoing argumentative exchange (Billig, 1996), a process of negotiation in which they attempt to position both themselves and others during the course of social interaction. The different positions that can be attributed to a person or thing in the world are themselves located in the various interpretive repertoires the speaking subject has at their disposal. Therefore, in the way we use them here, interpretive repertoires can be thought of as embodying a particular story about the phenomena, activity, or event they construct - a version of events - and it is within these different storylines that agents are positioned. However, interpretive repertoires and their related subject positions do not just "float in space". Instead, as noted above, these repertoires and subject positions are embedded in history. As they become dominant, they are not only adopted by many people as a way of conceptualising the world but they also "solidify" into particular institutional and organisational practices (Hajer, 1995). In doing this, they come to represent distinct social, political, and economic privileges for different people.

Thus in a number of ways discourse is intimately bound up with power. By considering interpretive repertoires and subject positions we can see that the issue of trust also

becomes relevant, where some repertoires and their positions serve to undermine trust between different actors, whilst others reinforce it. With this in mind, we can state here that the central aim of this study is to understand what the interpretive repertoires and subject positions that farmers utilise in the course of speaking about farming and water resources management reveals about "the broader ideological context in which talk is done" (Edley 2001: 217). In so doing, we reflect upon what this implies for developing relationships of trust in a way that encourages farmers to comanage water resources. To this extent, although we recognise the ways in which discourse is employed by the speaking subject within the local context of the interpersonal exchange, the focus is instead on providing a general account of the various interpretive repertoires and their related subject positions as evidenced in the talk of the farmers in this study. Nonetheless, we will return to one implication of this dual conception of discourse in the discussion.

6.2.3 Research approach

The data for this study consists of 20 interviews and two focus groups. All interviewees were members of water abstractor groups, whilst the focus groups were made up of farmers from two separate catchments who were considering forming an abstractor group. All abstractor groups were located in the low-lying east of the country, where irrigated agriculture is most prevalent and competition for water tends to be greatest (Barker and Turner, 2011). The locations of the two focus groups were a catchment in the east of England and another in the west, near the border with Wales. As so few water abstractor groups exist in England – perhaps as few as six (EA, n.d. a) – we adopted a non-probability "snowball" sampling strategy (Bryman, 2012), which involved interviewing the perceived "gatekeeper" of each group (typically the chairman), through whom contact was made with other group members. In almost all cases the interview and focus group participants were medium to large-scale industrial farm owners, tenants, or managers.

Interviews lasted on average one hour, and focus groups two hours. The sessions were recorded, transcribed, and analysed using the qualitative data analysis programme NVIVO. We adopted an abductive research strategy (Blaikie, 2010), whereby the analysis started with the language of the participants, from which were derived the

categories and concepts that comprise each interpretive repertoire. Interpretive repertoires and their subject positions are delineated according to a modified schema developed by Dryzek (2005), where for each repertoire we sought to identify: 1) the basic entities recognised or constructed, 2) assumptions about natural relationships, 3) agents and their subject positions, and 4) key metaphors and other rhetorical devices (Table 6.2). With respect to point 3, the "agents" we focus on in this study are the key government water managers and regulators (in England these are the EA and Natural England), farmer irrigators, as well as water and the water environment itself.

Table 6.2 Checklist of elements for the analysis of interpretive repertoires. Adapted from Dryzek (2005).

Elements of interpretive repertoires	Explanation of each element
Basic entities recognised or constructed	The ontology of the repertoire – the basic features of the world as it relates to farming and water resources management
Assumptions about natural relationships	The defining features that characterise relationships between people, things, and processes to do with farming and water resources management. In this study we give special attention to cooperation*
Agents and their subject positions	The "actors" involved in water management, including water and the water environment, and how they are positioned within the storylines associated with the different interpretive repertoires
Key metaphors and other rhetorical devices	The central rhetorical devices an interpretive repertoire relies upon to convey its understanding of the world, to convince or persuade others of its legitimacy, and to make it appear self-evident

* By cooperation, we mean situations where farmers are working together towards some end. In a comanagement situation, this end would be a contribution to one or more of the seven broad comanagement activities in Table 6.1.

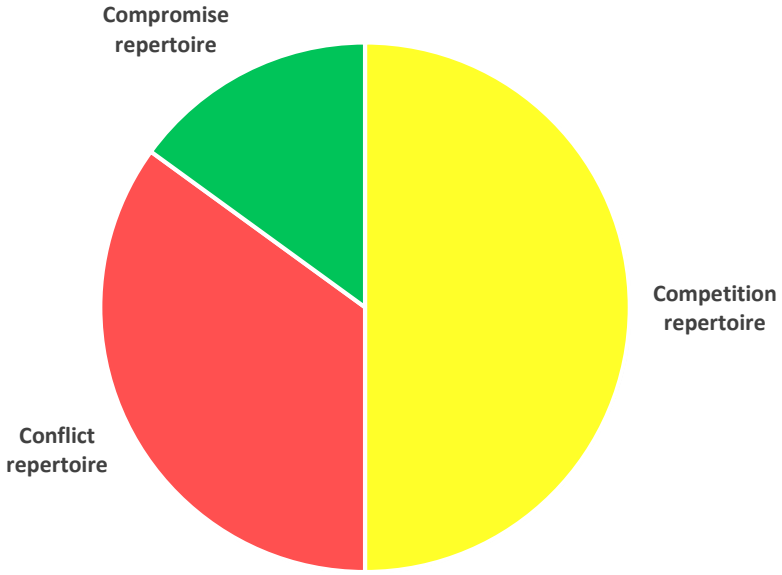
Our analysis followed the approach outlined by Edley (2001). It entailed reading and re-reading the transcripts to thoroughly familiarise ourselves with the data, after which we moved on to the coding stage. Initially coding was guided by the four broad categories

detailed in Table 6.2. We then read and re-read the excerpts in these broad categories, and slowly began to develop secondary categories into which all statements of a similar type could be placed. For example, all subject position statements that portray the government as a "complicated bureaucracy". From these secondary categories emerged what appeared to be relatively distinct interpretive repertoires, although with further readings these too were modified until we arrived at the findings in Section 6.3. This approach necessarily entails a degree of reflexivity (Silverman, 2004), where researcher and research are involved in a reciprocal relationship. The findings and conclusion are therefore situated and partial; they are the result of a process guided and influenced by our own life experiences, training, interests, and understandings.

6.3 Results

Our analysis of the interview and focus group transcripts revealed that the farmers in this study employed three interpretive repertoires when talking about their relationship with water managers and the water environment. In this section we detail the three repertoires, using excerpts from the transcripts by way of illustration, before proceeding to situate them in their wider social and historical context. Figure 1 overleaf portrays the relevant dominance of each repertoire. The proportions in this figure are not exact measurements, but rather are estimates intended for the purpose of illustration. The qualitative nature of the study and the theoretical position we take with respect to discourse and discourse analysis does not lend itself to a formal quantitative assessment of the data.

Figure 6.1 The relative dominance of the three interpretive repertoires



6.3.1 The competition repertoire

The interpretive repertoire that most dominated the interviews and focus groups is what we have called the "competition repertoire". This repertoire takes a utilitarian approach to the water environment, where water management should be about supplying and removing water in keeping with the needs of commercial farming, although this process tends to get interfered with when other interests get in the way (Table 6.3).

Table 6.3 The elements of the competition repertoire.

Basic entities recognised or constructed	Assumptions about natural relationships	Agents and their subject positions	Key metaphors and other rhetorical devices
Competitors Homo economicus The market Individual farm businesses	Competition Cooperation as business opportunity	Water as commodity Water environment as competition, business asset	Food security Mechanistic Tidy environment /countryside

Time and money Commodities, assets, and products Rules and regulations	Nature as secondary/ subordinate Relationships dictated by rules and regulations	Government regulators as authority figures, complicated bureaucracies, meddlers Farmers as individualistic, self-interested, cost-benefit businessmen

Basic entities recognised or constructed

The competition repertoire is strongly business oriented, adopting an atomistic view of a world populated by economic actors – "*Homo economicus"* - and individual farm businesses geared towards profit and material gain through the market-driven production and consumption of commodities. Strictly applied rules and regulations concerning water management are a fundamental aspect of this repertoire, as are time and money which are recognised as inherent constraints on behaviour. The water environment itself receives little recognition as an entity in its own right.

Assumptions about natural relationships

According to the competition repertoire the natural world is subordinate to the needs of man, where the water environment, when it is recognised, is seen as something to be competed with: "In this part of the world our competition is the environment". Competition also characterises the relationship between groups and individuals, where different farm businesses compete to secure a share of the market:

> But how the hell you get ten people on a river all to talk to each other […] you've got to remember that when you get down to individual catchments you're never going to get a farmer to give up any of his [water] rights if his neighbour has got all his rights because actually they're in competition to grow their crop for the market place.
>
> …it's that looking over the hedge and seeing what they're doing next door situation, which I think we'll struggle to get away from.

Cooperation, on the other hand, is viewed only as a business opportunity, a way of becoming more competitive in the market, or even as a business imperative - "its business driven" and "there's got to be a benefit" – but beyond this it is of little use or value.

Agents and their subject positions

Within the competition repertoire, water is positioned as a "commodity" and a business input that can be "tapped" or "mined". Water therefore becomes a "factor of production" that needs to be "secured", where a farmer may store water "on the basis that they have a commodity to sell", and where even rainwater "is a very variable commodity". Alongside being a competitor, the broader water environment is also positioned according to its economic function in a system of government subsidies and agri-environment schemes, where "like any other business asset" the consideration concerning an area of wetland is "how do I make the most amount of money?" Beyond this the water environment has no intrinsic value and receives little recognition: "something that is actually worthless is artificially being made worth quite a lot of money".

Given the strong emphasis the competition repertoire attributes to rules and regulations, it is not surprising that the government bodies charged with enforcing the rules concerning the water environment – the EA and Natural England - are typically positioned as "authority figures". Perhaps most prominently, the EA is positioned as a policeman – "deep down we need a policeman, the EA, to run this" - but other similar positions of authority are also present, such as the schoolmaster who can "take your name down in the book" or give you a "slapped wrist".

A second subject position sees these regulatory bodies as "complicated bureaucracies" which tend to be "very fragmented", making dealing with them "a fraught and really time consuming process" because there is "no joined up thinking between different departments". A degree of scepticism may accompany this subject position as it is even possible that the EA actively seeks to promote high levels of bureaucracy because "the more complicated they make it the more stable their job is". Furthermore, the subject position is associated with unnecessarily high costs when it comes to managing the environment, which tends to get "gold plated" so that "costs escalate enormously".

A final subject position for government water managers sees them as "meddlers", interfering in the affairs of agriculture and obstructing it from doing what it is supposed to be doing: "farmers are getting pretty fed up with being told what to do [...] they just want to get on and do what they do, which is grow crops". You therefore have Natural England "sticking their oar in", and the perspective that "having dealt with people like the EA, I would just dig my heels in and say I'm not going to agree to anything, ah because in the past you agree to something, in return for it they've taken that away as well".

In the competition repertoire farmers themselves are positioned as individualistic businessmen where decision-making relies upon cost-benefit analyses, where action is predicated on whether "the economics make sense", where "it's all risk-reward", and where "professionalism" and a "professional approach" are highly valued. In keeping with the business-oriented nature of this repertoire, the farming sector as a whole is positioned as an "industry".

Key metaphors and other rhetorical devices

Several key metaphors and other rhetorical devices are associated with the competition repertoire. The first is that of "food security", which features prominently and underlines the imperative to at least maintain, but ideally increase levels of food production in England. As a result farming should not be held back by environmental regulation or denied access to the water required to achieve this. The below quote effectively outlines the way in which the concept of food security has been adopted within the competition repertoire:

> I think the UK as an economy has got some big decisions to make, um you know, how much do we want from our home production? How much is home production giving us security? You know we've had a whole generation whereby there's been a surplus of food. You know we could find the next generation, or further down the line supply and demand is much tighter, and there's some difficult questions to actually balance. So I think coming back to this, we have to do everything possible to make sure there's enough water that the agricultural industry needs.

The competition repertoire also associates strongly with a mechanistic metaphor that conceives of the social and natural world in terms of component parts that can be manipulated and where solutions to problems require engineered or technical fixes. According to this metaphor water becomes an input into the mechanical workings of the agricultural industry, where the job of rivers is to act as a "conduit" for transporting, supplying, or removing excess water: "Getting rid of water; land drainage and abstraction are what you want a river for". The metaphor extends to farmers themselves, who are seen as a "vehicle" for achieving food security, and to cooperation which becomes a "mechanism" for acquiring additional water or for trading it.

A final metaphor is that of the "tidy environment" or countryside, where unkempt natural growth is seen as waste or "trash", as a sign of poor management on the part of the environmental regulators and non-governmental groups – "but their ponds aren't clean, so there's no, there's no…you know they're overgrown and whatever" - and as obstructing agricultural production, for example where natural growth such as reeds becomes problematic because "they are choking the supplies or the [water] courses".

6.3.2 The conflict repertoire

The second of the three interpretive repertoires, the "conflict repertoire", is founded upon a logic of opposition and stresses the place of conflict and difference in water resources management (Table 6.4).

Table 6.4 The elements of the conflict repertoire.

Basic entities recognised and constructed	Assumptions about natural relationships	Agents and their subject positions	Key metaphors and other rhetorical devices
Opponents Designated environment Pressure/lobby groups Rules and regulations	Conflict Winners and losers Cooperation to lobby Agriculture as secondary in relation to PWS	Water environment as threat or challenge Government as having a "different agenda" Government regulators as the enemy, incompetent	Warfare or battle Survival Court case Imbalance Brick wall /environmental wall

	and water environment	Farmers as wrongfully blamed, insular, uncommunicative

Basic entities recognised or constructed

Unsurprisingly, "opponents" are recognised as basic entities in the conflict repertoire. Other basic entities recognised are "pressure" or "lobby groups". Thus, although farmers might view each other as opponents, when individuals do join forces the resulting group or organisation is itself seen as an individual designed to speak with "one voice". These groups are often pitted against one other, with particular emphasis given to the conflict between environmental and farming lobbies. Like the competition repertoire, the conflict repertoire also strongly recognises "rules and regulations", but unlike the competition repertoire which sees rules and regulations as a hindrance, but nonetheless something to work with in a quest to maximise profit, the conflict repertoire sees them as a threat and a direct challenge, as something to be overcome. Finally, in the conflict repertoire the water environment is recognised, but only as particular areas of the countryside that have received an environmental designation: "…and suddenly there was this thing that was quite important and what used to be a muddy, wet reed bed has now got environmental protection".

Assumptions about natural relationships

In the conflict repertoire relationships between both people and groups are predicated upon a logic of opposition, where change is seen as the result of the coming together of different or opposing forces, resulting in winners and losers: "Now is the time and the opportunity to influence the process, and if we sit back at this point and say well let's see what they produce, then I think we could be the losers again". In this context cooperation is undertaken "because of the threat of losing what we've got" and as such lobbying is considered the basic relational feature between farmers and government bodies*:* "…we're in there to lobby, we're not in there to necessarily do what the EA wants us to do". Finally, agriculture is considered to be secondary, to "play second fiddle" to the needs of both the environment and public water supply because of the way in which the rules and regulations appear to unfairly favour these other interests.

Agents and their positions

In the conflict repertoire the water environment is positioned as a challenge or "threat" that "overruns the interests of agriculture", throwing up "problems to sort out". As is also typical of the oppositional nature of this repertoire, government regulators are positioned as having a "different agenda" to that of farming. According to the conflict repertoire, government regulators and managers assume the position of "the enemy" – "...you know the Agency is the enemy, and you do not contact the Agency, not even on a last resort, you just do not contact the Agency".

Moreover, blame is a regular feature of the repertoire, where farmers position themselves as being wrongfully "blamed for everything" when it comes to damage inflicted upon the water environment. Instead, the EA and Natural England are often themselves positioned as being at fault because of their incompetence and general inability to manage water resources and the natural environment in the "correct" way: "The problems with the SSSI [site of special scientific interest] are not our problems. We've changed what we're doing, if you've got a problem in there then look at your management". In part the blame attributed to these bodies arises because they may be focusing on the "wrong" issues, such as an environmental problem which lies outside of a designated area, whilst at the same time failing to properly manage the areas that have been designated: "…so they get quite excited by minor things, whereas to me they should be managing their sites better". In the conflict repertoire, alongside being wrongfully blamed, farmers are also positioned as insular – "If you don't want additional water, you've got enough of what you want, you're quite happy being in your little bubble and staying protected" – and uncommunicative: "I mean farmers don't talk to each other, that's one of the problems".

Key metaphors and other rhetorical devices

The dominant metaphor around which the conflict repertoire revolves is that of "warfare" or "battle" - with the positions of water managers outlined in the previous section already attesting to this - and the notion that farmers are "fighting for survival" in the current political and economic climate. Indeed, the interviews were peppered with allusions to the warfare metaphor. For example, communicating with the EA was considered to be putting your "head above the parapet"; helping out a non-group

member was “going above and beyond the call of duty”; offering an early voluntary agreement to the EA to reduce agricultural water use in a catchment was described as a “pre-emptive strike”; intervening in disputes between other farmers was “stepping into the firing line”; farmers operating in water-stressed catchments were “on the front line”; prospective abstractor group members needed to be “captured” and then “marshalled”; farmer cooperation was seen to be the result of having your “backs against the wall”; for one farmer, reporting back to other farmers about the outcome of a meeting with the EA involved making “a phone call back to base [to tell] the troops about it”; and it was suggested that “we shall go to war over water, never mind oil”.

Another metaphor associated with the conflict repertoire is that of the court case, which serves to illustrate dealings with regulators within the current system of governance. According to this metaphor communication, primarily between farmers and government regulators, is seen as a means of dispute resolution between two opposing parties. The metaphor also serves to reinforce the discourse’s notion of blame, and, in the case of farmers, wrongful blame, which must be defended against by “getting the evidence together” and putting forward your case: “It’s almost like law case history isn’t it, you know you’re good when you’re young but when you’ve been in case history for fifteen years you’re even better because you’ve got all these cases you can refer to, and it’s that sort of build-up of knowledge isn’t it, of experience”.

A key rhetorical device associated with the conflict repertoire is that of “imbalance” and its two associated metaphors, a set of “weighing scales” and a “swinging pendulum”. According to these metaphors, the current system of governance is unbalanced, having swung “too far” away from the needs of agriculture and in favour of the environment. To this extent, “some of its gone so far the wrong way you’re never ever going to get it back again”. The result is a system which has become “irrationally” biased in its protection of water resources and the water environment. Farmers must therefore lobby and “shout as one voice” so as to secure their “fair share of water”, and to “defend” their rights in the face of another of the repertoire’s metaphors, the “environmental wall” or “brick wall”, where the job of lobbying is to “keep chipping away”.

6.3.3 The compromise repertoire

The final interpretive repertoire, the "compromise repertoire", was the least prominent of the three identified in the interviews and focus groups. Whilst continuing to stress the interests of agriculture, this repertoire is more accepting than the other two, conceptualising water management as a process of balancing the various needs of the different stakeholders who use water; a process which includes accounting for the needs of the water environment itself (Table 6.5).

Table 6.5 The elements of the compromise repertoire.

Basic entities recognised or constructed	Assumptions about natural relationships	Agents and their subject positions	Key metaphors and other rhetorical devices
Finite resources Wider environment Stakeholders A changing world Complexity and uncertainty	Negotiation, dialogue, and compromise Different needs all with a valid claim Cooperation as compromise Flexibly applied rules	Water as precious resource Water environment as something to be enjoyed Environment Agency as flexible regulator Farmers as more outward looking	The big picture Holistic approach Jigsaw puzzle Negotiating table Water resources as bank account Wise use of water Balancing act

Basic entities recognised or constructed

The compromise repertoire gives explicit emphasis to the limits of nature and its "finite resources": "…there's only one lot of water, it's as simple as that". Furthermore, unlike the other two repertoires which only recognise the water environment in terms of its relationship to productive agriculture, the compromise repertoire also recognises the "wider environment" and makes reference to the existence of ecosystems. To some degree, the repertoire also recognises that change, uncertainty, and complexity are fundamental aspects of the world. Finally, the compromise repertoire constructs those with an interest in the use or management of the water environment as "stakeholders".

Assumptions about natural relationships

The compromise repertoire accommodates the needs of a range of actors, including the water environment itself, where all are seen as having a valid claim to use water. As with the conflict repertoire there is an emphasis on the issue of balance, but although tensions exist the relationships between farmers and the other actors involved in water management are considered to proceed by way of negotiation and compromise, and not direct opposition or blame: "So it is that balance between the two, and there will be conflict. You know you've got to resolve the conflict by balance. No one's all right". It is therefore a case of being able to "acknowledge each other's problems and requirements". In this light, cooperation itself is seen as a means of facilitating dialogue and allowing for compromises to be reached both within the farming community and between farmers and water managers under a more flexibly applied system of rules and regulations:

> I think we've never had a better framework to work under, so now I think it's up to the various stakeholder groups to make sure this is worked through in a workman-like way, in a way that recognises the needs of the different kinds of water users, including the ecology.

Actors and their positions

In the compromise repertoire the water environment is positioned as something whose significance extends beyond its relationship to agricultural production, as something also to be enjoyed, with the result that there is value in trying to conserve and maintain it. Due to its finite nature water itself is positioned as a "precious resource" which must be used judiciously: "the wise use of a precious resource". In contrast to the other repertoires, the EA was positioned as a "flexible regulator". Part of the EA's flexibility stems from the fact they are more "genuinely independent than they were" whereas before they were "really under the hammer of Natural England". In this repertoire the EA have a "much more balanced approach" where their officers on the ground seem "a bit less red-taped" and where "there's been a huge sea change of sort of cooperation" and "a real sense of having to work together". Finally, according to the compromise repertoire farmers themselves are positioned as "more outward looking", where "cooperation is in their vocabulary more than it ever used to be".

Key metaphors and other rhetorical devices

A few key metaphors are central to the compromise repertoire. The first is "the big picture" which is closely related to having a "holistic approach" to water management: "the bigger holistic picture". According to these devices there is a breaking down of some of the perceived barriers between farming, the water environment, and its management: "Some people say we must divorce environmental issues from irrigation, irrigation sits on its own; no it doesn't, irrigation is using a resource which is a very key part of the ecology forever, you know of our wider environment. And water is such an important part of the wider environment, and so important to other sectors of the community, that I think we have to engage holistically, as they say these days".

A recognition of the bigger picture also draws attention to how this picture is comprised, and here the use of the "jigsaw puzzle" metaphor becomes relevant, where cooperation is envisaged as helping to piece the puzzle together: "…what [water] they don't use and what they'd like to use is a huge jigsaw, which none of us have any ideas of the pieces really, and the group is there largely, to begin with anyway, to fit some of those jigsaw pieces together. So we have a picture of what...I don't think even the EA have that knowledge. They have certain knowledge, but they certainly don't have the whole picture".

A metaphor associated with the compromise repertoire that serves to illustrate the finite nature of water as conceived of in the discourse is "water resources as a bank account". According to this metaphor, water is "a bit like money", where surface water flowing in rivers is analogous to a "current account" in which "the water's flowing past and you either use it or you don't", and where groundwater is akin to a "savings account" where "once the summer starts, as a general rule no more water is going to be added to that, that's it, that's your stock, and we're all drawing off it. So if we all draw off it at a lower rate then it will last longer for everybody".

6.4 Discussion

Having identified three interpretive repertoires – the competition, conflict, and compromise repertoires – here we discuss what they imply about the potential for water abstractor groups (and other farmer collaborations) in England to comanage water

resources. During the analysis, the consideration of interpretive repertoires and their respective subject positions revealed to us how on the one hand "meaning making" and the exercise of power is bound up in the local dynamic of the interpersonal exchange, as positions were negotiated and arguments were rhetorically constructed by the participants. Yet, as discussed in Section 6.2, our intention in this study is to focus not on the local dynamics of language in use but to gain an understanding of what the interpretive repertoires and subject positions we identify tell us about levels of trust and the broader ideological context in which irrigators operate. As we noted, each repertoire can be thought of as an historical resource that the farmers drew upon during the course of the interview or focus group (Edley, 2001). Thus, in concerning ourselves with what the three repertoires imply about a broader ideological power structure, it is useful to consider the historical processes they most directly relate to.

Briefly then, the competition repertoire is perhaps best situated in light of the system of rationalised and individualistic large-scale farming the emerged after World War II in England, during which time there was a huge drive to increase food production through an efficient, competitive, and technologically sophisticated farming sector (Newby, 1979; Brassley *et al.*, 2012). The "productivist" ideology underpinning these developments has continued to hold sway over many farmers as food production has become increasingly integrated into a vertical, corporation-dominated supply chain; mirroring broader developments on the world stage (Mazoyer and Roudart, 2006; Lobley and Winter, 2009). Alternatively, the roots of the conflict repertoire may lie in the wide-ranging dispute between farmers and environmentalists during the 1960s and 70s - many concerning the reclamation of wetlands – engendering deep feelings of resentment and mistrust on both sides of the divide (Cox and Lowe, 1983; Lowe *et al.*, 1986). Then from 1989 the formation of a new body, the National Rivers Authority, which in 1996 became the Environment Agency, quickly established itself as a figure of contempt for many irrigators as new water resources legislation was implemented uncompromisingly and without regard for the affect it would have on farming (Hamett, 2013). The conflict repertoire has most likely been reinforced by the increasing distance and mistrust that has come to characterise the relationship between farmers (and the wider public) and the government (Dobbs and Pretty, 2008).

Finally, the compromise repertoire reflects developments which stem from international discourses championed in particular by the UN through such agreements as the Aarhus convention and Agenda 21, which promotes integrated water resources management "based on an approach of full public participation" (UNCED, 1992: para 18.9). These outputs have been translated into key EU water legislation, most notably the Water Framework Directive (WFD) which was introduced in England in 2000. The WFD has in turn prompted the introduction of the Catchment Based Approach in England during 2013, espousing the value of collaboration and partnership working (DEFRA, 2013b).

It was clear from our analysis that especially the competition repertoire, but also the conflict repertoire, were dominant in the talk of the farmers we interviewed (Figure 1). This dominance is reflected in the way the repertoires have solidified into the institutional and organisational practices of these farmers (see Section 2.2), witnessed by their involvement in large-scale commercial farming (the competition repertoire) and their participation in water abstractor groups with a strong lobby focus (the conflict repertoire). One important consequence of this dominance concerns the subject positions both repertoires provide for government water managers, which suggests they are viewed by these farmers with a distinct lack of trust. Given the importance attributed to trust in developing comanagement arrangements (Olsson *et al.*, 2004; Plummer, 2006), this represents a significant challenge to partnership building. Furthermore, the positions that the competition and conflict repertoires hold for water and the water environment, as well as many of the basic entities they recognise and their assumptions about natural relationships (Tables 3 and 4), points to inherent difficulties when considered in light of a comanagement approach.

In the case of the competition repertoire, the focus is on rational self-interest and farm profit, with an instrumental, rule-governed conception of natural relationships based primarily on the notion of competition, and a portfolio of subject positions that depicts government water regulators and managers as "authority figures", "fragmented bureaucracies", and "meddlers"; farmers as "individualistic"; water as a "commodity" or input for the mechanical workings of agriculture; and the water environment either as "competition" or as an economic resource or "business asset" in a system of government subsidies and agri-environment schemes. The competition repertoire therefore points to government rules, regulations, and incentives as the only real way of

encouraging farmer participation in the management of water, where the pursuit of wider environmental objectives must be married with short-term gain. More challenging still, the conflict repertoire - characterised as it is by a strong oppositional logic and the positioning of government regulators as "the enemy" and the water environment as a "threat" - instead serves to obstruct any opportunity for constructive, pluralistic dialogue and a more cooperative, local approach to water management.

It is only in relation to the less dominant and more recent compromise repertoire that real opportunity for cooperation between farmers and water managers appears to exist. Although the compromise repertoire continues to stress the interests of agriculture, it also makes room for an approach to water management which appreciates the needs of others and perceives negotiation, dialogue, and compromise as a necessary part of the process of piecing together the "jigsaw puzzle". Within the compromise repertoire the EA is positioned as a "flexible regulator", where at times rules may be applied as circumstances dictate. Farmers themselves are positioned as "more outward looking". The repertoire also recognises the "wider environment", and positions water as a "precious resource" which must be used wisely. However, despite our focus on the broader ideological aspects of the three interpretive repertoires, here we must also consider how repertoires are employed during the local interplay of social interaction. To this extent, the compromise repertoire must also be seen as a discursive resource which the participants drew upon because of its rhetorical power – a means of challenging others or defending one's position in the course of the conversation - and not because it is a true reflection of the "intentions" of the person uttering it.

Nonetheless, the presence of the compromise repertoire in the talk of the farmers in this study suggests that the power of the other more established repertoires has been and is being challenged as the "discursive space" (Wetherell, 2001) surrounding water management in England is expanded to allow for more pluralistic and cooperative approaches to affecting change. A central challenge to developing comanagement arrangements between farmer groups and water managers will be to move beyond the subject positions associated with the competition and conflict repertoires that currently undermine trust and act as obstacles to partnership building. To this extent Berkes (2007: 26) suggests that "the key may be the ability of comanagement arrangements to facilitate a process of communication to overcome these barriers". This highlights the

need to bring farmers and water managers together in fora which allow opinions to be voiced and differences to be discussed. As our findings suggest, both the competition and conflict repertoires demand that short to medium term measures geared towards garnering the participation of farmers and farmer groups in such spaces will require financial incentives. This points to the funding sources underpinning the various agri-environment schemes and water programmes in England as a means of achieving such an outcome.

At present the structure of agri-environment payments are geared largely to individual action at the scale of the farm or field (Emery and Franks, 2012). However, of the agri-environment schemes currently available to farmers, one Environmental Stewardship Scheme (ESS) option known as HR8 ("Supplement to Group Action") provides some incentive for collective action. HR8, and measures for encouraging "boundary spanning" approaches in England more generally, has been discussed by Franks and Emery (2013). At present HR8 is geared towards landscape-scale action and the protection of biodiversity. Yet the authors underline the importance of maintaining the flexibility of the scheme because of the diversity of ways it may need to be applied on a case-by-case basis. Such flexibility could make it a potential mechanism for incentivising the formation and participation of farmer groups in water comanagement activities (see Table 6.1 for potential activities). Given the changing structure of the system regulating water resources management (Section 6.2.1), a suitable comanagement activity to focus on initially could be water allocation. As we have mentioned, the likes of water abstractor groups may be well placed to act as a broker or middleman in an enhanced system of water licence trading. Franks and Emery (2013) also propose a more ambitious agri-environment programme they call "ESS-Plus", designed specifically to broaden the funding incentives available for promoting collaborative management approaches. Such a development would represent an opportunity to design schemes specifically tailored toward promoting pluralistic approaches that encourage constructive communication between irrigators and water managers.

A second consideration involves the nascent Catchment Based Approach. Funding for this programme could go some way to encouraging the likes of water abstractor groups to attend catchment meetings and involve themselves more in relevant management

issues, by at least covering the costs involved for attending. It would also be of use to consider ways of combing different programmes and schemes and thus minimising the plethora of options farmers are confronted with. For example, cooperative ESS initiatives like HR8 could merge with the Catchment Based Approach to channel funding sources in a way that promotes comanagement goals. Although such suggestions are speculative at present, this only underlines the importance of further research and the trialling of pilot studies in order to better understand the feasibility and design of approaches that may encourage communication and cooperation between farmers, and between farmer groups and water managers. Having developed the foundations for a more pluralistic management structure, research suggests that in the longer term and given certain conditions of success, it is possible for the comanagement process to become self-sustaining. This occurs as power asymmetries shift, new institutions and system linkages form, trust is nurtured, different interests are recognised, and participants learn to cooperate in order to solve problems and make decisions, potentially leading to the emergence of adaptive comanagement (see Section 2.1) (Olsson *et al.*, 2004; Armitage *et al.*, 2007; Armitage *et al.*, 2009).

6.5 Conclusion

In this paper we have used critical discursive psychology to explore the ideological context in which water resources management in England is currently being conducted from the perspective of farmer irrigators. The intention has been to reflect upon the potential for developing comanagement arrangements between farmer groups and water managers. The data set consisted of 20 interviews and two focus groups with medium to large-scale commercial irrigators who are members of water abstractor groups, or who are thinking of forming an abstractor group. Our analysis identified three distinct discourses, or "interpretive repertoires", relating to how these farmers talk about the relationship between farming and water resources management, namely the competition, conflict, and compromise repertoires.

The relative dominance of the competition and conflict repertoires in the talk of the participants suggests that the relationship between irrigators and water managers in England is characterised by low levels of trust, and reflects a power dynamic that favours individualism and opposition. This situation presents only limited possibilities

for the development of comanagement. In effect, despite signs of a structural move in England towards more local and participatory forms of water management, a critical analysis of the discourse of these farmers reveals that from a social psychological perspective the system more closely represents that which emerged during the second half of the 20th Century. At this time a productive, mechanised farming sector stood at odds with those concerned with the protection and enhancement of the water environment in England. In this respect, these findings support the claim of Burton and Wilson (2006) that to more critically understand rural change, research must move beyond studies that focus only on macro-level analyses of the political economy by also drawing upon the insights that fields such as social psychology can provide.

Yet our analysis also suggests that this power dynamic is being challenged by the compromise repertoire, which accounts for the needs of others, shows an appreciation for the wider environment, and views change in water resources management as a process of negotiation in which cooperation can perform a useful function. Encouraging the widespread adoption and institutionalisation of this repertoire, whilst moving beyond subject positions in the other repertoires that at present serve to undermine trust, must start with better communication between farmers, and between farmers and water managers. The competition and conflict repertoires imply that in the short to medium term it will be necessary to encourage comanagement through a focus on and restructuring of agri-environment schemes and water programmes. It is useful to think of the objectives of such an approach in terms of seven broad comanagement activities (Table 6.1). Given current proposals to reform England's water licencing system in a way that facilitates the development of water markets, one activity that appears particularly well suited to farmer abstractor groups is water allocation. Here abstractor groups could function as trading brokers between group members, thus lowering transaction costs.

In finishing, we might note that a broader research programme concerned with understanding the dynamic that exists between farmers and water managers would need to incorporate the discourse of farmers outside of water abstraction, including smaller-scale farmers, as well as water managers. In this respect we see this study as a useful early contribution to a critical approach for analysing the relationship between farmers

and water management in England, one which we hope will encourage others to do the same.

Chapter 7: Case Study Analysis

Prologue

The paper in this chapter (Paper 5) represents the final phase of the research (Phase 3). By integrating the findings from the contextual analyses that comprise Phase 2, this chapter provides a practical demonstration of how the politicised IAD Framework can be applied to (adaptive) comanagement. It therefore complements the theoretical discussion in Chapter 2, and in so doing completes Objective 1 of the research agenda. At the same time, it also address Objective 4, which is concerned with the mechanisms that generate comanagement under the conditions specified in Phase 2, and the implications for farming and water governance in the future. This paper is under review by the journal Ecology and Society.

Paper 5 - Using the politicised IAD Framework to analyse (adaptive) comanagement: Farming and water resources in England

Luke Whaley and Edward K. Weatherhead

Abstract

The challenge of managing water resources in England is becoming increasingly complex and uncertain, a situation reflected in many countries around the world. Cooperative and participatory forms of governance are now seen as one way of addressing this challenge. We investigate this assertion by focusing on five farmer irrigator groups in the low-lying east of England. The groups' relationship with water resources management is interpreted through the lens of comanagement, which over the last decade has increasingly merged with the field of adaptive management and related concepts that derive from resilience thinking and complex adaptive systems theory. Working within a critical realist paradigm, our analysis is guided by the politicised IAD Framework. Two previous studies concerned with the broader context surrounding farming and water governance in lowland England reveal low levels of trust between farmers, and between farmers and water managers, as well as a power dynamic that stands in the way of farmer cooperation and participation. Within this context, the findings of this study point to a number of mechanisms that appear to generate comanagement. Of these mechanisms, institution building through the specific group strategy of adopting a company structure, and the stationarity of the resource group members extract from, were seen to be the most crucial. These and other key findings are used to inform a discussion of farming and water resources management in England going forwards. In doing so, we also reflect upon the relationship between comanagement and market-based approaches to managing water resources. Beyond this, the research serves as a practical demonstration of how the politicised IAD Framework can be used to analyse potential (adaptive) comanagement situations, and the related benefits. The analysis complements a previous submission this journal, where we

discuss the relationship between the Framework and (adaptive) comanagement from a theoretical and methodological perspective.

Key words: politicised IAD Framework; comanagement; farming; water resources; England

7.1 Introduction

As a concept, comanagement provides a useful lens through which to interpret cooperation and participation in natural resource governance. Not least, it draws attention to key features of the process of developing joint management procedures, including trust, power sharing, and institution building (Berkes, 2009; Pinkerton, 1989a; Plummer and FitzGibbon, 2006; Pomeroy and Berkes, 1997). The adaptive turn in comanagement has provided further advances and has deepened our understanding of human-environment relations through its focus on concepts such as social learning, and its appreciation of the inherent complexity and uncertainty of coupled social-ecological systems (Armitage *et al.*, 2009; Folke *et al.*, 2005; Plummer and Fitzgibbon, 2007). These developments have shone the spotlight on comanagement as a way of enhancing system resilience and adaptive capacity if it evolves to become adaptive comanagement (Armitage *et al.*, 2007a; Folke, 2003; Moberg and Galaz, 2005; Olsson *et al*., 2004a)[20]; traits that will only become more important as the effects of climate change, a shifting demography, and changing lifestyle preferences continue to challenge the sustainability of natural resource governance (UNEP, 2012).

However, despite the contributions the field of comanagement has made to environmental and natural resource governance, some aspects of the concept remain less well explored. In particular, comanagement research has tended to focus on developing-country contexts, or else on indigenous communities attempting to secure more substantive property rights claims to natural resources in developed countries. Far fewer studies have explored comanagement in situations where the actors involved are economically driven and strongly embedded in capitalist systems of production.

[20] Our use of the term "comanagement" in this paper encompasses the concept as originally conceived as well as its adaptive counterpart (i.e. "adaptive comanagement"), where the latter is seen to be an evolutionary development of the former (Berkes 2009).

Furthermore, despite theoretical discussions in the literature, very few studies have concerned themselves with the relationship between comanagement and market-based forms of natural resource management.

Beyond these considerations, two methodological issues tend to challenge analyses of comanagement (Whaley and Weatherhead, 2014). The first concerns the cross-disciplinary nature of the subject, where comanagement's traditional social base in commons theory and related fields has in more recent times been complemented by resilience thinking, which has its roots in the natural sciences. The second, and perhaps more significant issue relates to the fact that the vast majority of comanagement research focuses on and works towards the development of the normative concepts associated with the subject. In contrast to this, far fewer studies adopt critical forms of analysis to investigate these concepts. With respect to work on social resilience and natural resource management, Wilson (2010) observes that those studies that do tend not to exhibit the same rigour as studies that proceed upon more normative lines.

In this paper we offer a contribution to these relatively underdeveloped aspects of comanagement theory and method. We address the theoretical considerations through an analysis of farmer irrigator groups - known as "water abstractor groups" – in England. Here we explore the potential for these collaborations to comanage water resources in conjunction with statutory water managers, by identifying key factors of success as well as deeper causal "mechanisms" that appear to generate comanagement. The research comes at a time when the UK Government is looking to instigate a more fluid system of water rights trading in England. This provides an opportunity to consider the contribution of abstractor groups to the comanagement of water resources within a market-based context. To guide our analysis we have adopted a version of the Institutional analysis and Development (IAD) Framework, originally developed by Elinor Ostrom and her colleagues (Kiser and Ostrom, 1982; Ostrom, 2005, 2011), but which has been modified by Clement (2010) to incorporate a critical consideration of the role of power in natural resource governance. In an earlier paper published in this journal (Whaley and Weatherhead, 2014) we discussed the suitability of applying this framework to studies of (adaptive) comanagement because of the way in which it is able to address the methodological issues outlined above. In particular, the politicised IAD Framework facilitates a structured and consistent approach to analysing the "many faces

of comanagement" (Berkes, 2009), whilst advocating for a range of analytical methods designed to provide an integrated and critical understanding of the normative concepts associated with comanagement theory.

This study therefore provides an opportunity to move beyond our initial theoretical discussion of the relationship between (adaptive) comanagement and the politicised IAD Framework, and to demonstrate its applicability from a practical perspective. Our analysis represents the culmination of a research programme investigating farmer cooperation and participation in English water governance, which centres on the adoption of the politicised IAD Framework. Therefore, the analysis also provides insights to issues currently affecting water management in England. Moreover, it is likely that our findings are of relevance to those attempting to establish comanagement processes in other developed-country contexts with similar conditions.

7.2 Water abstractor groups in England

Unlike many other countries, where agriculture is often the dominant water use, in England irrigation only accounts for around 1.5% of the total volume of water abstracted annually. It is used to supply high value crops on a land area of roughly 150 000 hectares (Weatherhead, 2006; Woods, 2000). Nonetheless, in agriculturally intensive regions like the low-lying eastern counties of East Anglia and Lincolnshire, irrigation can account for up to 70% of water abstracted in some catchments during the summer months (Holman and Trawick, 2011). As a response to developments in water and environmental regulation which placed new boundaries on water use in agriculture, since the 1990s a number of farmer "water abstractor groups" have formed, with the general aim of defending their rights to access a "fair share of water".

Over time, however, it has become clear that acting collectively brings additional benefits both to the members of the group and to the government. Leathes *et al.* (2008) discussed the institutional capacity of four of these groups to defend their rights to abstract water for irrigation. Beyond this reactive function the authors also ask if there isn't a role for abstractor groups in water management more generally. The role of abstractor groups in water management is also a question that has not escaped the attention of the Environment Agency (EA) - the regulating body in charge of managing

England's water environment - who for example find it easier to deal with a coherent group than numerous individuals (EA, n.d. a). Although currently only a small number of abstractor groups exist, the likelihood that access to water will become more variable and less secure in the future suggests that further groups will form in response to a growing number of challenges to irrigated agriculture, particularly in those catchments where water is scarce.

7.3 Methodology

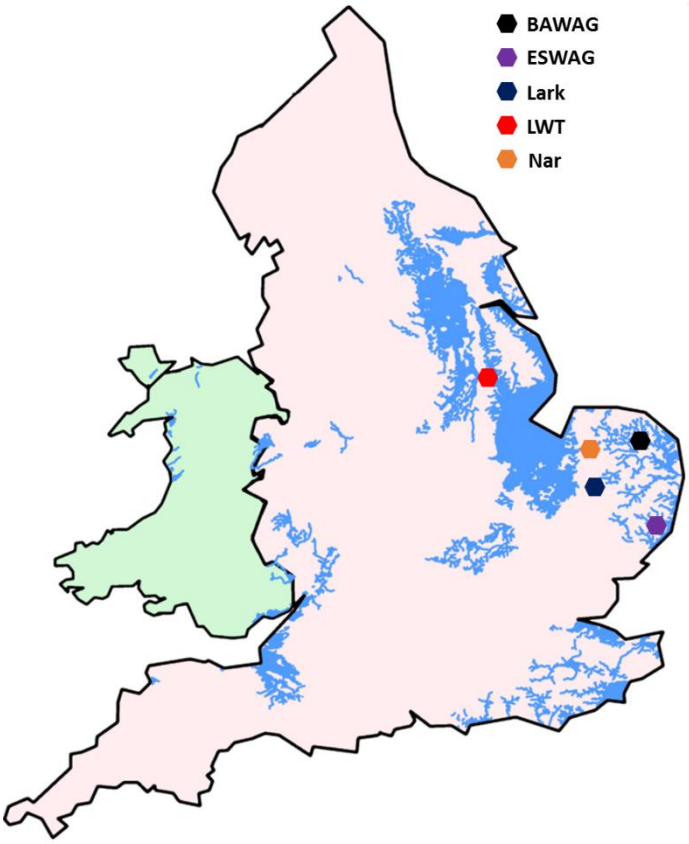
We adopted an embedded multiple case study approach (Yin, 2009) to analyse the structure and function of five farmer water abstractor groups in England. The research employed the politicised IAD Framework to guide the various strands of the analysis, where in total data was sourced from 25 semi-structured interviews with farmers and governmental and non-governmental water managers; two focus groups with farmers in catchments to the east and west of the country; an analysis of primary and secondary documents relating to water policy and the development of farming and water management dating from World War II until the present day; and a literature review. This study incorporates and builds upon the findings from two separate analyses (Whaley and Weatherhead, 2015a, 2015b, *in press*), as described below.

7.3.1 Five case studies

The five water abstractor groups we analysed are located in the low-lying, and generally drier, east of England (Figure 7.1). Our intention was to include in the study the same four groups previously analysed by Leathes *et al.* (2008). After making contact with representatives from each of these groups we found one of them (the North Northumbrian Water Abstractor Group) was no longer fully functional. The remaining three are the Broadlands Agricultural Water Abstractor Group (BAWAG), which formed in 1997 and comprises roughly 180 farmer members and 20-30 corporate members; East Suffolk Water Abstractor Group (ESWAG), that consists of approximately 80 members and which also formed in 1997; and Lincoln Water Transfer limited (LWT), which officially formed sometime during the late 1990s. LWT initially consisted of 19 members, but over time has been reduced to 14 as several members have left and new members have joined. As will become apparent, LWT is somewhat

different to the other groups with respect to its involvement in water comanagement. To this extent, LWT served as an "extreme case study", allowing us to explore certain factors that give rise to comanagement in their "purer" form (Danermark *et al.*, 2002). Alongside these three groups, we included two more. These are the Lark group, which is the oldest group in England, having formed in 1991, and consisting of roughly 80 members (of which approximately 50 hold significant water licences); and the Nar group, a nascent organisation comprising roughly 30 farmers that formed on the river Nar during 2011. These five groups account for the vast majority, if not all of the active water abstractor groups in England (EA n.d. a).

Figure 7.1 Map of England and Wales showing location of the five water abstractor groups included in the study. Blue shading represents areas under the management of internal drainage boards (see Section 7.5). Adapted from Venables *et al.* (n.d.).



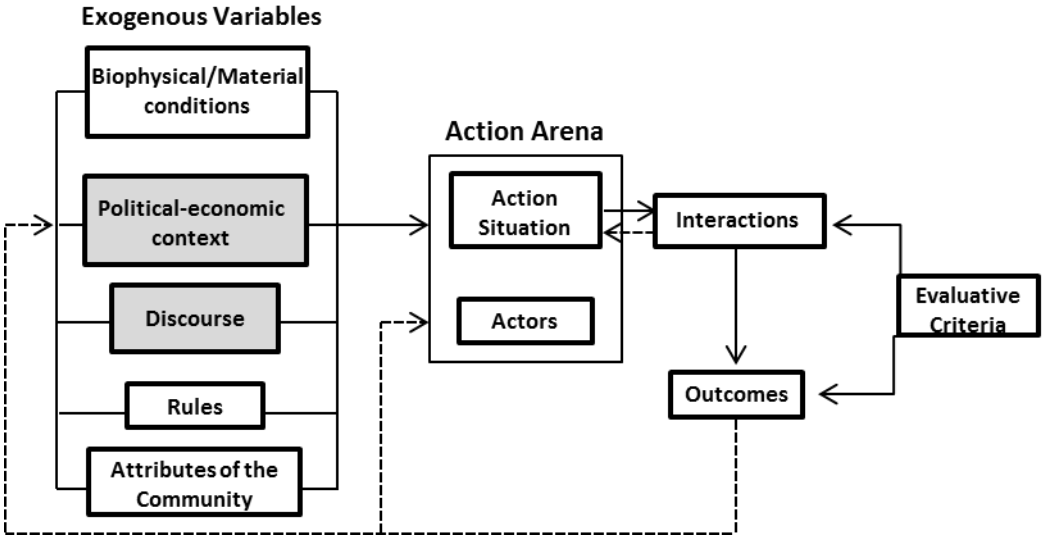
7.3.2 Applying the politicised IAD Framework

We analysed the structure and function of the five water abstractor groups and their contribution to seven broad comanagement activities (Table 7.1) using the politicised IAD Framework (Figure 7.2). The comanagement activities are adopted from Pinkerton (1989b). Our approach to employing the Framework follows the process detailed in Whaley and Weatherhead (2014). This allowed us to critically analyse normative comanagement concepts within the context of the specific case histories of the five water abstractor groups. Two of the "exogenous variables" of the politicised IAD Framework, the "political economic" and "discourse" variables (see Figure 7.2), were analysed in separate studies. In the first study (Whaley and Weatherhead 2015a, *in press*), we employed a political economy analysis of farming and water governance in England from World War II until the present day. In the second study (Whaley and Weatherhead 2015b, *in press*), we used a form of discourse analysis called critical discursive psychology to analyse the ways in which farmers talk about water resources management, water managers, and the water environment in England. Both analyses served to highlight how context, power, and levels of trust fundamentally influences the ability of farmers to comanage water resources in England. A discussion of the findings of each study is provided in the results section.

Table 7.1 Seven comanagement activities. Adapted from (Pinkerton 1989b).

Comanagement activities						
1	2	3	4	5	6	7
Data gathering and analysis	Logistical decisions such as who can abstract water and when	Water allocation decisions	Protection of resource from environmental damage	Enforcement of regulations	Enhancement and long-term planning	Broad policy decision making

Figure 7.2 The politicised IAD Framework, with the two variables that have been analysed in separate studies shaded in grey. Adapted from Clement (2010).



Working within a critical realist paradigm (Bhaskar, 1979; Danermark *et al.*, 2002; Sayer, 1992), a core concern of the research was to identify the generative mechanisms that allow farmer abstractor groups to comanage water resources, within the broader contextual conditions we identify in the previous two studies. This entailed using the politicised IAD Framework to firstly identify more concrete "factors of success" that appear to link the water abstractor groups to comanagement, and then to make inferences about what these factors suggest about relatively abstract generative mechanisms operating at a deeper, more conceptual level (see Bhaskar 1975). Examples of these generative mechanisms in the comanagement literature include "trust building", "problem solving", and "social learning" (Berkes, 2009). The relevance of each mechanism to a comanagement outcome was decided by employing three strategies put forward by Danermark *et al.* (2002), namely counterfactual thinking, a comparative case study approach, and, as mentioned in Section 7.3.1 above when discussing the LWT group, the use of an extreme case study. The interactions and outcomes of each case study were evaluated using three related transaction costs, namely information, organisational, and strategic costs (Imperial, 1999). We also evaluated the ways in which the cases did or did not contribute to the overall adaptability, efficiency, and equity of water management, as outlined in Ostrom (2005).

Following the analysis, we considered the implications of our findings for water resources management in England going forwards. This involved making assumptions about likely changes to the exogenous variables of the politicised IAD Framework – and thus the context of water management – in the future. Given the complexity of natural resource management, it is not possible to make strong predictions as to future interactions and outcomes. Yet, as Polski and Ostrom (1999: 24-25) note: "When examining these more open, less constrained situations, a policy analyst is forced to make weaker inferences about patterns of interaction. However, well-informed weak inferences can still provide important policy information". The IAD Framework is a powerful tool of making well-informed inferences about the behaviour of a system because of the integrated, comprehensive, and context-specific approach it encourages the analyst to adopt (Whaley and Weatherhead, 2014).

7.4 Results

First we provide an overview of the findings of our investigation into the five exogenous variables of the politicised IAD Framework as they apply generally to all five case studies. We summarise the main findings from the analyses of the political-economic and discourse variables, explored in the two previous studies (Whaley and Weatherhead, 2015a, 2015b), before considering the remaining three exogenous variables, namely the biophysical-material, rules, and community variables.

7.4.1 Political-economic and discourse variables

The political-economic variable was investigated by employing an approach known as the "Power Cube" (Gaventa, 2006a, 2006b). This was used to analyse the development of the system governing farming and water management in England from World War II until the present day. Doing this revealed how different forms of power, operating in different types of spaces, and at different levels of governance, has come to shape the current dynamic among farmers, as well as between farmers and water managers. The analysis revealed that the system of industrial agriculture that developed after World War II in England resulted in an occupational identity for farmers that revolves around individualism, competition, and a desire to maximise production, often at the expense of the environment. In part this sense of identity, or power "within" (Veneklasen and

Miller, 2002), has been maintained by the corporate agricultural supply chain and the structure of the global food system, which exert considerable downward pressure on farmers. These findings suggest that notions of participation, cooperation, and wider environmental concern are marginal considerations for many farmers in England today, especially in the low-lying east of the country where large-scale, mechanised farming dominates (Holderness 1985, Marsden *et al.* 1993).

The analysis also charted the rise of water abstractor groups, who, as mentioned above, started to form in the 1990s in order to defend their rights to abstract water. At the same time, legislation emanating from Europe, influenced by international conferences and conventions, has resulted in greater opportunity for farmers to participate in water management at the local catchment and sub-catchment levels. This suggests that there is the potential for water abstractor groups to undertake a more proactive management role, despite their reactionary beginnings. Given the barriers to farmer cooperation and participation that the paper identified, it was suggested that this opportunity to develop comanagement "could be enhanced through greater integration of government programmes and a channelling of funding sources".

We investigated the discourse variable of the Framework by employing critical discursive psychology (Edley, 2001) to analyse the ways in which irrigators in England talk about water management, water managers, and the water environment. Three different discourses, or "interpretive repertoires" (Potter and Wetherell, 1987), were identified, namely the "competition", "conflict", and "compromise" repertoires. The competition repertoire was the most dominant of the three, whilst the compromise repertoire was by far the least dominant. The competition repertoire embraces strong business values and takes a utilitarian approach to the water environment. According to this repertoire, farmer cooperation and participation in water governance is only considered of any use if it makes sense from an individual business perspective. The conflict repertoire, which is "founded on a logic of opposition and stresses the place of conflict and difference in water resources management," serves to largely obstruct the comanagement process.

On the other hand, the less prominent compromise repertoire provided more scope for farmer cooperation and participation in water governance as it recognises the value of

the wider water environment and views water resources management as "a process of balancing the various needs of the stakeholders who use water". The analysis highlighted the importance of improving communication between farmers, and between farmers and water managers in order to move beyond the productivist and conflict repertoires, and to instead nurture a more widespread adoption of the compromise repertoire.

Each interpretive repertoire has a number of "subject positions" (Davies and Harre, 1990; Harre *et al.*, 2009) associated with it, which relate to the various actors involved in water governance. One outcome concerning the dominance of the productivist and conflict repertoires is "attributed to the subject positions both repertoires provide for governmental and non-governmental water managers, which suggest that relationships between farmers and water managers are characterised in large part by a distinct lack of trust". The paper concluded that, given the importance comanagement places on the development of trust (Folke *et al.*, 2005; Olsson *et al.*, 2004; Plummer, 2006), "this represents a significant challenge to partnership building".

Both the political-economic and discourse variables most affect the "position" element of the action situation. They also influence the norms and values of participants in these situations (see Whaley and Weatherhead 2014). Given the findings of the two studies, we concluded that the dominant norms of the farmers in this research programme are likely to be those of competition, business operating procedures, conflict, and non-participation, whilst the values they place on water management outcomes will tend to revolve mostly around profit and business independence, success, and professionalism.

7.4.2 Biophysical-material, rules, and community variables

Considering first the biophysical-material variable, a common feature of many catchments with a high proportion of irrigation licences is the presence of on-farm reservoirs. The biophysical-material variable affects what actions are physically possible in an action situation, what outcomes can be produced, how actions are linked to outcomes, and what is contained in participants' information sets (Ostrom, 2005). Therefore, having a degree of storage in the system in the form of reservoirs has the potential to significantly affect the internal dynamic of the action situation and the

incentives participants face. In the discussion we will consider the role of on-farm reservoirs in water management going forwards.

Given that England is a country with strongly enforced formal institutions, we have taken the government regulations relating to water management as *de facto* conditions that participants operate under within the action situations we looked at. Many of the rules which are of particular relevance relate to the government's water abstraction regime, which is enforced by the EA (see Ostrom 2005: 188-215 for a discussion of the types of rules that structure an action situation). In particular, there is a boundary rule stating that anybody intending to abstract more than $20m^3$ of water a day must first obtain a licence. The licence itself contains scope rules detailing how much water a person or business can take, what they can use the water for, where and when they can abstract water, and any minimum flow or level limitations. Breaches of the licence conditions may result in financial losses to farmers if they are claimants of the various subsidies available through the EU's Common Agricultural Policy, where a proportion of the amount normally received can be withheld as a penalty. Continued licence transgressions can result in the EA taking legal action through the courts.

Other rules relating to water resources management include section 57 of the Water Resources Act 1991, which states that during periods of water scarcity the EA has the power to halt water abstraction for the purpose of spray irrigation. Furthermore, there are rules allowing abstractors to trade their licences with one another on a waterbody, although to date few trades have taken place. In part this is because of a lack of understanding of how to trade, and the time consuming nature of the process (EA/Ofwat 2009).

Finally, with respect to the community variable of the Framework, the vast majority of farmers we interviewed were white males between the age of 40 and 65. This is unsurprising given that farmers in the UK are predominantly male, with an average age of 59 (DEFRA, 2012a).

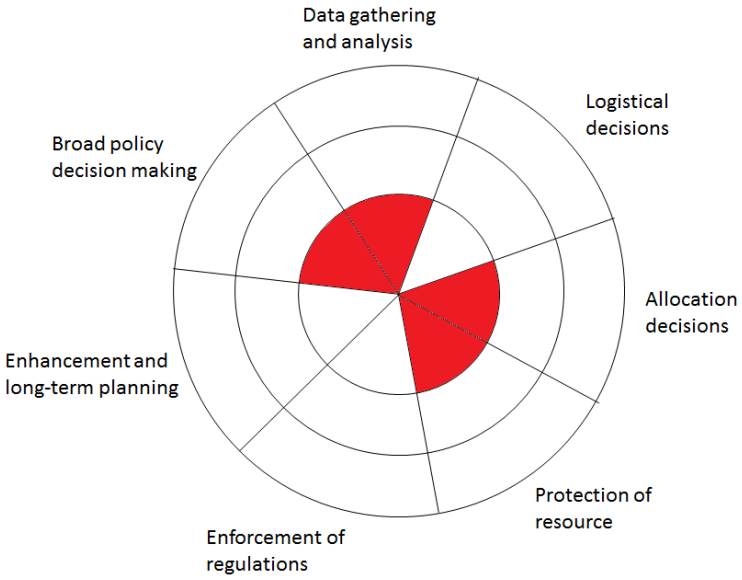
Having considered the exogenous variables of the politicised IAD Framework, now we discuss the findings from the analysis of the five water abstractor groups detailed in Section 7.3.1. As noted above, of these groups, LWT differs substantively from the others in terms of its involvement in the comanagement of water resources. Due to this,

we have combined the discussion of the remaining four groups, that is, BAWAG, ESWAG, the Lark group, and Nar group, and then follow with a more detailed consideration of LWT.

7.4.3 Analysis of four farmer irrigator groups

Our analysis revealed that the Lark, BAWAG, ESWAG, and Nar abstractor groups contributed relatively little to Pinkerton's seven comanagement activities (Figure 7.3). Instead, to differing degrees, the central function of these groups is to lobby for farmers' rights to access water. Yet despite their lobby focus, it has been noticeable that over time the groups have developed more proactive tendencies. Perhaps the most notable contribution is a shared strategy adopted by several of them to volunteer a reduction in their water use during periods of water scarcity. This strategy appears to have been adopted in order to avoid a section 57 order (see discussion on "rules" variable above), rather than out of any altruistic impulse on behalf of farmers to improve the water resources situation in the catchment as a whole.

Figure 7.3 The combined contribution of the Lark, BAWAG, ESWAG, and Nar water abstractor groups to Pinkerton's seven comanagement activities.



We also observed evidence of groups encouraging water efficiency measures among their membership, conducting resource monitoring, representing farmers in conferences and meetings dealing with broader water policy issues, and commissioning studies to assess resource conditions in some catchments as well as the value of irrigable agriculture to the local economy. Again, these measures have been adopted largely to improve the groups' ability to effectively lobby for farmers' rights, as well as to increase the benefits they gain from irrigation. There is also evidence that at least two of the groups were facilitating water trading between members, either through advertising of spare water in their periodic newsletters, or through face-to-face communication between members at meetings.

An analysis of the information component of the action situation revealed that group members held varying degrees of local time-and-place knowledge, which may contribute to water management decision-making. This related to an understanding of the distribution of interests and resources within the catchment, local knowledge of the resource and its history, current and future water requirements, as well as future business practices which may have an impact upon the resource. In contrast, the knowledge held by the regulatory agencies stemmed from a scientific approach to managing the resource, and focused on a better appreciation of the bigger picture of water governance in England. Whilst staff in these agencies also held a degree of local knowledge, over time this knowledge-base has been eroded away as staff members have retired or have moved on in the many waves of government re-organisation.

EA and NE officers also held detailed knowledge about water and environmental regulation, as well as recent or upcoming changes to these regulations. Interestingly, in each case the leader of the abstractor group also held this information to a large degree. In two of the groups there was a choice rule (again, see Ostrom, 2005, for a discussion on the types of rules and their relationship to the action situation of the IAD Framework) instructing the leader of the group to remain up to date with water legislation and to attend meetings and conferences where necessary. In both these cases this individual received a salary from the group, primarily in order to perform this function.

Considering the costs and benefits of abstractor groups from a transaction costs perspective, it is clear that the biggest benefit to water governance has been a reduction in information costs. This is a direct result of enhanced communication channels between farmers, and between farmers and water managers. On the other hand, coordination costs have tended to increase for the farmers involved, particularly in the early stages of group formation. This increase in coordination costs is significant in light of the findings from the political-economic variable of the Framework, whereby the prevailing power dynamic serves as a barrier to farmer cooperation and participation in water governance because of demands on time, as well as a central concern with costs and profit. Although we discovered little hard evidence to suggest it occurs, the development of abstractor groups opens the door for a number of strategic costs. These costs relate to the ability of non-members in the catchment to "free ride" on the group's achievements, and the potential for groups, or even specific individuals within the groups, to exert power over other participants in order to achieve purely selfish ends.

Given that these four groups offer only a minimal contribution to the comanagement activities in Table 7.1, we do not discuss their relationship to the more general evaluative criteria of adaptability, efficiency, and equity.

7.4.4 The case of Lincoln Water Transfer limited

In contrast to the other four water abstractor groups, the Lincoln Water Transfer group is a clear example of a case in which farmers have self-organised in order to comanage water resources. Given the generally low levels of trust between participants and the way in which the current power dynamic in England stands in the way of farmer cooperation and participation in water governance (see above), this case represents a notable exception. As a result, it is of much interest to identify the key factors that link the farmers in this study to a comanage outcome, and causal mechanisms that can be inferred from these "factors of success". Before discussing our findings, below we first provide a brief overview of the comanagement scheme that LWT participates in.

The LWT scheme

The area where the LWT group operates is characterised by a network of drainage ditches from which the members are able to abstract water for irrigation during the

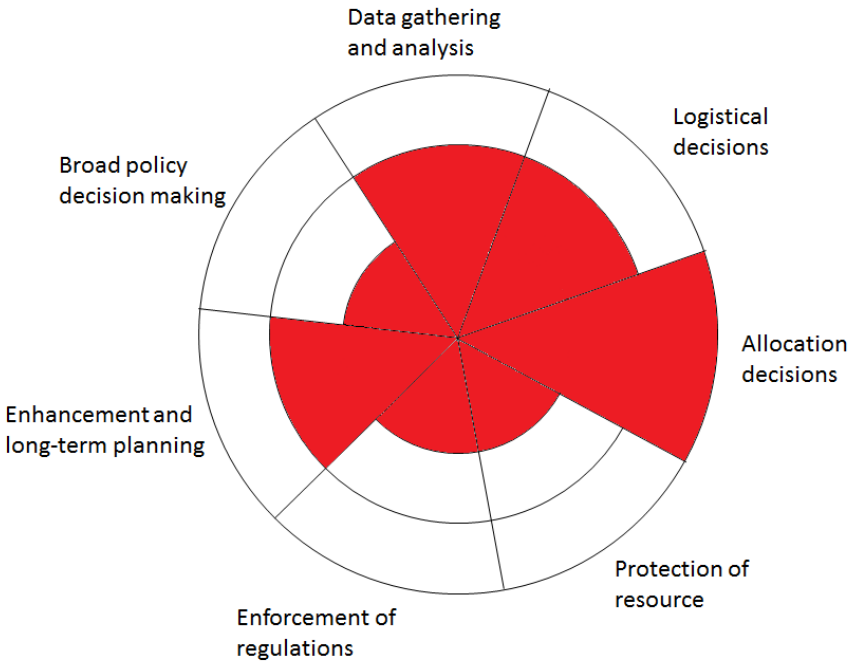
growing season. These ditches represent a "ponded" system inasmuch as the water in them tends to stand relatively still, making it significantly easier to manage water levels. The interconnection of the ditches also means that water can be withdrawn at any point in the system. The ditches drain into the oldest canal in England, the Fossdyke canal, which connects the river Trent with the river Witham. The drainage ditches are managed by an internal drainage board (IDB), which is a body with the jurisdiction to manage water levels in certain low-lying areas of England that are most at risk from flooding. The LWT group, which is currently comprised of 14 farm businesses (originally 19), formally came together in the late 1990s after years of attempting to secure additional water for irrigation. A window of opportunity arose when improvements were made to the capacity of a water transfer scheme – the "TWA scheme" - that carried water from the river Trent via the Fossdyke canal to supply a town further downstream. With the upgrade to the TWA scheme it was now possible for the group of farmers to request some of this additional capacity supplied from the Fossdyke canal to service their own irrigation needs.

The LWT group shares a single abstraction licence, which they initially divided up among themselves according to predicted water demand. Some or all of each member's licence share can then be reallocated within the group either before or during the growing season, as circumstances dictate. Although submissions of unwanted water by members into a central pool, and requests by members to take water from this pool, are managed by the IDB, the group's board of directors have final say on how the water is allocated. This is important in situations where demand for water from the central pool outstrips supply. In these situations, it appears the board would employ a pro rata approach, where water is allocated to members requesting additional water in accordance with their overall licence share. The group also holds a second shared licence. This licence allows them to apply for additional water under the TWA scheme when water levels in the network of drainage ditches fall too low to allow for irrigation.

The LWT scheme entails a close working relationship between the abstractor group and the IDB, who have taken on the responsibility of administering the system on behalf of the group, as well as the EA, who are in charge of transferring additional water under the TWA scheme. In order that the IDB can manage water levels accurately, LWT members are required to provide weekly returns detailing their water use in the previous

week, and an estimation of their water use for the coming week. In time the function of the group has evolved. Of particular note, LWT has funded its own programme to eliminate the potato brown rot virus, *Ralstonia solanacearum*, from the watercourses where it abstracts. The status of the group has also meant that its leader is invited to attend meetings, conferences, and workshops relating to water resources management and policy direction in England. Our assessment of the overall contribution the LWT scheme makes to water resources management is shown in Figure 7.4.

Figure 7.4 The relative contribution of the LWT scheme to Pinkerton's seven comanagement activities.



Factors of success and generative mechanisms

Using the politicised IAD Framework (Figure 7.2), we were able to identify a range of factors that appear important to the success of the LWT scheme. Here we consider these factors of success in relation to the scheme's formation, operation, and evolution. The factors are categorised according to their relationship to the exogenous variables of the politicised IAD Framework (Table 7.2). We also discuss how these factors relate to deeper, more abstract mechanisms that can be thought of as generating comanagement, as discussed in Section 7.3.2.

Table 7.2 Nine factors contributing to the success of the LWT comanagement scheme and the generative mechanisms derived from them; displayed in relation to the five exogenous variables of the politicised IAD Framework.

Exogenous variable	Factors of success	Generative mechanisms
Rules	Formation of limited company with members' agreement and protocol	"Institution building", "problem solving, and "social learning"
	Shared licence	"Institution building"
Biophysical-material	Ponded system of drainage channels	"Stationarity"
	Access to additional water	"Plus-sum game"
Community	Similar race, age, gender, and profession of group members	"Homogeneity"
	Small group size	"Group size"
	Presence of a leader	"Energy centre"
Political-economic	Relationship between farmers and IDB	"Trust" and "bridging organisation"
Discourse	Greater use of "compromise repertoire"	"Trust building"

During the formation of the scheme, perhaps the most significant factor stems from the rules variable, where the group decided to form a limited company to conduct their affairs. This entailed drawing up a members' agreement and protocol that detail members' rights, conduct, commitments, payments and costs, as well as punitive measures for rule infringements. The protocol also details an operating procedure for internally allocating water among group members. The agreement and protocol are upheld by English law, where serious rule infringements on the part of members, or a failure on the part of government officials and other actors to respect the terms of the agreement, can result in action being taken in the courts.

It is clear that adopting a corporate strategy helped the group to overcome the prevailing power dynamic and low levels of trust we identified in the previous studies (Whaley and Weatherhead 2015a, 2015b, *in press*) by providing a structure and operating

environment which is in keeping with the business orientation of modern farming. It also gave the group independent legal status, which greatly assisted with their successful application for the two shared water licences. Doing this embedded LWT within a macro-institutional structure that supports the group from both a legalistic and regulatory perspective, while still providing it with a degree of local autonomy. We can therefore conclude that adopting a company structure with related members' agreement and protocol represents a case of "institution building" (Pomeroy and Berkes, 1997). A second factor relating to the rules variable is the joint licence the group holds, which facilitates water sharing between members. However, this is perhaps a less significant factor because the group's corporate structure would allow for a similar water-sharing dynamic regardless of whether the members' allocated volume pertained to an individual's own licence or a proportion of a single group licence.

From a biophysical perspective, the key factor to note is the ponded system of drainage ditches the group abstracts from, which relates to the "stationarity" of the resource. Stationarity here refers to the mobility of a natural resource such as water, where the less mobile the resource is the more stationarity it has (Ostrom *et al.*, 1994). As Ostrom et al (1994: 314) discuss, stationarity is important mechanism for developing collective action as it "significantly affect[s] appropriators' incentives and capabilities to devise rules because of [its] impact on the type of information available…[stationarity affects] the level of reliable information and the costs of obtaining information". The ability of the group to secure water over and above their existing allocation was also an important factor as it represents a "plus-sum game", which is known to promote collaboration among water users (Dinar *et al*., 1997).

From the perspective of the community variable, commons theory suggests that the "homogeneity" of the farmers' identities in terms of age, race, gender, and profession would most likely have assisted group formation (Baland and Jean-Philippe Platteau, 1996; Ostrom, 1990; Wade, 1987). Another key community factor was the presence of leadership within the group, which took the form of a new farm business in the area with a strong desire to secure additional water for irrigation. The manager of this farm, incentivised by the success of his business, functioned as an "energy centre" (Olsson *et al.*, 2006; Pinkerton, 1989b) by leading discussions between the parties, in turn driving the scheme forward. A final mechanism relating to the community variable is "group

size", where the LWT group is small (14 members) in comparison to many of the other groups (where the largest, BAWAG, is comprised of roughly 180 members).

The political-economic variable draws attention to the IDB's relationship with the farmers and the EA. IDBs have a long history dating back to the medieval period, where for much of this history they have shared a strong political and economic alliance with farmers and landowners (Purseglove, 1988; Reeves and Williamson, 2000). As a result, relatively high levels of trust exist between the IDB and farmers, a factor which was clearly of importance in the IDBs decision to take responsibility for administering the scheme. Furthermore, we found evidence that the IDB was also well respected by the EA for its professionalism and technical knowhow. In this light, the IDB can be considered a "bridging organisation", a role which is often crucial to comanagement arrangements because of its importance in building trust and social capital more generally, accessing and sharing knowledge, and resolving conflicts (Berkes, 2009). It may also be argued that the LWT group itself performs some of the functions of a bridging organisation within the scheme when seen in light of the relationship between its members and local water managers. Finally, with respect to the discourse variable, it was clear during our interviews that particularly local EA staff, but also the farmers we spoke to relied more on the "compromise repertoire" (see above for discussion on discourse variable) than we found when analysing all but one of the other abstractor groups. The emergence of this repertoire reflects the development of a "trust-building" dialogue among the farmers in the group (Folke, 2003; Olsson *et al*., 2004b).

As our analysis makes clear, much of LWT's involvement in collective-choice situations has occurred during the scheme's formation, when the system of rules that guides the operational activity of the group, the IDB, and the EA was put in place. This process of institution building at the local level helped to overcome low levels of trust whilst facilitating the emergence of power-sharing arrangements. Over time, the company structure of LWT also appears to have facilitated "problem solving" and "social learning" among group members in the face of change and uncertainty. This was best illustrated when the group devised additional rules in order to fund the eradication of the potato brown rot virus from the drainage ditches they irrigate from. The procedure was institutionalised in the members' protocol, and demonstrates that the company structure was able to cope with an issue which was potentially divisive, given

that some members did not grow potatoes and so faced much less of an incentive to expend resources treating the disease.

Considering the outcomes of the LWT scheme, from a transaction cost perspective it appears information costs increase in some respects and decrease in others. In general terms, information costs go down as channels of communication open up between farmers, and between farmers and water managers, where local time-and-place knowledge is able to better complement the scientific knowledge held by the regulator. However, information costs also increase for farmers and the IDB with respect to the weekly submission and processing of water usage data. Yet this level of communication is important not only in that it allows the IDB to correctly manage water levels, but because it endows the management system with greater sensitivity to both resource conditions and farmer decision-making, meaning it is better prepared to deal with change when it occurs. Coordination costs also increased, especially in the early development phase as the group self-organised, legal costs for setting up the company were incurred, and rules and operating procedures were devised. It appears that these coordination costs are a significant factor in the group members' decision not to take the functionality of the scheme any further, given the pressurised economic environment that farmers are operating within, as well as their ideological leaning towards individualism and competition. We also found anecdotal evidence that an incentive for one or more group members to drop out was because they knew they could benefit from the additional water and better water level management the scheme brought whilst avoiding the costs of being a member. This would represent a case of free riding, resulting in greater strategic costs.

Considering the overall evaluative criteria, we can conclude that the LWT scheme has enhanced the adaptability of local water governance in at least two ways. Firstly, the establishment of new networks and improved channels of communication between farmers and water managers enhances the ability of the system to respond to social-ecological feedback in a more timely and flexible manner. Secondly, as demonstrated by the group's ability to deal with the case of potato brown rot, the organisational and institutional structure of the scheme has helped to develop greater social capital among participants and has facilitated their ability to solve problems when they arise. It is very unlikely that such an outcome to the potato brown rot threat could have been achieved

without the presence of the group. Therefore, despite a lack of interest in developing the scheme any further at present, it does appear that the institutional structure of the group and its relationship with the IDB and EA provides a latent capacity for further action and adaptation.

The scheme has also enhanced economic efficiency, as it allows specialist contract growers – an increasingly common feature of farming in England - more flexibility to rent land with water to grow and irrigate their crops anywhere across the whole land area of the group, a useful benefit considering the long crop rotations required for disease control for some of these crops. However, the scheme is unlikely to maximise economic efficiency due to the non-competitive nature of the group's water allocation system. This sharing system prohibits members from bidding for water in such a way that, according to economic theory, it would go to its highest value use (Keohane and Olmstead, 2007). It is however possible to conceive of a similar scheme that instead adopted a competitive bidding system in order to allocate water. From a water use perspective, the scheme also appears to be more efficient than if each farmer held an individual abstraction licence proportional to their current share of the group's joint licence. This was demonstrated when the group's licence came up for renewal in 2010. At this time, several of the members handed back some of their licence share to the EA, resulting in a reduction to the overall licence volume. The reasons given for this were that these members felt confident that if they needed additional water they could apply for it within the group, because of the added security the scheme provides. This mindset differs from the standard situation in England, where irrigators typically only use around half of their licenced volume but hold on to a large amount of "headroom" for security. Finally, the scheme demonstrated high levels of equity – in terms of fiscal equivalence - with financial costs to members being equivalent to the benefits they enjoyed in terms of licence share. Again, this dynamic was institutionalised in the members' agreement and protocol.

7.5 The findings in their wider context

Of the factors and more abstract generative mechanisms identified in Table 7.2, the following will be taken further by considering their relevance in the context of water resources management in England more generally: 1a) the stationarity of the resource,

1b) the formation of a limited company with a clearly defined and legally binding members' agreement and protocol 1c) the role of the IDB as a bridging organisation and scheme administrator, 1d) a plus-sum game, where the farmers involved have the opportunity to acquire additional water over and above their existing allocation.

Looking to the future, we can also make several informed inferences about changes to the exogenous variables of the Framework. These are: 2a) the biophysical-material variable: water supply will become more variable and less secure, with water scarcity becoming more common (EA, 2010a), 2b) the rules variable: the regulatory system governing water resources will continue along a direction of increasing liberalisation (EA 2010b; DEFRA 2011b, 2013c), and 2c) the political-economic and discourse variables: a continued drive towards both the use of economic instruments for managing the environment and natural resources, as well as the promotion of greater stakeholder participation and cooperation (DEFRA, 2011b, 2012b, 2013b).

How the factors 1a-1d combine with inferences 2a-2c will be the subject of this discussion. We will also reflect on what our conclusions infer for comanagement in other countries with similar characteristics to those outlined here.

Considering point 1a, the stationarity of the resource, draws attention to the benefits of developing water storage in catchments where farmers currently abstract from non-stationary, free-flowing rivers. This would make decisions about resource allocation more predictable, in turn making it easier to devise cooperative arrangements (Ostrom et al 1994) akin to the LWT model. Furthermore, there is scope for enhancing the cooperative aspect of such an arrangement through the development of joint reservoir schemes nested within larger catchment-based abstractor groups. A small number of joint reservoir schemes already exist in the east of England, and have allowed the farmers involved to devise their own operating procedures and allocation rules. Interestingly, in one case the three farm businesses have adopted the same shared strategy as LWT by forming a limited company. This company separately owns the reservoirs and related infrastructure and the water is then sold back to the individual members, who have a holding right equivalent to their share of the business.

There are large parts of eastern England which, like the LWT scheme, are characterised by ponded networks of IDB-managed drainage ditches with a high degree of stationarity

(Figure 7.1). Furthermore, these regions tend to be prime agricultural land. This suggests that there is much scope for encouraging the emergence of water abstractor groups in these low-lying areas, and provides an opportunity for IDBs to take on a new function as a bridging organisation and administrator in a system of comanagement (1c). In recent years the place of the IDBs as they currently exist has come under pressure from some angles (Bankoff, 2013; Purseglove, 1988), and a move such as this one might ensure their position within water management going forwards.

It is also important to note that, particularly in the east of England, roughly fifty percent of abstraction is from groundwater sources (DEFRA, 2014b). Although water flow within aquifers is typically less predictable and controllable than the flow in ponded surface systems, here too there is potential for farmers to work together to allocate the resource among themselves. In all these cases, successful implementation of the scheme would be advanced by the formation of a limited company or similar legal structure, and the adoption of a members' agreement and protocol (1b). As we have discussed above, doing so provides a familiar and structured operating environment for farmers to work within, which in turn helps to overcome the relatively low levels of trust and a power dynamic which currently impedes the participation of farmers in cooperative forms of water governance.

As climatic conditions change and irrigation needs and water availability becomes more uncertain (2a), it is likely that these options for enhancing cooperation between farmer groups and water managers will become increasingly relevant if, as this paper suggests, they are able to enhance the adaptability and efficiency of the system. At the same time, the possible emergence of a more liberalised licencing system also has the potential to change the relevance of these options (2b). If we are to assume that the government continues with its current proposals to further develop a system of water rights trading in England, then in contrast to the present system where water users hold a licence that details a set quantity of water which may be abstracted, licences might instead become linked to the available flow in a given waterbody. The volume of water linked to the licence would therefore go up and down as conditions in the river or aquifer change, and some or all of the licence could be traded with potential buyers. Agriculture holds by far that greatest number of abstraction licences but only uses a small amount of water compared to public water supply (approx. 1.5% to 50%) (DEFRA, 2008). This dynamic

points towards a future scenario in which many small trades occur between farmers, whilst less frequent but much larger trades occur between water companies, or between water companies and other sectors. Among other things, this has raised the issue of market power, where it is feared that large abstractors, such as the water companies, will "outmuscle" the smaller abstractors in a water market.

This situation suggests there is an opportunity to utilise the strategy of pooling water licences and forming a company among a group of agricultural abstractors, where doing so has the potential to increase their standing in the market. Our analysis of the other four groups has already provided some evidence that abstractor groups have a tendency to facilitate trading by acting as a broker between buyers and sellers. By acting collectively, each member's licence quantity would in effect act as a share in the company. Here, as with the LWT scheme, fiscal equivalence could be achieved as member costs are incurred in proportion to their company share. Furthermore, participating in the market to secure additional water is a plus-sum game, which, as noted, provides a greater incentive for farmers to act collectively (1d). Having formed a company, farmers would have the option to trade their individual licences internally, submitting any additional or unwanted water to a central pool, much like the procedure used by the LWT group. Alternatively, this internal allocation system could employ a competitive bidding/trading process to maximise economic efficiency. However, we caution that doing so has the potential to undermine other aspects of the arrangement such as the development of social capital, in turn diminishing the adaptability of the system. Any of the central pool which is not taken up by members of the group may then be aggregated and traded with other players in the market. A collective approach such as this would have the advantage of providing flexibility of water use within the agricultural sector, whilst giving farmers greater security and a firmer standing in trading situations with bigger players in the market.

The UK government is currently only intending to develop water markets in those catchments where trading would bring tangible benefits (Defra, 2013c). In part this is because instituting a new regulatory system is a resource-intense process. This would suggest that, where possible, it would be better not to implement such changes if it can be avoided. Again, especially in the IDB-controlled ponded systems to the east of the country (Figure 7.1), adopting schemes akin to the LWT model would save on the need

to undertake wholesale changes, whilst bringing the range of potential benefits we identified. Developments of the sort outlined in this discussion fit well with the changing political and discursive landscape of environmental management in England, where there is an increasing move towards both greater participation and cooperation by all stakeholders in management decision-making and action, as well as management liberalisation through the adoption of economic measures such as water markets or payment for ecosystem services (2c).

It is probable that many of the factors and mechanisms that have made the LWT model successful would work well in other countries with a similar context. Generally speaking, these would be situations characterised by a history of centralised natural resource management, stakeholders embedded in capitalist systems of production who are driven by strong economic incentives to act individualistically and compete, and relationships lacking in trust. Whilst mechanisms such as "stationarity", "storage", or a "plus-sum game" are already established criteria in the literature on the collective management of natural resources (Dinar *et al.*, 1997; Ostrom *et al.*, 1994), far less attention has been given "institution building" through the development of company structures. Yet the subject has not been wholly neglected. For example, in a study of grazing systems in the Australian Outback, Brunckhorst and Marshall (2007) consider the benefits of developing a corporate approach among stakeholders as one option for collectively managing the resource. Here the authors note that "appropriate business structures might offer a supportive framework for collective decisions that facilitate adaptive management, [thus] enhancing sustainability and endurance" (Brunckhorst and Marshall 2007: 182). Our analysis of the LWT scheme would support this assertion.

7.6 Conclusion

In this paper we have demonstrated the practical value of applying the politicised IAD Framework to studies of comanagement through an analysis of farmer water abstractor groups in England. This follows a previous submission to this journal in which we explored the relationship between the politicised IAD Framework and (adaptive) comanagement from a theoretical perspective. By adopting an integrated and critical approach, the analysis was able to identify a range of factors that appear to link water

abstractor groups in lowland England with comanagement. These "factors of success" were also used to infer more abstract mechanisms that can be said to generate comanagement, such as "trust" and the presence of an "energy centre". We then discussed the relevance of several of these factors and generative mechanisms for English water governance in the future, where the Framework guided a set of predictions about likely changes to the context in which water governance takes place. The discussion considered the relationship between comanagement and market theory by contemplating the place of water abstractor groups within a more liberalised system of water trading; a topic which has received scant attention in the literature to date.

In general, the findings of this paper have relevance for the emergence of comanagement in situations characterised by a power dynamic that favours individualism and competition, and where there has been a history of centralised and bureaucratic natural resource management. In particular, we have found evidence that institution building through the adoption of a company structure with a well-defined, legally enforceable members' agreement and protocol can overcome low levels of trust among resource users and managers. Doing so has the potential to facilitate power-sharing arrangements in a way that enhances the adaptability of the system, whilst also maintaining or even improving its efficiency and equity. The political economy and discourse analysis component of this investigation highlighted the need to encourage collective action among farmers through better integration of government programmes and the channelling of funding sources. To this extent, we propose the current system of grants and subsidies in England should be used to promote the formation of new catchment-based farmer groups whose purpose is to comanage water resources, whilst bringing existing groups into the management fold. Funding for shared farm reservoirs could also be used to create a "plus-sum game", with the intention of facilitating collective action. Finally, we conclude by suggesting that further investigations into the role of various types of company structures, as a means of facilitating stakeholder cooperation and participation in natural resource governance, is of much interest to scholars and practitioners of comanagement.

Epilogue

In this Chapter I have not been able to demonstrate the way in which the action situations of the politicised IAD Framework were analysed. In particular, the approach I employed in order to identify different institutional statements relating to the rule-in-use variable of the Framework (rules, norms, and shared strategies), how I differentiated between the different types of statement, and how these statements structure an action situation. As a result, in Appendix 3 I provide a short discussion with working examples.

Chapter 8: Conclusions

8.1 Review

The aim of this thesis has been to explore farmer cooperation and participation in English water governance, through the conceptual lens of (adaptive) comanagement. To do this I have developed an interdisciplinary approach that draws in particular upon sociology, political science, economics, and psychology. The various analytical strands of the research are held together by the politicised IAD Framework, which has guided the research at each turn. The thesis has moved through three broad phases. Phase 1 was theoretical and methodological, and comprises Chapters 2 and 3. Initially, in Chapter 2, I demonstrated how, from a theoretical perspective, the Framework is well suited to analyses of (adaptive) comanagement. Key to my argument was that by choosing to adopt the Framework, the researcher's attention is drawn to a range of methods which together are able to address the "many faces" commonly associated with the concept. Then, in Chapter 3, I outlined the research design. In doing so I discussed the critical realist paradigm I am working within, the Retroductive Strategy underpinning the research, and the various methods that have then been employed to address the four research objectives. In Chapter 3 I also discussed how the politicised IAD Framework is well suited to a critical realist approach.

Phase 2 was exploratory, and set out to investigate the wider context surrounding farming and water governance in lowland England, and what this implies for farmer cooperation and participation as viewed through the lens of (adaptive) comanagement. This phase focused on issues of policy, power, and trust, which in turn relate to three of the politicised IAD Framework's exogenous variables, namely the "rules-in-use", "political-economic", and "discourse" variables. This phase of the research therefore provided the context in the model of the Retroductive research strategy I have employed (Figure 3.3). In Chapter 4 I undertook a literature review, from which five policy categories were distilled that appear to act as an enabling environment for adaptive comanagement. I then compared these categories to water

policy in England using a directed content analysis. In Chapter 5, I employed a broad political economy analysis of farming and water governance in lowland England, by examining historical developments from World War II until the present day. This analysis, which was structured by an approach known as the Power Cube, shed light on the current power dynamic influencing the relationship between lowland farmers, and between these farmers and water managers. Then, in Chapter 6, I undertook an analysis of farmer discourse using two concepts from the field of critical discursive psychology, namely interpretive repertoires and subject positioning. This study also examined the power dynamic between lowland farmers, and between these farmers and water managers, but from a different perspective to the previous study. Both studies, and in particular the latter, provided insights about the levels of trust that characterise these relationships.

Finally, Phase 3 was more focused, where here I adopted a multiple case study approach in order to analyse five farmer water abstractor groups in the low lying east of England. Consistent with a critical realist approach, the intention of this analysis was to identify those mechanisms that generate comanagement between abstractor groups and statutory water managers. Again the politicised IAD Framework was employed in order to guide the analysis, where the broader findings of Phase 2 were incorporated into a more fine-grained analysis of each abstractor group at different levels of organisation and governance. Doing this allowed me to discover various "factors of success" that appeared to link farmer cooperation with comanagement outcomes. These more concrete factors were then used as a foundation upon which to make inferences about the deeper, more conceptual causal mechanisms. The relevance of the findings were discussed in relation to the future of water governance in England, where the Framework guided a set of inferences about likely changes to the context in which water management takes place. I gave particular attention to the relationship between comanagement and market theory by considering the place of water abstractor groups within a more liberalised system of water trading; a topic which has received very little attention in the literature to date.

8.2 Conclusions

Having reviewed the research process, here I will detail the various conclusions that follow from the findings of this thesis. The conclusions are displayed in relation to each of the four research objectives stated in Chapter 1.

Objective 1: Demonstrate whether and how the politicised IAD Framework can be applied to studies of (adaptive) comanagement, and discuss the benefits of doing this.

Objective 1 has been addressed throughout all three phases of the research. In Chapter 2 I offer theoretical justification for how the Framework applies to analyses of (adaptive) comanagement, and then in the remaining chapters - culminating in the case study analysis of abstractor groups in Chapter 7 - a practical demonstration of the Framework is undertaken. I can conclude that the politicised IAD Framework is well suited to studies of (adaptive) comanagement. Generally speaking, this is because it provides breadth, clarity, and structure, drawing the analyst's attention to: 1) the range of variables and questions to be considered when undertaking a study of (adaptive) comanagement, 2) the various components of the situation and the ways in which they interact, 3) the way in which these components are structured by the five exogenous variables, and 4) the criteria the analyst may wish to adopt in evaluating the outcomes of the process.

More specifically, from an (adaptive) comanagement perspective, the advantages of employing the politicised IAD Framework are: 1) the five exogenous variables of the Framework encompass the range of approaches needed to analyse the "many faces" of comanagement that exist in the literature (Berkes 2009), where these include trust building, institution building, power sharing, problem solving, social learning, and governance, 2) the Framework can be used to perform embedded analyses concerned with both different levels of organisation and governance, and the relationship between these levels. This "holons-within-holons" approach (Ostrom, 2005) is consistent with adaptive comanagement's focus on multiple levels of activity and cross-scale interplay. It is also a means of tacking the complexity associated with

social-ecological systems by dissecting them into composite holons, which can then be dissected further (*ibid*), 3) the Framework allows the analyst to ground the normative concepts associated with (adaptive) comanagement in a critical awareness of "situation" and how context and power fundamentally influence the behaviour of the system in question, 4) the Framework helps to identify the key mechanisms that generate (adaptive) comanagement and the contextual conditions that facilitate or obstruct this process, 5) analyses that employ the Framework provide a solid foundation upon which to make sound policy recommendations. Of importance is the fact that the research remains relevant to policy makers through its focus on the socioeconomic and institutional components of an action situation. This issue of informing the policy process has been recognised as a challenge to adaptive comanagement scholars (Berkes *et al.*, 2007).

Objective 2: Analyse the extent to which English water policy provides an enabling environment for adaptive comanagement.

In a number of ways decision makers have put in place policy objectives that are amenable to the emergence of adaptive comanagement. In particular, the key features of water policy in England that were identified as facilitating adaptive comanagement are: 1) a recognition of the many economic and non-economic functions that water and the water environment perform, using the framework of the ecosystem services approach, 2) an acceptance that change is an inherent feature of water management that is only likely to become more prominent in the future, 3) a stated desire to enhance the resilience of the system, 4) the promotion of participatory and locally-based governance approaches that are linked across scales of organisation, 5) a growing awareness of water management as a long-term social process.

Yet at the same time, I also noted a level of discrepancy between key aspects of the five policy categories that facilitate adaptive comanagement and water policy in England. In particular, I identified: 1) a failure on the part of policy makers to adequately prioritise the place of social learning as a central mechanism by which water governance in England can progress and adapt to changing circumstances, 2)

only a weak focus on uncertainty and the need to live with it, instead of simply attempting to reduce or eliminate it, 3) a failure to link resilience and adaptive capacity to the social dimension of water management.

Objective 3: Analyse the ways in which power and levels of trust influence the ability of lowland farmers to comanage water.

Broadly speaking, the political economy analysis in Chapter 5 revealed how since World War II the system governing farming and water governance in lowland England has witnessed a dispersal of power across different levels of organisation from the local to the international, and in different types of spaces. One outcome is the establishment of "invited spaces" in which non-state actors, including farmers, have an opportunity to influence planning and decision-making. Yet despite this opportunity, the power dynamic revealed by the analysis indicates that three distinct barriers stand in the way of developing comanagement arrangements between lowland farmers and water managers. These are: 1) the power "within" lowland farmers, which continues to be defined in large part by a productivist ideology that favours individualism, competition, and profit, often at the expense of the environment, 2) the ongoing power that government water managers exercise "over" farmers instead of sharing power "with" them, and 3) the relationship between modern farming and environmental interests, where the two sides power "to" act has tended to be diametrically opposed.

The discourse analysis in Chapter 6 identified three distinct discourses, or "interpretive repertoires", relating to how the farmers in the study talked about the relationship between farming and water resources management. These are the competition, conflict, and compromise repertoires. The relative dominance of the competition and conflict repertoires in the talk of the participants suggests that the relationship between irrigators and water managers in England is characterised by low levels of trust, and reflects a power dynamic that favours individualism and opposition. This situation presents only limited possibilities for the development of comanagement. Yet the analysis also suggests that this power dynamic is being challenged by the

compromise repertoire, which accounts for the needs of others, shows an appreciation for the wider environment, and views change in water resources management as a process of negotiation in which cooperation can perform a useful function. Encouraging the widespread adoption and institutionalisation of this repertoire, whilst moving beyond subject positions in the other repertoires that at present serve to undermine trust, must start with better communication between farmers, and between farmers and water managers.

Objective 4: Analyse the relationship between water abstractor groups and water resources management and identify the mechanisms that generate comanagement. Discuss the relevance of the findings for water governance in England going forwards.

By employing the politicised IAD Framework, the analysis in Chapter 7 identified nine key factors that appear to link the abstractor groups in the study - and particularly the LWT group - to comanagement. These "factors of success" are: 1) the adoption of a company structure with a clearly defined and legally enforceable members' agreement and protocol, 2) a shared water licence, 3)the ponded system of drainage channels which LWT abstracts from, 4) access to additional water, 5) the close relationship between farmers and the IDB, 6) the presence of the "compromise repertoire", 7) Similar race, age, gender, and profession of group members, 8) small group size, and 9) the presence of a leader.

As discussed in Chapter 3, an important part of a critical realist approach demands that I do not take the co-variance of events in the domain of the empirical as implying a causal relation. Instead the goal is to discover deeper, more abstract mechanisms that can be said to generate the observed outcome pattern within a given context. In the case of this research the "outcome pattern" refers to the participation of abstractor groups in one or more of seven broad comanagement activities (Table 7.1). Therefore, it can't be said that the factors of success listed above *cause* comanagement, but only that they appear to correlate with this outcome. However, as discussed in Chapter 3, these factors are useful for making inferences about more abstract generative

mechanisms. From the factors of success identified above, I have concluded that the following generative mechanisms were operating to bring about (adaptive) comanagement: 1) stationarity (of the resource), 2) a plus-sum game, 3) institution building, 4) trust and trust building, 5) the presence of a bridging organisation, 6) group homogeneity, 7) group size, 8) the presence of an energy centre, 9) problem solving, and 10) social learning. All of these mechanisms are recognised in the commons, resilience, and comanagement literature, and this provides support for the internal validity of the research, as discussed in Chapter 3.

Of these mechanisms, several appear to be more crucial for generating (adaptive) comanagement within the context identified in Phase 2 of the thesis; that is, within a situation characterised by relatively low levels of trust both between farmers, and between farmers and water managers, where individualism and competition are dominant behavioural traits. By employing three strategies for deciding among contending mechanisms – namely counterfactual thinking, an extreme case study, and a comparative case study approach (see Chapter 3) - two mechanisms in particular appear most crucial for generating comanagement between abstractor groups and water managers in lowland England. The first is "institution building" through the specific shared strategy of adopting a company structure with a related members' agreement and protocol. Furthermore, the strategy to form a company as a way of facilitating comanagement is perhaps the most novel finding of the thesis, given that it has received relatively little attention in the literature to date. It is also of particular relevance given the contextual conditions described above, where it has helped to overcome low levels of trust, in turn facilitating power-sharing arrangements. The second key mechanism is the "stationarity" of the resource, which was unique to LWT and appears a crucial element of the scheme's success.

The mechanisms identified in this thesis have potentially significant implications for farming and water governance in England, where I have proposed that in the future: 1) water supply is set to become more variable and less secure, 2) the water regulatory regime will become more liberalised through the development of water markets, and 3) a dual focus on market instruments and participatory approaches is likely to remain

a central characteristic of water and environmental policy. Within this changing picture, a company structure and a clearly defined and legally enforceable operating procedure has the potential to increase the flexibility of agricultural water management, and the overall adaptability of water governance at the local level, whilst maintaining or improving measures of efficiency and equity. Furthermore, within a water market, adopting a company structure is likely to facilitate cross-sector trading with farmers whilst improving their standing in relation to the "bigger players" in a trading situation.

Finally, the water resource systems of many agriculturally important, low-lying parts of the country already exhibit stationarity, whether in the IDB-managed ponded systems of the Fens (see Figure 7.1), or the aquifers which many farmers abstract from. These areas represent opportunities to encourage collective action among farmers because of the way stationarity makes it easier to self-organise and participate in management decision-making. Even on free-flowing rivers a degree of stationarity can be achieved, by storing water in on-farm reservoirs. In the future, introducing measures to trigger these mechanisms may become increasingly relevant as the requirement to manage water through change and uncertainty becomes commonplace. It is probable that these conclusions are applicable to other countries with similar contexts.

8.3 Recommendations

In this final section I provide recommendations that stem from the research findings and conclusions. They are divided into two sections, where these are recommendations for policy makers, and recommendations for researchers and further research.

8.3.1 Recommendations for policy makers

Here I propose recommendations for policy makers that would facilitate the development of (adaptive) comanagement arrangements between farmer groups and

water managers in lowland England. A number of useful suggestions can be derived from the findings of the analyses in Chapters 4-7.

With respect to the policy analysis in Chapter 4, which set out to address Objective 2 of the research agenda, two recommendations can be made that would facilitate the development of an enabling policy environment for adaptive comanagement. Firstly, water policy should give special attention to the place of social learning within existing management processes such as river basin management planning and the Catchment Based Approach. It should also promote new objectives especially designed to facilitate joint learning as a way of developing a more adaptive system of water governance in England, and to recognise that this is necessary because of the inherent levels of uncertainty decision-makers face from a range of sources. Secondly, attempts to enhance the resilience and adaptive capacity of water governance in England must explicitly link this objective to the social dimension. In the policy documents, although resilience and adaptive capacity were stated aims of the government, this typically related to the design of infrastructure and regulatory systems, or the healthy functioning of natural ecosystems. Whilst these are important considerations, from an adaptive comanagement perspective the participatory, multi-level, learning, and process aspects of water governance are seen as key social attributes of a more resilient system.

Considering Objective 3, which was addressed in Chapters 5 and 6, it is clear that both of these analyses provide justification for the use of regulations and financial incentives designed to instigate behaviour change. This points to the importance of the current system of agri-environment and water-related schemes and programmes. Encouraging farmer cooperation and participation in water governance will depend on the structure of such schemes. To this end, I suggest a greater integration of government programmes and a channelling of funding sources. Here CAP payments under Environmental Stewardship Scheme (ESS) options such as HR8 (see “The CAP” in Section 5.3.5) could combine with initiatives like the Catchment Based Approach to incentivise the formation of farmer groups and their participation in water comanagement activities. Given the changing structure of the system regulating water

resources management (see Section 6.2.1), a suitable comanagement activity to focus on initially could be water allocation.

This consideration of water allocation leads on to recommendations that arise from the final analysis in Chapter 7, which set out to address Objective 4. Considering the success of the comanagement scheme that the LWT group participated in, it was clear that a power-sharing arrangement that revolves around water allocation is a feasible option for farmer groups operating in conjunction with local water managers. Again looking to the current system of grants and subsidies in England, a recommendation to encourage similar arrangements in other areas of lowland England is to tailor ESS options and Catchment Based Management funding in order to cover the costs of self-organising (start-up and running costs). Specific focus should be given to options that facilitate the formation of a company structure among a group of farmers, where the function of the company is oriented towards comanagement through the adoption of an appropriately designed, and legally enforceable members' agreement and protocol.

Options of this sort would appear to be most suitable for regions where water levels are managed by IDBs. This is because the resource in these areas tends to exhibit a high degree of "stationarity", whilst the land itself often provides excellent growing conditions for farming. Furthermore, the higher levels of "trust" between IDBs and farmers could help to facilitate the development of comanagement schemes, as was the case in the LWT study. It would also provide IDBs, whose position in England's system of water governance is sometimes called into question, a new function as a "bridging organisation" in arrangements of this sort. However, even outside of these areas, on free-flowing rivers, a degree of stationarity can be achieved by storing water in on-farm reservoirs. Here I recommend the provision of funding designed to promote the development of shared reservoir schemes. This would represent a "plus-sum game" that again could encourage collective action among farmers in a way that is geared towards making water allocation more adaptable and efficient.

8.3.2 Recommendations for researchers and further research

Several recommendations for researchers and further research emerge from the findings of the thesis. With respect to researchers, the clearest recommendation is for the use of the politicised IAD Framework as a means of analysing natural resource governance, and (adaptive) comanagement in particular. Whilst I do not need to go into all the reasons for suggesting this again here, it suffices to say that the clarity, breadth, and structure the Framework provides, the way it is able to ground normative concepts in a critical appreciation of situation, and its ability to produce results that are relevant for policy makers, all act as strong arguments for its adoption. Furthermore, I recommend using the politicised IAD Framework as a way of structuring multi-disciplinary team studies, whereby the analytical clarity it provides can be used to guide and organise the work threads of the various members in the team.

A number of specific recommendations for further research also emerge from this study. Of particular importance, I recommend that the causal relationships I have proposed exist between the generative mechanisms identified and (adaptive) comanagement be further investigated. Indeed, this is regarded as an important step in a critical realist approach, whereby causal mechanisms are not just postulated, but are then subjected to further empirical testing in order to ascertain both their presence, and their relative explanatory power with respect to the phenomena of interest (Bhaskar, 1975, 1979; Danermark *et al.*, 2002). For example, although I have proposed that all the mechanisms identified generate comanagement, following further investigation it is likely that some of these mechanisms, whilst perhaps generating collective action among farmers more generally, are not as relevant to a specific comanagement outcome pattern. Within the limited scope of this study I have already attempted to make this distinction by proposing that “institution building” (with respect to the specific measure of adopting a company structure) and resource “stationarity” are most vital for generating comanagement arrangements geared towards water allocation between farmer groups in lowland England. Yet further enquiries are needed in order to refute or add weight to such claims, and to discover

new structures and causal mechanisms that facilitate or obstruct the development of (adaptive) comanagement.

Finally, there is real value in undertaking further research aimed at exploring options for promoting farmer cooperation and participation in water governance that revolve around the key findings. In particular, I recommend attention is given to the role of IDBs, where their function as a potential bridging organisation, especially in the ponded surface-water systems of lowland England, should be explored further. Secondly, and most interestingly, I recommend that further research concerns itself with the role of various types of company structures, as a means of facilitating farmer cooperation and participation. These proposals will need to be investigated in relation to the current system of grants and subsidies, which, as the findings from Chapters 5 and 6 suggest, are the most efficacious means of instigating behaviour change among lowland farmers in the short to medium-term. This will require that new agri-environment schemes and options are explored, with the aim of providing the relevant support to incentivise the formation of farmer groups designed to participate in water comanagement.

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Appendix 1: Extended Interview Schedule

1. General

- Information about me, the research, and the interview.
- What level of confidentiality would you like? I will ask you again at the end of the interview.
    a. Name b. Name of group c. Position in group
- First of all can you please tell me a little bit about you and your farm business before moving on to questions about the abstractor group?
- What would you say are the major challenges to farming in the future?

2. Internal group dynamics

- What is your role in the abstractor group?
- When did the group form and what were the reasons for doing so?
- How many members do you have now? How many did you have to begin with?
- How does someone become a member of the group?
- What type of agreement do you have between members of the group (e.g. contractual or implicit)?
- How has the group changed when you compare it now to how it was in the beginning? (Function, size, etc.)
- What would you say have been the achievements of the group to date and were there any particular challenges you faced in attaining them?
- What would you say are the benefits of being a group member?
- What would you say are the drawbacks of being a group member?
- How often do you meet up? Who meets up? What do you discuss?
- What level of communication would you say exists between members, and between members and the committee, etc.?
- Would all group members know who the other members are?
- What sorts of decisions do you have to make as a group, and how do you decide upon them?
- What sorts of costs are involved in running the group and how are they paid for?
- To what degree would you say there is trust between the group members, or to what degree do the group members trust the organisation to act on their behalf?
- How do you feel about cooperating with other farmers? And in an ideal situation would you rather be operating independently? Why?
- Do conflicts ever arise between the group members, and does the group itself play any part in resolving them if they do arise? If so, how?

- Does the group have any say in how its members use water in order to manage it better? If so, how is this done?
- Has the group facilitated any water trades between its members? How well placed do you think the group is for doing this?
- What do you feel about water trading? Have you had any experience with it or know anyone who has? Would you like to see farming ring-fenced in a market?

3. External group dynamics

- What is the group's relationship with the Environment Agency and other government bodies like Natural England?
- How have these relationships changed over time?
- In what way does the group function to resolve issues between its members and other stakeholders or the government?
- Do you think the Environment Agency is effective in monitoring abstraction volumes and timings?
- What are the consequences to farmers who break their licence conditions?
- Does the group have much to do with other non-government organisations or stakeholders?
- What is the group's relationship with environmental NGOs like the rivers trusts?
- To what degree did the recent drought affect your members?
- How did the group responded to the challenge of the drought?
- What would be your advice to any farmers thinking about forming an abstractor group?

4. Farming and water management

- I read in a report that the NFU wants the Government to support farmer-led catchment abstraction groups who play a part in managing water. Would you say this is feasible? And if so, is it desirable? How could you see such an arrangement working?
- Do you feel a responsibility towards the condition of the river in you catchment? And do you have any control over management decisions even if you did?
- What do you think about the way water is managed in England, and what are the ways you would change it if you could?
- In what ways do farmers contribute to water management in this catchment? Is there a role for them to become more involved in water management issues going forwards?
- What could farmers contribute towards water management?

- Do you think there is a greater role for cooperation, both between farmers and between farmers and the other stakeholders involved in water management? And could groups like yours be used in this way?
- Are you part of any Catchment Sensitive Farming, catchment-based management, or stewardship schemes at the moment? If yes, what does this entail? If no, why not?
- There is a higher level stewardship grant for collective environmental action; do you think there would be any interest from your group to apply for this sort of funding in order to play more of a role in water management issues in the catchment?

What level of confidentiality would you like? I will ask you again at the end of the interview.

a. Name b. Name of group c. Position in group

APPENDIX 2: Research Information Sheet and Interview Consent Form

Cranfield UNIVERSITY

Understanding the role of farmer cooperation in the management of water resources

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully.
This study is part of an EPSRC funded research project looking at the potential for abstraction licence trading to overcome issues of water scarcity in the UK. The research team is made up of nine academics from four universities, including three PhD students. As one of those PhD students, my specific area of interest is looking at the ways in which farmers are working together as members of water abstractor groups.

The aim of my research is to understand how abstractor groups and shared reservoir groups that exist at the moment might function in the future, where weather conditions are predicted to be more variable and water supply less secure. To do this I will be interviewing farmers who are part of these groups, as well as individuals from outside organisations who deal with the groups, in order to explore how they function at present and how these functions may change over time.

As someone involved with one or more of these groups, you are invited to participate in the study. It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and asked to sign a consent form. Please note that you are free to withdraw from the study at any time and without giving a reason.

Participating in the study will involve being interviewed for approximated 45 minutes on issues related to the abstractor group you are involved with, as well as water issues more generally. If you are happy to, the researcher may then contact you at a later date to ask for additional information or to clarify any information given during the interview. Your participation will assist in an understanding of how farmers use and manage water in partnership, and how this might improve water security for both farming and the environment.

All data you provide will be stored in accordance with the Data Protection Act, and should you wish to remain anonymous your name and any other relevant details will be removed upon request. The results of the study will go towards a final PhD thesis, and may also be published in a relevant academic journal.

If you wish to take part in this study, please initial where appropriate and sign the form provided. Please note that this research has been reviewed and approved by Cranfield University's Science and Engineering Research Ethics Committee.

If you would like to know any further information, please contact:

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Thank you for taking the time to read this information

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CONSENT FORM

Full title of Project: Understanding the role of farmer collaboration in the future management of water resources.

Name, position and contact address of Researcher:

Luke Whaley
PhD Student
Water Science Institute
Cranfield University

		Please tick box
1.	I confirm that I have read/listened to the information about the above study and have had the opportunity to ask questions.	☐
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.	☐
3.	I agree to take part in the above study.	☐

		Please tick box	
		Yes	No
4.	I agree to the interview being audio recorded	☐	☐

Name of Participant	Date	Signature
Name of participant	Date	Signature

Appendix 3: Analysing Action Situations

Here I provide a brief working example to illustrate how I analysed action situations during the research. Much has been written in the main body of the text on the process of using the politicised IAD Framework to do this. In this appendix I therefore limit the theoretical discussion and instead refer the reader back to the relevant sections of the thesis (see Chapters 2 and 3).

The stages of the analysis were shown in Figure 3.1. The first step was to define the action situations for each case study in Chapter 7 (each of the five abstractor groups), where these related both to levels of organisation (inter-organisational and intra-organisational) and levels of governance (operational, collective-choice, and constitutional levels). Each action situation is broken down into seven working components (see Figure 2.2) consisting of *participants* who take up various *positions*, where any given position allows the participant to undertake certain *actions* that are dependent on how much *information* they possess about each available action, how actions are linked to potential *outcomes*, the degree of *control* individuals exercise over these outcomes, and the *costs and benefits* they assign to them (Ostrom 1990). An example of an intra-organisational action situation at the operational level is provided in Table A3-1. This situation relates only to the task of allocating water between members of the LWT abstractor group.

Table A3-1. Water allocation between LWT members at the operational level.

Participant	Position	Actions	Information	Control	Costs and benefits	Outcomes
Farmer	Chairman	Ensure the board of directors make decisions in accordance with the rules of	Members' agreement and protocol	Strong control, but accountable to membership.	Coordination costs, benefit of ensuring operating procedure is followed	Board of directors operate in accordance with rules

		the members' agreement and protocol				
Farmer	Board director	Decide how water is to be allocated	Members' agreement and protocol	Joint control/decision-making	Coordination costs, benefit in that water allocated fairly when demand outstrips supply	Equitable allocation when demand outstrips supply
Farmer	General member	Submit proportion or all of licence to central pool before season begins for permanent or annual use	Estimate of water requirement for season	Individual decision	Coordination costs, benefit by receiving additional income for unwanted water	1) Greater flexibility of water use, especially for specialist growers operating across the catchment, 2) Increase income for members, 3) Enhanced water security
		Take water out of central pool before season begins for permanent or annual use	Estimate of water requirement for season	Individual decision	Coordination cost, benefit by having water to irrigate current crop or to expand the crop for whole season	
		Submit proportion or all of licence to central pool during season	Estimate of water requirement for remainder of season	Individual decision	Coordination cost, benefit by receiving additional income during season for unwanted water	
		Take water out of central	Estimate of water requirement	Individual decision	Coordination cost, benefit by	

		pool during season	for remainder of season		being able to irrigate crop during season	

The action situation is structured by the five exogenous variables of the politicised IAD Framework. The variables themselves where analysed in Chapters 5-7. In Chapters 5 and 6, the political-economic and discourse variables were explored, where these variables are seen to influence in particular the "position" element of action situations. For example, the analysis of the political-economic variable revealed that within the action situation in Table A3-1 above, farmers are positioned as individualists with low levels of trust in one another. This finding was supported by the discourse analysis in Chapter 6, where the positions attributed to farmers in the competition and conflict repertoires were self-interested, insular, and uncommunicative businessmen. As Chapter 7 revealed, the LWT scheme nonetheless constitutes a case of genuine comanagement, where both farmers and water managers cooperate in order to contribute to a range of water comanagement activities. It was clear that the decision to form a limited company and devise a legally enforceable members' agreement and protocol was one a key factor of success, pointing to the process of institution building at the local level. Here I take this factor further; in Table A3-2 the allocation rules the group devised in order to structure the action situation above (Table A3-1) is shown.

Table A3-2. The rules devised by the LWT group to allocate water. This table only details the choice rules concerning allocation of water among group members.

Type of Rule	**Basic verb**	**Rule-in-use**
CHOICE	Do	Before the season starts any member with surplus water may submit some or all of their licence share to a central pool on a one-year basis, where this will include proportionate daily allocation, or else this water cannot be shared with anyone else in the group. Any annual allocation offered but not taken up will be transferred to a "first reserve".

		Before the season starts any member with surplus water may submit some or all of their licence share to a central pool on a permanent basis, where this will include proportionate daily allocation, or else this water cannot be shared with anyone else in the group. Any annual allocation offered but not taken up will be transferred to a “first reserve”.
		Before the season starts any member requiring additional water on an annual or permanent basis may apply for it from the central pool on the condition that they contribute towards the annual administrative costs of the scheme in proportion to their total share of the group’s abstraction licence or else the board of directors will take disciplinary action against the member in question.
		During the season any member requiring additional water may apply for it from the first reserve on the condition they have used their total allocation, where this will not include any daily allocation, or else they cannot access additional water from the group.
		During the season any member with surplus water may submit this licence share to a “second reserve”, where this will not include proportionate daily allocation, or else this water cannot be shared with anyone else in the group.
		During the season any member requiring additional water may apply for it from the second reserve on the condition that the first reserve has been used, where this will not include any daily allocation, or else they cannot access additional water from the group licence.
		All members must not trade any part of their share of the

		licence directly with any other member or else the board of directors must apply disciplinary action.
		All members must not to trade any part of their share of the licence with a third party outside of the group or else the board of directors must apply disciplinary measures.
		All members must not allow a third party to use any part of their share of the licence on land that is not designated within the scheme as laid out in the licence conditions or else the board of directors must apply disciplinary measures.

All of these rules are "choice" rules. That is, they most directly impact upon the "actions" element of the action situation (see Figure 2.2). The syntactic structure of the rules-in-use[21] is defined according to Ostrom and Crawford's (1995) grammar of institutions. According to this structure, rules are comprised of five components: [Attribute], [Deontic], [A*i*m], [Conditions], and [Or else]. For example, the rule in England relating to driving on the left hand side of the road can be structured as: "All drivers [attribute] must [deontic] drive on the left hand side of the road [a*i*m] unless overtaking another vehicle in designated areas [condition] or else they will be prosecuted [or else]". The same syntax can be seen in the ways in which the rules detailed in Table A3-2 above have been structured.

Using the grammar of institutions also allowed me to distinguish rules-in-use (ADICO) from other institutional statements, namely norms (ADIC) and shared strategies (AIC). For example, one norm relating to the LWT case study concerns the close relationship between the IDB and the farmers in the abstractor group, where, according to the grammar of institutions, the norm in question can be written as: "Farmers who irrigate [attribute] must [deontic] be assisted by managing water levels [aim] when they request help [condition]. Here there is no "or else" component of the statement – i.e.

[21] Where these rule were discovered after analysing the interview data and other supporting documents.

no formal penalty is incurred for not following this course of action – thus distinguishing it from a rule.[22] Finally, to illustrate a shared strategy I can refer to the decision by several abstractor groups to reduce their water use during drought periods. This can be written as: "All group members [attribute] reduce water use by the agreed amount [aim] when there is a drought [condition]. Alternatively, LWT's decision to form a limited company is also a shared strategy that was adopted within the structure of the inter-organisational action situation during the formation of the scheme. This strategy can be written as: "All group members [attribute] form a limited company [aim] before applying for a shared licence [condition].

The various action situations, as well as the rules-in-use and other exogenous variables that structure them, interact with one another. Thus, in the simple example of choice rules in Table A3-2, reference is made to the disciplinary measures the board of directors can use to penalise members who break the rules. These sanctions are also encoded in the members' agreement and protocol, and constitute "pay-off" rules, which most directly affect the "cost and benefit" component of an action situation. There are of course many other rule-in-use relating to the other five components of the action situation, where alongside choice rules and pay-off rules, these are position, boundary, aggregation, information, and scope rules (Ostrom, 2005). By way of illustration, an example of each type of rule from the analysis of the LWT scheme is provided in Table A3-3 below.[23]

Table A3-3. Examples of each of the seven types of rules-in-use.

Type of rule	**Basic verb**	**Rule-in-use**
POSITION	Be	There will be no fewer than four directors
BOUNDARY	Enter or leave	A third party may enter the scheme as a member if the majority of members vote him or her in, and where the joining

[22] Nonetheless, not following norms will typically result in an "informal sanction", be it external, for example through peer pressure, or internal, for example by feeling guilt or shame (Ostrom, 2005).

[23] Note that "position" rules do not conform to the ADECO syntax (Ostrom, 2005).

		party is not taking a transfer of any existing member's rights and where he or she contributes towards the capital payments as decided by the board, or else the person in question must not join.
AGGREGATION	Jointly affect	When demand for water in the central pool outstrips supply the board of directors must decide how the water will be allocated between those members requesting it or else the chairman can take disciplinary action.
INFORMATION	Send or receive	All members of Lincoln Water Transfer must send their abstraction returns to the UWIDB at the end of each week or else the board can take disciplinary action.
SCOPE	Occur	Lincoln Water Transfer's abstraction activity must occur along the reaches of the drainage channels designated in the group's licence and must be used on the area of land designated in the group's licence or else the regulator has the right to sanction the offender/s in question.

Finally, it is necessary to note that a fine-grained analysis of rules-in-use (and other exogenous variables) was not employed to analyse all the ways in which the five exogenous variables structure all of the action situations comprising the case studies in Chapter 7. This would have been a massive task, without sufficient benefits to justify such an undertaking. This is especially so because such an approach is typically only necessary when attempting a formal game-theory analysis (Ostrom 2005). In this thesis, the approach I have adopted has been less formal. As such, at times it sufficed to pick out what appeared to be the most significant elements of the exogenous variables as they related to the action situations, or to define those action situations that were of most interest in detail, whilst spending less time on others.