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## **Micro-level crafting of institutions within integrated catchment management: early lessons of adaptive governance from a catchment-based approach case study in England**

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### **Abstract**

There has been considerable interest and discussion surrounding institutional design and governance in the areas of planning, political studies and policy development and more recently natural resource management. Within England, like much of Europe, an integrated catchment management, called the catchment-based approach (CaBA), has been developed when implementing the European Union (EU) Water Framework Directive (WFD). This is seen as both a driver for stricter standards for water quality and ecological status in water course and encouraging the active involvement of stakeholders and communities in both planning and action. This paper analyses institutional design at the local level from the perspective of two concepts, namely institutional governance and social–ecological systems. The intention is to highlight synergies between the two concepts. Through this a new aspect of institutional design is revealed, the micro-level or ‘crafting’ of institutions by local actors. The paper identifies criteria that are associated with this aspect and analyses an integrated catchment case study in England. The paper concludes that the current policy approach in England, and potentially elsewhere in Europe, offers potential for the ‘crafting’ of institutions and at the local social–ecological systems scale this has potential for positive benefits such as greater understanding and locally effective governance. Both would assist in achieving policy objectives, such as those of the WFD. The case study utilised an effective participatory approach that was, according to the criteria, robust and transferable in developing an adaptive governance approach.

### **Introduction**

There has been considerable change in the past 20 years regarding the governance of natural resources, the way institutions view those resources and the diversity of these arrangements (Ostrom, 2005, 2011). The management of natural resources and the environment was highlighted at the UN Rio Earth Summit during 1992 and led to a focus on sustainability issues for the next 20 years. More recently, the Millennium Ecosystem Assessment (MEA) has indicated that two thirds of the world’s resources are being depleted by human activity (MEA, 2005). This has led many to ask what needs to change, and this mostly hinges around adjusting systems to incorporate new environmental issues, making the right decisions and ensuring they are implemented (Anderies and Janssen, 2014). All three of these aspects involve changing institutions, either adjusting or expanding existing ones or creating new ones (Thiel et al, 2014).

The aim of this paper is to bring together institutional design and social-ecological (SES) perspectives around the current discussions on and changes in governance within integrated catchment management policies across Europe. The literature reviewed in the paper suggests that the connection between SES, in the shape of co-management (Carlsson and Berkes 2005) and the

ecosystem approach (Waylen et al 2014), and institutional design, especially micro-level or 'crafting' of institutions (Alexander, 2006; Thiel et al, 2014), is strong. However, the social-ecological literature assumes an ability of institutions to change or the need for change. Therefore there is a mutual synergy in extending the institutional design literature with the concept of social-ecological systems. The benefit would be to increase understanding of the micro-level or 'crafting' of institutions and potentially be able to assess the effectiveness of such an approach where it takes place. One pilot catchment is examined in detail using an action research approach (Zikos and Thiel, 2013) where an integrated bottom-up participatory framework is being trialed.

The move away from a sector or issue-based approach (e.g. flooding, water quality and agriculture) towards a place-based approach (e.g. catchment or sub-catchment) has been long predicted. Lowe and Ward (2007) saw this as a part of Government policy in the mid-2000s and a new way forward for rural policy. This is also true of developments in spatial planning (Scott et al 2013) and the rise in policy based around the ecosystem approach (MEA 2005). From an institutional perspective Gualini (2001) also suggests that the move towards a 'collective framing' is required to make sense of a complex situation. This suits a spatial or place-based approach and involves some reflective thinking rather than an issue-driven process. Alexander (2006) suggests that this reflective processing is a key driver for institutional change.

The management of water within river catchments has to some extent been at the forefront of the sector to territorial change within developed countries (Bissett et al, 2009, Marshall et al, 2010). As Rijke et al. (2012a) outline developed countries have focussed on civil engineering and 'controlling nature' with a range of structures and interventions concerning flood management and fluvial flow. Nevertheless this sectoral based approach covering flooding, drinking water, abstraction and irrigation quality is now being replaced by 'an integrated approach that covers many disciplines' such as spatial planning, ecology, hydrology and water management (Rijke et al., 2012a, p.369). Increased integration around the governance of water resources has coincided with a heightened awareness of the various goods and services that ecosystems provide society (Fish 2011). Key elements include the provision of clean water and the regulation of water flow and these were identified in the MEA and the UK by the National Ecosystem Assessment (NEA) (NEA 2012). The UK NEA also highlighted the need for a systems approach, which has in turn influenced the development of the catchment-based Approach (CaBA) (EA 2012). Both are frameworks that reveal the shift towards a territorial or catchment-based approach, which seeks to recognise the links between the ecosystems and society (MEA, 2005).

The Environment Agency (EA), the government agency in England which implements national policy on issues concerning rivers, flooding, and pollution, has been developing proposals to take forward the Government's commitment to integrated catchment management. The approach is similar to that of 'Room for the River' in the Netherlands (Rijke et al. 2012a). Phase one of CaBA was to introduce pilot projects in 25 catchments across England during 2011 and 2012 as a 'proof of concept' for a more integrated and participatory approach at the catchment scale (Catchment Change Management Hub. 2013). Previous participatory work by the EA had been around issues, such as flooding or fish stocks, rather than integrated at a spatial scale. The prime driver behind this initiative is the European Union (EU) Water Framework Directive (WFD) and its requirement that all water course will reach 'good ecological status' by a particular date, for the UK this is 2027. WFD provides a statutory framework and timetable for making improvements to the whole water

environment and introduces new stricter standards for water quality and ecology. However, the Directive also contains a specific objective that encourages the active involvement of stakeholders and communities in planning and action, a trend that is present in planning more generally (Healey, 1998). In this sense there is the potential for institutional change in the way that catchments are governed and understood by a wider range of stakeholders than has hitherto been the case.

### **Institutional design and integrated catchment management**

According to Alexander (2005), institutional design emerged from debates across planning theory and institutional analysis and he defines it as

*'the devising and realization of rules, procedures, and organizational structures that will enable and constrain behavior and action so as to accord with held values, achieve desired objectives, or execute given tasks'* (Alexander 2005: 213)

As Healey (1998) notes planning had already recognised the value of engaging a wider range of stakeholders and interest groups and Alexander (2005) notes the impact that these have on institutions. This is further developed in spatial planning (Scott et al, 2013), water resource management (Kidd and Shaw 2007), integrated catchment management (Blackstock et al 2014) and within other areas focusing on institutional change (Anderies and Janssen 2014). However the approach of Alexander (2005, 2006) is valuable for the development of institutions associated with a multi-scale challenge such as integrated catchment management as it attempts to break down the variations within institutional design. Alexander does this by identifying three scales (macro, meso and micro) and by highlighting the variations across three key terms in associated with institutional design; namely governance, coordination and agency (2005:218). Governance operates at the *macro-level* and includes all relevant 'processes of regulation coordination and control' and therefore spread across a number of disciplines (Alexander, 2006, p.9). Within the UK a milestone example might be the policy innovation displayed at the end of WWII that introduced the National Health Service, National Parks and legislation for the planning framework (Blunden and Curry 1988). The need for coordination at various levels, largely at the *meso-level* is a necessity because of the need to define areas that are pushing for changes within the institutional structures. Here institutional responses to the foot and mouth outbreak in 2001 highlighted disconnections (Donaldson et al. 2003) with relevant repercussions for government department and agencies that are now responsible for catchment management (Mardsen and Sonnino 2008).

Agency is important for understanding the context in which *micro-level* decisions are made. Notwithstanding the progress across some areas of planning (Kidd and Shaw, 2007, Scott et al., 2013), Alexander suggests that traditionally designed institutions offer little allowance for local or traditional knowledge and structures as a sector-driven the process is often top down and driven by a sense of diagnostic desire (Curry 2012; Scott et al., 2013). As a result Thiel et al. (2014) propose to offer '*crafting of institutions*' as an extension of Alexander's thinking on institutional design at the micro-level. In this sense crafting is an internal process driven by knowledge and experience of those on the ground (Ostrom 2005) shaping the institutional framework through facilitated cooperation so that it can deliver into a local problem solving context (Carlsson and Berkes 2005). McAreavey (2006) refers to the 'hidden and subtle processes that bind groups and actors together'

around key factors such as trust, power and legitimacy. It is these processes that are at the heart of the micro-level interactions.

By focusing on aspects of the micro-level interaction with institutions there is an emphasis on alternative connections that will feed up to the system, translate the governance but also influence and ‘craft’ the institutions and policies (Thiel et al, 2014) so that they make sense at the micro-level. This is important if spatial or territory based approaches, such as integrated catchment management, are to deliver environmental, economic and social benefits. Fig. 1 shows how the three levels inter-relate to each other and key aspects of institutional design.

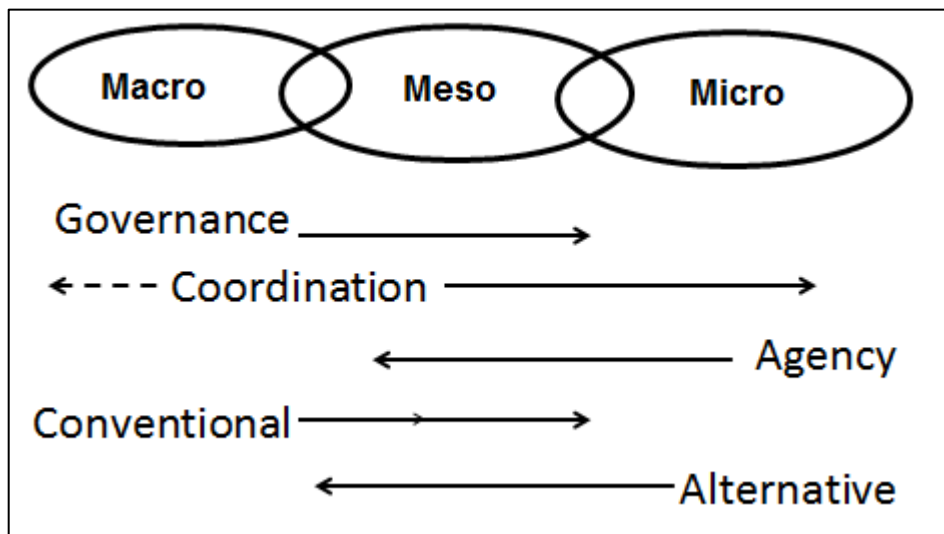


Fig 1. Institutional design at 3 levels

Whilst Alexander (2005, 2006) shows a greater focus on the macro and meso-levels, relatively little attention is placed on distinguishing the characteristics of the micro-level. The table below compares the key characteristics across the three levels and provides a starting point for a set of criteria through which to distinguish between different types of institutional design, notably to explore the characteristics of crafting institutional change (Table 1).

Table 1 Comparison of characteristics across 3 levels of institutional design

<b>Characteristic</b>	<b>Objective institutional change (Macro-level)</b>	<b>Subjective institutional change (Meso-level)</b>	<b>Crafting of institutions (Micro-level)</b>
<i>Level and process</i>	Formal, external rules and procedure shape actors behaviors.	Semi-formal, actors rules and procedures shape the institutions they are in.	Informal, actors intra and inter-organisational networks to shape change.
<i>Core mechanisms</i>	Legislation, policy making, regulations, top-down programme design.	Local programme design, interpretation and implementation.	Local and informal interactions meetings, social media, integrated working.
<i>Philosophy</i>	Rational design to suit mechanisms.	Reflexive, dialogical and ongoing via networks.	Collective action and participation.

<i>Triggers</i>	Strategic response to upheaval or reform.	Institutional (in)effectiveness.	High social capital pushing for change.
<i>Initiators</i>	Leaders in government institutions.	Intuitive response within organisation.	Very localised and situation dependent.

(Source: Adapted from Alexander (2005, 2006) and Thiel et al. (2014))

A key trigger and difference between micro-level crafting of institutions and two main aspects of institutional design outlined by Alexander (2005, 2006) is the presence of social capital. The presence of social capital is critical in order to understand the challenges of CaBA institutional design. As Wendt (2001, p.1023) outlines micro-level changes are initiated by collective action and participation through a shared perspective. Lowndes and Wilson (2001) looked at the role of social capital within local governance and in particular critiqued Putnam (1993). This centres around Putnam's assumption that local governance was a constant, when in reality it changes significantly, reducing the weight that Putnam places on the influence of society. As the local context varies it is also important to note as Shorthall (2008) highlights that social capital can hinder inclusion where there is a lack of diversity and trust. The local context, as in an identified catchment will:

- make it more attractive for some groups to engage in a particular activity than another;
- reward groups with certain internal structures whilst sidelining others who are organised differently;
- influence the level of voluntary activity;
- determine access to funding and networks.

Many are cautious about offering 'blueprints' (Alexander 2005) or panaceas (Ostrom 2005) for institutional design because the context varies and it is not clear what aspects can be moved from one case to another. However, within integrated catchment management the need to consider the ecological aspects alongside the social and economic is well understood (Blackstock et al, 2014), albeit based on different concepts, as explored in the next section.

### **Integrated catchment management, social-ecological systems and institutions**

According to Bissett et al. (2009) and Grigg (2008), integrated catchment management is the coordinated planning and management of a river catchment by a group of stakeholders operating under agreed terms of engagement. Rijke et al. (2012a, p.371) define as a 'comprehensive water management approach that aligns multiple objectives in a river basin across different spatial scales and temporal dimensions'. Blackstock et al (2010) sort to identify good practice in collaborative catchment management and concluded that relationships and procedural aspects were key. Bissett et al. (2009), go on to identify three overarching principles for good practice in catchment management:

- Integration – where common issues, objectives, types of information or stakeholders in a catchment are identified and involved so multiple goals can be achieved.
- Collaboration – where different stakeholders work together to agree actions and achieve goals.
- Adaptation – where the planning process can anticipate, accommodate and respond to change.

Similarly Rijke et al. (2012a, p.372) makes the case that since this about change, governance is central to the thinking in terms of the processes involved (networks and hierarchies) and structures (mechanisms) that drive this change. Consequently, there would seem to be a clear link between integrated catchment management and the literature around institutional design.

Within the UK, the EA is implementing a change from the sector-based approach, which separates water quality, water flow, flood protection, land use, biodiversity and environmental protection in the organisation, to one where a catchment officer covers a group of water courses. This corresponds well with the CaBA pilots that will be assessed in more detail later in the paper and mirror what has happened in agriculture with agri-environment policy in Europe (Prager and Freese, 2009).

In outlining where institutional design appears and who is involved, Alexander (2006) suggests that at the meso-level, it involves professional experts such as planners and hydrologists as well as inter-organisational networks. At the macro-level Alexander is clear that the process is strongly top-down. Both of these seem to be a little at odds to the more recent advancement in environmental policy that gives a greater emphasis to participatory techniques that attempt to combine science and traditional knowledge (Berkes et al., 2000; Reed, 2008; Fish 2011). However, Alexander (2006) does recognise the importance of knowledge, and that institutional design cannot be overly scientific, perhaps more of an art than a science, not least because the situations can be very complex. However, this is not really explored at the micro-level where most integrated catchment management is situated. As a result of the complex connections between land and water the context for integrated catchment management it is evident that there is potential for a wide range of interests and corresponding stakeholders to be involved in the institutional and governance changes. The micro-level brings the social and biophysical aspects together and represent a cornerstone for social-ecological thinking, as in co-management (Carlsson and Berkes 2005) and the ecosystems approach (Shepherd 2004; Waylen et al 2014).

Co-management has its roots in the work of Likens, Burch and others who combined social theory with ecology to develop social-ecological systems (Olssen et al., 2004) or human ecosystems (Likens 1992). The applied nature of this approach and the desire to change the more polarised approach of 'nature', and 'society', has led to these concepts developed further through approaches such as 'community-based conservation' (Berkes 2003) and 'adaptive management' (Jacobson et al., 2009; Pahl-Wostl, 2007). All are an extension of the ecosystems approach, which although developed at the UN Earth Summit in Rio in 1992 (Shepherd 2004) is only recently gaining traction, partly as a result of the rise in thinking around ecosystem services (Fish 2011). Both co-management and the ecosystem approach, start from the premise that conservation and community development can be achieved in parallel. However whilst their starting points are different they both represent a significant shift in ecological thinking that recognises humans as part of the ecosystem and the need for participatory approaches to identify a sustainable way forward.

The frameworks offered by co-management and the ecosystems approach have been implemented in catchment situations (Shepherd 2004; Harrington et al 2011). Also to a certain extent this can be seen in some of the issue-based work within the EA, most notably around flood management. However, it is the emphasis on the holistic and integrated management perspectives that include participation and collaborative problem solving that sets these two approaches apart (Carlsson and



Berkes, 2005; Waylen et al 2014). Nevertheless there is a common structure to the process that both co-management and the ecosystems approach follow, which is summarised in Table 2.

*Table 2 Summary of implementation steps in co-management or ecosystems approach*

<i>Steps</i>	<i>Characteristics</i>
<i>Defining the boundaries of the social-ecological system (SES)</i>	Identifying the group, community or system to assess and determining its various stakeholders and structure(s);
<i>Identifying the structure, function and management in the SES</i>	What activities are performed, who makes this decision and how are these decisions related and problems resolved
<i>Analysing the economic, social and environmental linkages</i>	What are the connections between these activities within the area and their impact on neighbouring systems and areas
<i>Evaluating capacity needs among key groups and individuals</i>	A comprehensive review of the institutional arrangements and the capacity of the various stakeholders
<i>Development of adaptive management process</i>	Involving all stakeholders in shaping an adaptive process that provides an integrated process for future decision-making

(Source: Adapted from Carlsson and Berkes (2005); Shepherd (2004))

The review of the literature suggests a strong synergy between co-management, ecosystem approach and micro-level institutional change, or ‘crafting’ of institutions. However, there are clear assumptions on each side. The social-ecological literature, especially co-management, assumes an ability of institutions to change or the need for change. The ecosystems approach, starts from an environmental perspective but sees the need to integrated this with the social, although this can fall short of participation due to the ambiguous nature of the ecosystem approach concept (Waylen et al., 2011). Therefore by extending the social-ecological thinking to include aspects of institutional design (Alexander 2005, 2006) some light may be shed on the micro-level or ‘crafting’ of institutions. This also presents a framework to assess the effectiveness of such an approach where it takes place.

Table 3 brings together the key areas from social-ecological and institutional design sets of literature to develop some criteria in order to assess the micro-level or ‘crafting’ of institutions within a case study using the catchment based approach. The aim here is to go beyond what Fish (2011) calls ‘ready-made’ communities of interest to one that embraces a ‘diversity of perspectives and experiences’.

*Table 3 Potential criteria for assessment of micro-level or ‘crafting’ of institutions.*

<i>Criteria</i>	<i>Summary</i>	<i>Factors</i>
Comprehensive identification of social-ecological assets	Assets identified in both the social and ecological systems to determine area, diversity, function and structures.	Quality, quantity and breadth of assets within appropriately defined area.

Effective establishment of economic, environmental and social linkages	Linking each asset into corresponding policy and strategies within the governance and decision making processes.	Strength and frequency of links with policy and strategies and associated governance processes.
Utilisation of networks within the SES	The communication between and within organisations and the actors involved.	The range and effectiveness of communication by the actors involved.
Cohesion of adaptive management activity	Complementarity of adaptive management activity linked with identified assets and actors	Level of consensus across activity by actors.

#### 4. UK case study: piloting the catchment-based approach (CaBA)

In March 2011 Defra, the government department with responsibility for the environment, launched CaBA. CaBA is an integrated catchment management initiative that Defra define as being able to offer a ‘more locally focused decision making and action’ framework to support ‘improvements to the water environment and support river basin management planning as part of WFD activities (Defra 2013). To pilot this approach they invited other agencies to come forward and run the CaBA approach in 15 catchments.

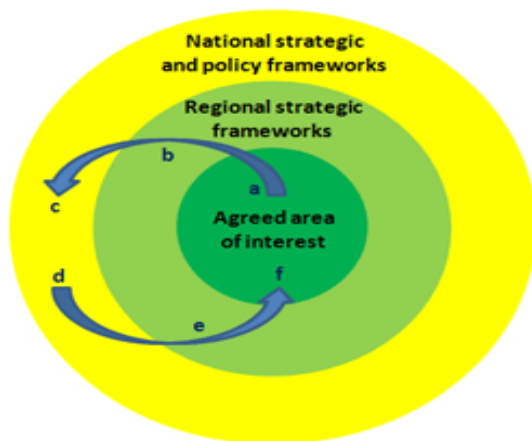
One of the 15 pilot catchments that are hosted by an external host is the Upper Thames catchment, here an independent advisory organisation (the Farming and Wildlife Advisory Group South West (FWAG SW)) is the local host. Within the Upper Thames Catchment Partnership (UTCP) they used a participatory framework tested in other sites (Short et al., 2010) in order to gather a wide ranging stakeholder committee that goes beyond the ‘community of friends’ (Blackstock et al 2014) and to take forward an integrated approach. The stakeholders for the catchment are many and varied, as outlined in Table 4.

*Table 4 Stakeholders active within the Upper Thames catchment*

<b>Interest area</b>	<b>Number</b>	<b>Type of organisations involved</b>
Water Companies	1	Thames Water (private water company)
Conservation NGOs	2	Gloucestershire Wildlife Trust, Cotswold Water Park
Government Agency	4	Environment Agency, Natural England, Highways Authority, Forestry Commission
Local River’s Trust	1	Cotswold Rivers Trust
Farmer/landowner	3	National Farmers Union, CLA and individual farmers
Local Authorities	3	County, Borough and District representation
Fishing/angling	0	Linked through Rivers Trust
Economy regeneration	1	Cotswold Canal Trust
Woodland/forestry	0	Linked via Forestry Commission
Water recreation	0	Also part of Cotswold Water Park remit
Higher Education	1	Local university
National Park and similar	2	Statutory protected landscape organisations

The hosting and development of this pilot catchment is being reviewed using an action research approach (Zikos and Thiel, 2013) as this acts as a 'conduit for conveying change' through the bottom-up participatory framework being used to deliver integrated catchment management. The data were gathered at various stages of the process from a participatory workshop of on-line questionnaires.

In line with the both the co-management and ecosystems approach frameworks, the first phase of ILD is a scoping exercise that identifies each asset or issue within the smallest unit of the defined area. This is represented in Fig 2 with the micro (dark green); moving out to meso (light green) and macro-level (national/international) framework identified. The scoping then returns to find the local partner responsible for delivery on the ground in the locality. This process is repeated for each asset or issue to create a diagrammatic representation of the catchment. Within a participatory workshop the output of this process is ground truthed. Once agree it acts as means of showing all involved the range of assets and issues within the catchment and how they connect with the whole area and each other.



*Figure 2 Scoping phase within Integrated Local Delivery (Short et al. 2010)*

The outputs thus far include an action plan that has targeted water quality and provides a framework for meeting WFD requirements. This sits underneath an overarching strategic framework and links to the Upper Thames Catchment Management Plan (UTCMP), which is an Environment Agency technical document. The latter identifies water quality pressures and reasons for failure in specific water bodies across the catchment.

The tasks agreed and completed by the UTCMP reflect the commitment of the membership to focused on:

- The development of catchment-wide sources of information and analysis.
- The organisation of delivery mechanisms for improvements in water quality with an emphasis on multiple benefits.
- A project template for the roll out of prioritised actions on all water bodies in the catchment through a mixture of community and farmer involvement and agency and conservation NGO activity.

Through a series of meetings the UTCP highlighted a clear need for more joined up thinking at the local level is to reduce overlap, duplication and single issue delivery by different institutions within the catchment. This outcome was a consequence of local members of UTCP feeling that there were 'multiple voices' from the statutory agencies and other national groups, sending mixed messages on how to tackle issues such as ditch clearance and improving habitats. As a result of this the UTCP also served as the steering group for the Catchment Sensitive Farming initiative, which seeks to reduce diffuse pollution from agriculture, in the area as the two groups involved the same membership. As one member noted

*'The EA needed to write a plan for the Upper Thames catchment, the AONB were revising their AONB management plan, the CSF team had to write a strategic plan and the County Council had to write a plan as the lead flood authority. Without the UTCP all of this would have been done separately so there would be 4 separate strategic plans for the same area, which are all connected'.*

Within one community in the catchment the residents have:

- mapped and verified management tasks.
- made contact with key local and statutory stakeholders and formed a contact list.
- taken responsibility for preparing and prioritising the key tasks.
- embedding the support of the local community into the existing governance systems.

Critical to this is the presence of a specialist facilitator, provided by FWAGSW. This has enabled the application of a similar process to each water body linked to WFD failures. Through the catchment and local meetings there is a process by which farm businesses and communities can reconnect and engage with national organisations like the Highways Agency regarding common issues. Critical to the involvement of local communities is the involvement of the Gloucestershire Rural Community Council (GRCC) who help rural communities in developing and delivering cross cutting environmentally sustainable parish and local plans. Given one year to prove the concept of CaBA was a challenge and meant that the formation of the partnership took precedence over delivery on the ground. However, now the framework is in place delivery should be much easier and cost effective. The creation of this partnership was challenging as there were well established single-issue initiatives, mostly based around conservation that had their own targets to deliver. This was overcome through discussion and identifying areas of mutual benefit.

Ultimately the aim is to speed up the delivery of WFD objectives, which in this catchment concern fish stock, levels of nitrate and phosphate in the river as well as sediment. However the CaBA process, as implemented through ILD means that other strategies can be achieved, such as biodiversity and to some extent flood protection. There is also an increased understanding on a range of water related issues, such as land management, flooding and wider biodiversity issues. This case study also suggests that a micro-level participatory approach enhances social capital and partnership working.

## **Analysis**

Using the criteria developed in the previous section (see Table 3) to review the overall approach adapted in the pilot catchment as far as the 'crafting of institutions' is concerned, there is a clear

purpose to the approach and the local context is recognised. However few of the stakeholders outside of the government and the main agency (EA) developed the CaBA approach. The way the process has been implemented is critical and in the Upper Thames Catchment the use of the ILD framework has resulted in the mapping of the context and the review of membership indicating that a wide interpretation of the context has been undertaken. The one common element across all of the 15 catchments involved in this process has been the development of Catchment Management Plans which feed into the revised River Basin Planning process required by WFD. Consequently the national review of the catchment process (Cascade, 2012) revealed that whilst the engagement of stakeholders varied it was both dense and increasingly cohesive, although there was an emphasis on river-based organisations such as the Rivers Trusts. As noted earlier the Rivers Trust were the most committed actors and central to the overall network and closest to the aims of WFD.

However, the review of the Upper Thames Pilot did reveal that the direction taken in this catchment has an identifiable framework and process that could be repeated elsewhere. Within the Upper Thames pilot the presence of a framework that had been tested elsewhere added confidence to the process as the natural and social ‘assets’ within the area are identified and linked to national/local strategic objectives. Using the criteria identified earlier it is possible to highlight the effectiveness of this approach. This is shown in Table 5.

*Table 5 – Assessment of Cotswold Pilot Catchment using ‘Crafting of institutions’ criteria*

<i>Criteria</i>	<i>Summary of Cotswold Catchment</i>	<i>Strength of effectiveness</i>
Comprehensive identification of social-ecological assets	The scoping process used reveals a high number of assets and associated actors	+++
Effective establishment of economic, environmental and social linkages	The mapping portal is a strong way of the establishing the linkages and corresponding decision making	+++
Utilisation of networks within the SES	The local management group provides a forum for discussions and levels of communication are strong between and within organisations	++ (+++)
Cohesion of adaptive management activity	Level of activity remains largely unchanged with some examples of cohesion and a shared vision in place.	+(+++)

+++-highly effective to +-marginally effective, Note: potential figures shown in brackets

The table suggests that the framework has been effective in identifying the assets, in establishing the linkages and to some extent assessing the networks. However within the current timeframe the ability for an establishing cohesive activity is constrained but the potential for this to occur over time exists. Certainly the Defra and EA guidance recognises the important role that these pilots play in highlighting the need for coherent and connected activity and the external hosts have experimented most in this area.

## Concluding thoughts

Clearly participation is central to integrated catchment management and CaBA in England. As Alexander (2006) and Ribot (2006) both point out it is important to recognise that local stakeholders are able to distinguish between fulsome participation where they can adjust the final outcome and those processes that are a paper exercise. Processes such as ILD are able to provide a recognisable and reassuring framework for national interests as well as providing a replicatable one that local stakeholder can promote in order to feel that their contributions are valued. However, evidence of participation does not equate to the presence of social capital (Reed 2008). However institutional design, whether crafted or designed, in the context of an adaptive governance process would involve both as confirmed by Alexander (2005, 2006) and Rijke et al. (2012b). A bottom up-based participatory framework, such as ILD, might also assist those organisations who retain the pursuit of single-sector management objectives to adjust to an integrated perspective based around a more collective and cohesive network.

The criteria derived from comparing the concepts of institutional design and social-ecological systems provides a useful means of assessing both the presence and extent of micro-level or crafting of institutions. This will be critical in the assessment of integrated catchment management across Europe and anticipating the longer term impact and embedding of the changes within a range of institutions. Fundamental to the area of crafting institutions, and one that has not been investigated here, is the issue of leadership. This has been examined more generally, and found to be a key factor (see Rijke et al., 2012a,b). Here and elsewhere it was considered central to the issue of self-organisation, which will shape the implementation of the catchment based approach at the local level.

Finally, given the close match between the ILD framework and the synergistic criteria derived from adaptive governance and social-ecological systems it is possible to see such a framework being implemented at the local level. Clearly any framework needs to be robust but also flexible and able to be repeated and replicated in various situations in order to facilitate institutional design at the micro-level. The ILD process used in the Upper Thames appears to have this capacity; further use of the framework in different settings will test it further. For the catchment-based approach more generally, it is also too early to speak of 'deep institutional change' as outlined by Rijke et al. (2012a, p.370) but future evaluations and reviews will determine the rate of progress and perhaps, using the micro-level criteria, be able to determine how we might know when, or if it is possible to, arrive at that milestone.

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