Institutional challenges in complex commons landscapes[1]

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Abstract

Much of commons research and practice has focused on local common pool resources of a particular type and institutional arrangements for their governance. Thus commons analysis by Ostrom and others has focussed very much on institutions (traditional or crafted, informal and formal) for one livelihood related to one portfolio of natural resources or common pool resource – grazers and pasture, loggers and forests, fishers and fish stock, etc. On the other hand, landscape discourses have paid special attention to tensions amid multiple land-uses and governing entities, but give far less attention to the impacts of different livelihoods on natural resources or the impacts of resource uses in society (and the relations between them – conflict and/or cooperation). Considering a larger landscape scale highlights the complex interactions between common pool resources and their users. While communities do make multiple uses of multiple commons, specialisation has tended to bring livelihood interests into conflict. For example, forests are managed for timber but used by poor people for diverse non-timber forest products as well as by pastoralists; water provides common fisheries and aquatic plants but is used by farmers and pastoralists.

The extent that local commons institutions including associated community organisations and initiatives have focused on single interests is discussed, "failures" associated with this, and attempts to address complex multi-use commons at different scales. The first theme is that commons institutions may be effective among farmers with a shared water source, among fishers with a shared stock, or among pastoralists, but they are weak in terms of managing interactions between these user communities. This goes some way to explain unsustainable outcomes, including exclusion and/or conflict. For example, the papers reveal how conflicts between livelihood interests have emerged as wider climate, environmental, economic or social contexts have changed with time. Secondly, this analysis is used to assess initiatives that aim to mitigate such conflicts and improve governance of complex commons and landscape scales. For example, the extent that community based institutions can adapt or be facilitated to balance competing uses and interests, overcome or bypass natural resource conflicts, and the equity implications of this. Lastly, examples are given of achievements and constraints to wider scale - landscape - approaches to coordinating and negotiating between local and single interest commons. For example, collaboration between user communities and their initiatives to share lessons and cooperate in addressing local conflicts or to influence policies and practices that come into conflict with local interests; and also links between local commons institutions and more formal attempts at governance that may be termed co-management or multi-stakeholder forums.

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1 Introduction

Much of commons research and practice has focused on local common pool resources of a particular type and institutional arrangements for their governance. Thus commons analysis by Ostrom and others has focussed very much on local institutions (traditional or crafted, informal and formal) for one source of livelihood related to one portfolio of natural resources or common pool resource – grazers and pasture, loggers and forests, fishers and fish stock, etc.

Somewhat opposite to this are what are termed "landscape approaches", which have been widely adopted in conservation and environmental management and seek to balance conservation and development tradeoffs (Sayer 2009). A review by Sayer *et al.* (2013) found no generally agreed understanding or definition of this approach, and that it was often used interchangeably with "ecosystem approach", but there is a common focus on understanding and attempting to reconcile diverse and complex interactions between humans and ecosystems at a range of linked scales. This move to consider interactions and a landscape approach is argued to be reflected in use of the term integrated in various approaches (Reed *et al*. 2015), including in examples of action research given in this paper from integrated floodplain management.

Landscape discourses have paid special attention to tensions amid multiple land-uses and governing entities. For example, multiple land units with different functions or uses, and different uses and functions of land in different seasons or even in the same season, and we also consider here governance as part of landscapes. However, they give far less attention to the impacts of different livelihoods on natural resources or the impacts of resource uses in society (and the relations between them of conflict and/or cooperation).

Comparison of key principles identified for effective local commons institutions and for landscape approaches reveals similarities and differences (Table 1). This has informed the case studies and action research summarised here and conclusions drawn from this. Ten principles of the landscape approach have been adopted by the Convention on Biodiversity and lessons on these are elaborated in Sayer *et al* (2013). Eight design principles for managing common-pool resources were set out by Ostrom (1990) and have been tested in various studies since. Cox *et al.* (2010) assessed a large number of these studies and confirmed with some adjustments these design principles.

There are common themes as well as significant differences – the commons design principles focus on sustainability of local institutions, and may explain existing traditional institutions or guide facilitation of community initiatives and organisations, whereas the landscape principles focus on developing new initiatives for complex larger scale natural resource systems and associated governance. Considering a larger landscape scale highlights the complex interactions between common pool resources and their users. Table 1 is organised to show how the two approaches consider six or seven similar themes or issues, as well as those that do not have close equivalents. This highlights differences within a theme – for example considering multiple scales and less clear boundaries in landscape approaches compared with clear boundaries (often associated with modest scale) being more

appropriate for commons institutions. Out of the principles that do not have close equivalents between approaches, the landscape approach principle of a common concern or entry point among stakeholders is close to commons findings on the importance of trust among commons users and how cooperation or changes in institutions respond to common or widely perceived challenges. Strengthening stakeholder capacity is more of a project/programme based principle for building new institutions. Graduated sanctions are a more detailed single commons specific principle below the landscape scale.

Table 1 Comparison of key principles identified in landscape and commons institutions approaches

Landscape approach principles	Commons institutions - Ostrom's design principles*
1. **Continual learning and adaptive management**	
2. Common concern entry point	
10. Strengthened stakeholder capacity	
3. Multiple scale – scaling up, complexity	1 Clearly defined boundaries (regarding users and resource system)
4. Multi-functionality - multiple uses of resources	8. Nested enterprises: Appropriation, provision, monitoring, enforcement, conflict resolution, and governance
5. Multiple stakeholders - conflicts	
9. Resilience	2 Congruence with local conditions (appropriation and provision rules fit local conditions, benefits fair)
6. Negotiated and transparent change logic	3. Collective-choice arrangements: Most individuals affected by the operational rules can participate in modifying the operational rules.
8. Participatory and user friendly monitoring	4. Monitoring: Monitors are present and actively audit CPR conditions and appropriator behavior; Monitors are accountable to or are the appropriators.
7. Clarification of rights and responsibilities	7. Minimal recognition of rights to organize: The rights of appropriators to devise their own institutions are not challenged by external governmental authorities.
	5. Graduated sanctions: Appropriators who violate operational rules are likely to be assessed graduated by other appropriators, officials accountable to these appropriators, or both.
	6. **Conflict-resolution mechanisms**: Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials.

* following adjustments in Cox *et al.* (2010)

This paper focuses on the two remaining principles and how these cross over scales - between local commons institutions embedded in community based organisations, and landscapes and associated co-management that often seeks to coordinate between multiple community based organisations and government.

Adaptive learning

Adaptive management is already widespread in management of natural resources and has been termed as an experimental process that can be improved based on learning from implementation (Borrini-Feyerabend *et al*., 2000). Moving beyond this, adaptive co-management is now regarded a specific management approach that incorporates both a hierarchy of institutional arrangements to share management responsibilities over scales of resource and an explicit commitment to learning

among these partners (Armitage *et al*., 2008, 2009). This has elements of a landscape approach, although co-management may explicitly address diverse environmental uses or remain focused on one type of commons. However, we argue that while adaptive management and learning involves systematic sharing and testing, it need not be based on formal scientific designs which have often been stressed in adaptive management literature, but instead can be a more flexible social learning process covering natural resources and governance aspects of commons institutions and landscape interactions.

To some extent adaptive management is implicit in traditional commons institutions and this has been documented in numerous case studies (for example in Berkes and Folke 1998). However, this is at the level of individual commons. Olsson *et al*. (2006) and Fabricius *et al*. (2007) considered that learning becomes more effective when knowledge networks are formed, which enable adaptive actors working at different levels to share information, and that this can enable communities to access technologies from outside their area.

Conflict and its mitigation

Although, communities do make multiple uses of multiple commons, specialisation has tended to bring livelihood interests into conflict. For example, forests are managed for timber but used by poor people for diverse non-timber forest products as well as by pastoralists; water supports common fisheries and aquatic plants but is also used by farmers and pastoralists. Conflict resolution mechanisms are seen as an important component of local commons institutions, but institutions that allocate use rights among fishers or among firewood collectors are compromised when other actors outside of community organisations compete for the same resource (especially if the outsiders are socially, politically and/or economically influential). Superimposed on local sources of conflicts, are factors at larger scales that trigger or underlie conflicts – these include government policies, economic opportunities and market forces, and climate stresses and trends. Understanding the role of such factors and how conflicts can move into cooperation through a range of actions and initiatives including adaptive learning is one of the aims of research presented here.

2 Purpose of this paper and source of examples

This paper and the other papers in this panel are outputs of research projects supported under the Conflict and Cooperation in the Management of Climate Change) Research programme supported by the Netherlands Organisation for Scientific Research (NWO); specifically CALCNR (Community based adaptive learning in management of conflicts and natural resources in Bangladesh and Nepal). They address the additional impact and contribution to conflicts over complex commons raised by climatic trends and project and programme responses to climate trends and stresses.

The papers in this panel explore: the extent that local commons institutions including associated community organisations and initiatives have focused on single interests and "failures" associated with this; how far Community Based Organisations (CBOs) have diversified their resource management to address complex local commons

and/or complex sets of natural resources that include commons, private and public resources; and attempts to address complex multi-use commons at different scales.

In this paper and others, the role of adaptive learning processes is highlighted in bridging the apparent gap between local commons institutions that may start with a resource or sector focus, and landscape complexity. The extent that conflicts over natural resources are a product of cross-scale challenges in governance and a range of other factors (such as climate-environment changes) is also examined, along with the contribution of different factors in addressing local conflicts and enhancing cooperation. Examples and evidence are drawn largely from action research with existing community based organisations around 79 cases of local conflicts over natural resources in Bangladesh and Nepal.

3 Community based natural resource management in Bangladesh and Nepal

In Nepal community based NR management started in early 1980s in response to environmental degradation and increasing costs of top down NR protection (Malla 2001). Community forestry is regarded as one of the most successful local collective actions. With the expansion of community forestry user groups (CFUGs) across the country, there appeared a need to share, exchange and learn from each other. These grassroots institutions also wanted to consolidate and articulate their interests in wider national policies. This led to networking of CFUGs and the emergence of Federation of Community Forest Users Nepal (FECOFUN). Now over 18,000 CFUGs are organised under the umbrella of FECOFUN that functions to amplify nationally CFUG voices; ensure government forest policy decisions do not compromise the interests of forest dependent people; and provide the vehicle to mobilise citizens on environmental issues (Paudel *et al*. 2012). Nepal's forest sector frequently observed conflict between FECOFUN and the government over control over forest governances, resulting into impasse and consequent adverse impacts on both forest conservation and wellbeing of local communities.

In Bangladesh community based co-management started in fisheries and local water management in the mid-1990s. In water management projects, community participation directly followed from guidelines on public participation (Ministry of Water Resources 2001). In fisheries projects, community management was promoted by funding agencies and national NGOs. By now there are over 500 floodplain community based organisations (CBOs) (Sultana and Thompson 2010. Collective action among fishers offers higher catches from restoring habitat and conserving fish. Since 2007 a network of CBOs has developed for structured adaptive learning between CBOs (Sultana and Thompson 2012). Some CBOs have enhanced resilience to climate stresses by focusing on community ecosystem benefits. Federated CBOs have also raised the issue of conflicting policies that threaten continued tenure and benefits for their members.

4 Focus of community institutions

4.1 Local commons institutions and diverse livelihoods

The first issue is that commons institutions may be effective among farmers with a shared water source, among fishers with a shared stock, or among pastoralists, but they are weak in terms of managing interactions between these user communities. It can be argued that this goes some way to explain unsustainable outcomes, including exclusion and/or conflict over natural resources between types of user.

This raises two questions:

1. How far do commons institutions focus on a particular natural resource? and
2. To what extent do local conflicts arise between different types of resource use?

In the cases of Bangladesh and Nepal most CBOs were formed under various projects or programmes or policies that focused on a particular natural resource. This means that they did start with a single commons or "sector" focus. We argue that the extent that each CBO remains focused on that resource depends on a range of factors: local interests, external pressures, opportunities, local challenges and responses, and especially learning between CBOs.

Firstly, not all local people derive their livelihoods all or mainly from one natural resource, many rural people (at least in Bangladesh floodplains and in both hills and terai of Nepal) make to a greater or lesser extent multiple uses of a range diverse natural resource. For example, households in Bangladesh often cultivate some land, and catch wild fish, collect wetland plants for food and fuel, and raise livestock grazing in common lands and fallow fields. Similarly in Nepal a household may depend on water from sources in a forested watershed for domestic use and for agriculture, and also collect fuelwood, timber and medicinal plants from forest. As a result local people see interconnectivity in their socio-ecological systems that may be ignored or simplified and assumed away by government ministries, agencies and projects that operate in pre-defined "sectors".

Secondly, detailed case studies in Bangladesh and Nepal have revealed that CBOs diversified their natural resource focus over time, this was determined considering the rules, norms and activities that the CBO undertook. On average each had adopted rules/norms and/or interventions for four different resources, but these were qualitatively more diverse in Bangladesh than in Nepal. In Nepal learning exchanges have taken place between CBOs working in forest management, whereas adaptive learning between CBOs in Bangladesh has involved learning exchanges between CBOs originally formed for fishery, water, agriculture, and environmental management. Thus in Nepal CFUGs have mainly diversified their local commons institutions considering forest products (non-timber forest products as well as trees) and also in some cases watershed and soil conservation. In Bangladesh diversification by CBOs of their initiatives has involved fish, water, agriculture, wildlife, and in some cases trees. This is elaborated in the following sub-sections.

4.2 Fisheries and water management CBOs

In Bangladesh 12 out of 18 CBOs investigated in detailed case studies started as fishery management organisations, and the other six were formed to manage water mainly for agriculture. It is notable that a high percentage of the CBOs are now active in managing fisheries and water and in coordinating agricultural innovation (Table 2). It is notable that ten of these sets of activities and rules relate to commons, while four relate to collective action addressing private lands or group enterprises (although the latter make use of common resources – for example duck rearing in waterbodies based on aquatic life).

Table 2 Ecosystem components managed by selected Bangladesh CBOs

Ecosystem component	No of CBOs (out of 18)	Management interventions	Evidence/outcome
Fishery (C)	15	Sanctuary, closed season, reintroduce fish sp.	Catches increased outside sanctuaries
Water (C)	12	Limit on pumping, sluice management	Retain water for fish
Agriculture (P)	10	Promote low water demand crops, IPM, pesticide restriction	Changes in cropping
Wildlife (C)	7	Ban on hunting	Waterbirds increased, tourism increased
Duck rearing (P)	5	Enterprise using water	Income
Aquaculture/fish stocking (P)	5	Enterprise, also or release of native sp to wild	Income
Timber/trees (C)	5	Swamp trees planted (for habitat), other timber trees	Ban on cutting
Fuelwood (C)	3	Ban/limit, access for poor	Some minor cutting continues, but trees have restored
Wetland restoration (C)	3	Excavation	Fish catches, water retention
Tourism/ biodiversity (C)	2	Visitor facilities (external funds)	Increasing visitors, limited income
Fallow land returned to cultivation (P)	1	Irrigation, suitable crops, sharecropping	Crops profitable, incomes for poor
Medicine (C)	1	Common medicinal plant garden	Own use
Fodder and grazing (C)	1	Try to limit	Cattle excluded, cut and carry continues
Aquatic plants (food) (C)	1	Organised harvesting	Income and own use

Notes: C – common pool resources (which can take place in public or private lands), P – private resources

Other natural resources such as snails (used as feed for ducks and shrimp farms) are also important for households in some of the sites but no management actions were taken by these CBOs.

This combination of initiatives is influenced by two factors. Firstly, the existence of multiple floodplain natural resources in the same physical area (with seasonal variations), particularly agriculture and fisheries. There is a common connection between resource bases - water - which is in ample supply in the wet season but severely limited in the dry season. Secondly, the influence of learning and sharing of experiences and innovations between networked CBOs. One notable change is the way in which ten of the CBOs have taken up agricultural extension and coordination activities to influence the crops and practices of members and others in the

community on private lands not the common waterbodies or waterways that the CBOs were designed to directly manage. This has been dependent on opportunities that show private returns (increased or more stable profit) from crops with lower water demand, resilience to climate variability, and complementary community benefits by securing more water for fish to survive in the dry season (Sultana and Thompson 2012). Other commons or ecosystem management initiatives of the CBOs are more specialised – although almost half have banned hunting, in reality wildlife is limited in most of these sites, but two do have related tourism and for one of these sites the CBO manages a large wetland sanctuary which has become well known as a successful wildlife refuge. Several CBOs have added tree planting and fuelwood management, and a sub-set focus on culture based fishery enterprises.

4.3 Forestry CBOs

In Nepal the focus of management by the CFUGs has by definition been on forest products – all have taken up a range of activities to plant, restore and exploit timber, which is their main source of income and for which they provided evidence of substantial group enterprise earnings shared among members (Table 3).

Table 3 Ecosystem components managed by selected Nepal community forestry cases

Ecosystem component	No. of cases (out of 14)	Management interventions	Evidence
Timber (C)	14	Block based silviculture management; nursery and plantation; fire line improvement; cleaning, thinning, pruning, singling; harvesting of dead, decayed and drying tree.	Cash earning; better off people have used best timber/furniture in their houses, timber for community buildings
Fuelwood/ Fodder (C)	14	Bamboo and broom grass plantation; allocation of land for grass farming; grassland management (e.g. weeding, cleaning, and controlled fire); fire line construction	Fuelwood collection for cooking and heating; livestock feeding; construction materials, household uses, cash earning pro-poor enterprise development (e.g. leaf plate from Sal *Shorea robusta*);
Herbs/ medicine (P)	10	Plantation of seedlings of medicinal plants	Household use of herbal medicines, cash earning through sale.
Soil conservation (C)	10	Bamboo and grass planted on erosion prone areas; ban on harvesting in erosion prone areas	Reduced erosion
Water bodies (C)	6	Construction of irrigation channel and tube wells; construction of water holes	Increased supply of water for irrigation and drinking; improved water holes for wild animals
Wildlife (C)	3	Habitat management; construction of water holes; wildlife observation centres	Revenue from tourism, employment

Note: C – common pool resources (which can take place in public or private lands), P – private resources

In 3 cases fisheries were a main livelihood source for specialist occupation groups, but the groups did not take up any resource management actions. Likewise in 3 cases religious or scenic sites are within the group managed area and are a source of income for the group (visitor fees) and create employment but no management interventions were taken.

Limits on grazing are a common measure that is tied up with enabling forest regeneration and with planting to limit soil erosion. Other initiatives are more limited

but include medicinal plants as an enterprise, common water management, and in three cases wildlife management which is particularly notable where community forests adjoin protected areas and they have taken up a combination of wildlife protection and eco-tourism enterprises in effectively the buffer zones. The majority of actions and rules established by the CFUGs cover common resources, although planted areas of medicinal plants are more of a private group enterprise. Despite this diversification, broader ecosystem-landscape linkages are somewhat limited – some CFUGs have developed irrigation systems, but have not worked on innovations in agriculture and none reported having tried to influence the interactions between private lands and the common forest lands that they manage.

5 Institutions and conflict in local complex commons

Community based co-management institutions have in part been a response to competing demands and conflicts over natural resources (Castro and Nielsen 2001). Ostrom (1990) argued that conflicts need to be reduced if individuals are to have the incentives to invest in creating appropriate institutions, and within sustainable community management institutions for commons one of the design principles is that there are effective low-cost conflict resolution mechanisms. On the other hand at larger scales one function of co-management is as a means of reducing and resolving conflict between local resource users and state actors (Pomeroy and Berkes 1997). Ratner et al. (2010) considered research to date has not analysed the positive potential of collective natural resource management to reduce broader conflict. Yet conflict can be part of a dynamic process of change and transformation in institutions or production systems that brings benefits, as well as costs. Moreover the implications of changes in stresses arising from climate change, changes in productivity, and of adaptation and mitigation options have added new sources of competition and potential conflict over commons (Barnett and Adger 2007).

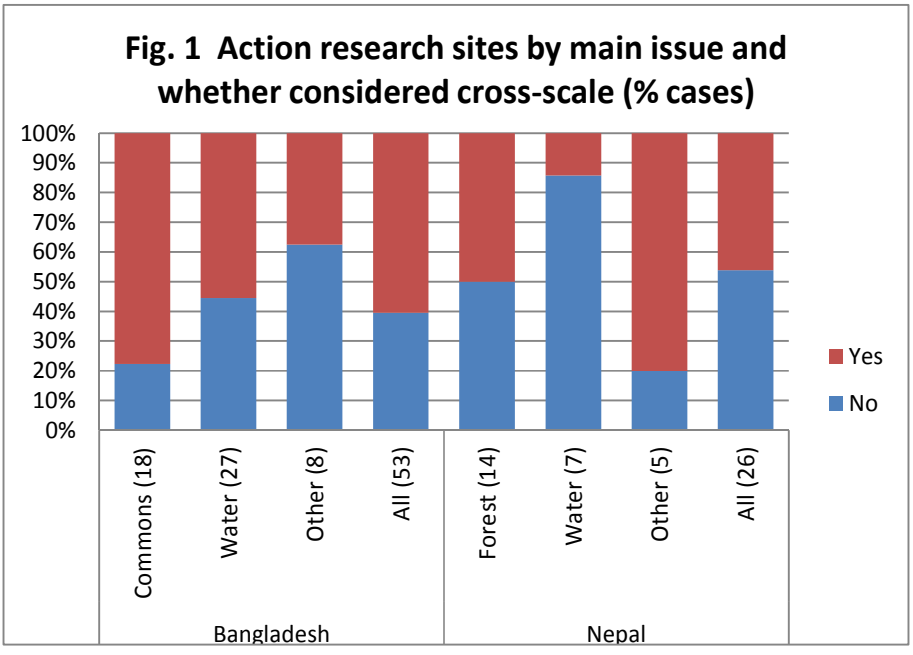
Past research in Bangladesh indicates local conflicts between elites and fishers over access are reduced where there are well established CBOs with defined secure use rights (Bennett et al. 2001; Sultana and Thompson 2010). But this relates more to a single natural resource and issues of tenure rights. There are other sources of conflict that can reappear when use rights are threatened by a range of factors including policy and climate changes.

One common finding is that conflicts between different livelihood interests have emerged as wider climate, environmental, economic or social contexts have changed with time, including miss-matches between policy and livelihood interests. Examples of this include conflicts over water and land in Bangladesh and over access to forest resources in Nepal.

Out of 79 cases of natural resource conflict investigated and addressed through action research, 27 (20 in Bangladesh and 7 in Nepal) involved conflicts between different types of natural resource use (for example between yak herders and community forest groups or between small scale crop farmers and shrimp farms. The other 52 cases were conflicts within what might be termed a sector (between farmers over water for irrigation for example. However, conflicts at scales beyond local communities that involve multiple villages, or all villages within a large water

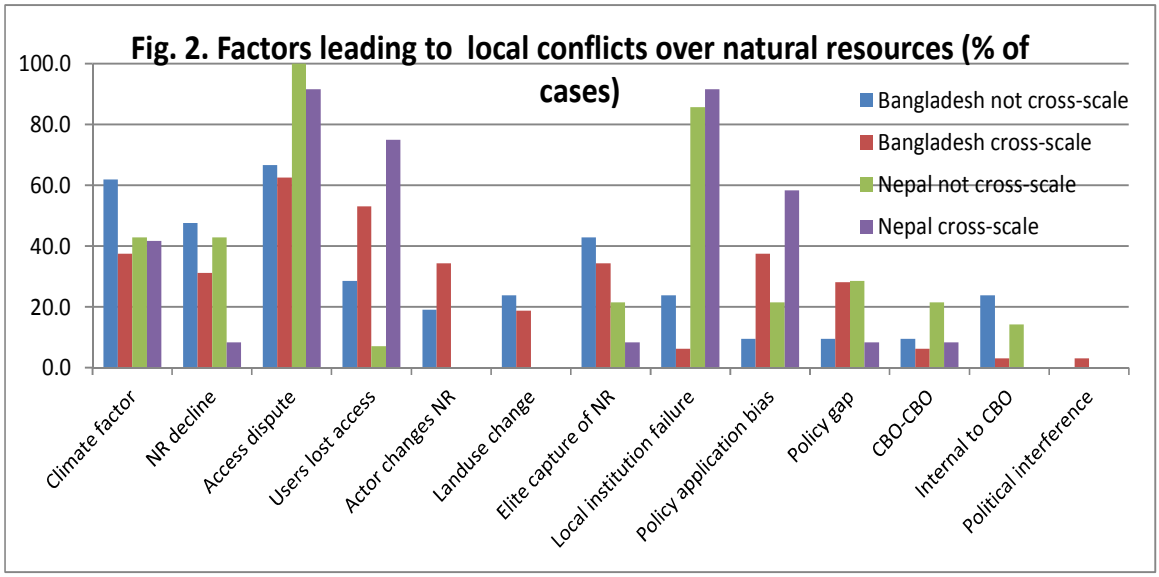
management polder for example, or conflicts arising from government policy application were also a large part of the cases: we term 44 (32 in Bangladesh and 12 in Nepal) cross-scale. The other 35 cases were conflicts within local communities – some among those represented in CBOs and others between CBO members and other local people (varying between conflicts with landless people excluded from community forests in Nepal, to conflicts with local elites who grab waterbodies and waterways when they silt up, or areas of floodplain commons to make aquaculture enclosures in Bangladesh. It should also be noted that some of the Nepal cases related to water management issues where there were no CBOs directly involved – in these cases local government units (Village Development Committees) played some role in mobilizing or supporting local communities, which also often had multiple CBOs (associated with forests, marketing, and social development), with overlapping membership. In these cases Local Adaptation Plans of Action could have played some role in addressing local landscape issues around natural resources in general, but tended to focus on physical adaptation works with some but less emphasis on governance of commons and regulating land uses.

Fig. 1 shows the breakdown of cases by the main issue and types of resource involved (mostly commons of different types and with multiple uses, but with a minority – 13 cases that did not relate to commons as such – for example conflicts over financial management within a CBO). It highlights how many of these cases involved landscape issues beyond the scale of local community, particularly around water and commons in Bangladesh, although others such as a majority of water related conflicts in Nepal were essentially within a community or between two groups within the lowest tier of government.



Summarising the detailed case studies revealed that on average four or more out of 13 factors contributed to each of these conflicts (Fig. 2). These include declining or changed natural resource endowments (such as declining dry season water flows or loss of aquatic commons), which in some cases are associated with factors such as

climate changes, land use changes and actors (elites) physically changing commons (by enclosing floodplains and blocking water connections for example, or blocking a waterway to catch or grow fish). Other factors include disputes and perceived injustices in access to commons – for example due to elite capture, or between villages competing for the same resource. Gaps in policy and its application included limitations in community forestry policy in Nepal that targets people living close to forest; restrictions on access to mangrove forest and aquatic commons in coastal Bangladesh; and policies that direct rights to accreted land in large rivers to landless erosion victims in Bangladesh but are implemented through processes that are inaccessible to the intended target group. Relatively few conflicts arose between CBOs or within CBOs.



Access disputes and local institutional failures were particularly important in Nepal whether the conflict was cross-scale or not, these were often a result of limitations in the community forestry provisions which fail to recognise other commons users such as herders or people living several km to the south of terai forests who had long-standing customary use of forests but were excluded from community forests and associated CBOs. In cross scale conflicts in both countries loss of access and biases in policy application affected more cases, examples include CBOs that were threatened with loss of access to public waterbodies in Bangladesh, despite policies that on paper should secure them continued access rights, and took the issue to the courts with indeterminate results.

Action research over three years working with the concerned CBOs and other actors resulted in greater cooperation and reduced conflicts to a greater or lesser extent in a majority (78%) of the cases (Table 2), with a greater achievement in resolving local conflicts than cross-scale conflicts. Changes were partial in relatively more of the cross-scale cases, which is to be expected when the main focus of action research was on individual CBOs. Examples include reducing conflict over individual sluices and local waterlogging (poor drainage) in Bangladesh, when at a larger scale there are still conflicts waiting to be triggered between those who want to relieve wider

waterlogging relieve siltation by breaking embankments and those who want to maintain the status quo so that their aquaculture farms can prosper. Examples of conflicts over other commons that are cross-scale and unresolved include conflicts between fishing communities and government in Bangladesh where the former lost tenure over waterbodies and despite sympathetic curt orders prohibiting the land administration from awarding use rights (leases) to other groups, the land administration was unwilling to reach a compromise or recognise the right of these CBOs to continue managing waterbodies even though they had done this on a sustainable basis for ten years.

Table 2 Outcomes of action research addressing conflicts (resolved, partly resolved or not resolved) faced by CBOs by scale of conflict

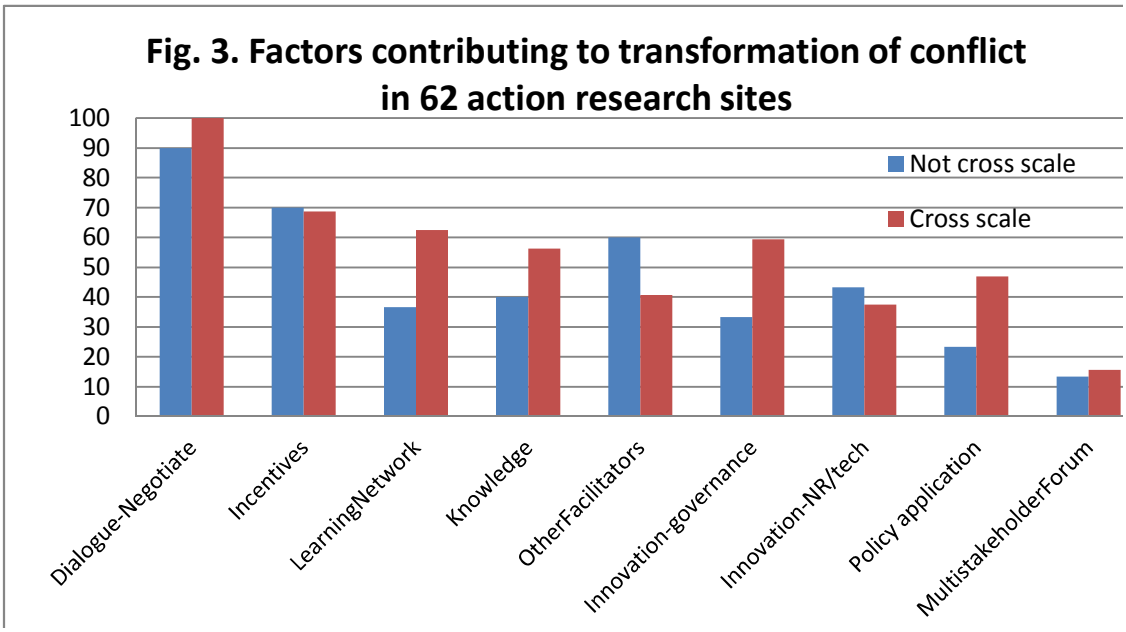
	Local (35)			Cross-scale (44)			All (79)		
Main issue	Not	Partly	Resolved	Not	Partly	Resolved	Not	Partly	Resolved
Water (34)	11.1	0.0	88.9	12.5	18.8	68.8	11.8	8.8	79.4
Forest (14)	14.3	42.9	42.9	14.3	28.6	57.1	14.3	35.7	50.0
Other commons (18)	25.0	0.0	75.0	42.9	14.3	42.9	38.9	11.1	50.0
Other (13)	16.7	0.0	83.3	42.9	42.9	14.3	30.8	23.1	46.2
All (79)	14.3	8.6	77.1	27.3	22.7	50.0	21.5	16.5	62.0

6 Landscape and learning institutions

Out of 79 conflict cases, 62 were transformed or are least mediated partly during the action research, and documentation of outcomes and processes revealed eight factors that contributed to these changes in addition to facilitation through action research itself. Typically 3-5 factors contributed in each of these cases, the percentage of cases where each factor contributed to change is shown in Fig. 3.

Dialogue and negotiation was almost always involved although often not on its own sufficient to address conflicts, and in a few cases failed. For example, one CBO in Bangladesh attempted to negotiate with a neighbouring CBO to share its water but this failed. Ultimately conflicting farmers within the community cooperated when the CBO restored lost water flows from springs, thereby compensating for declining and increasingly unreliable rain in the dry season. Incentives were also important irrespective of conflict scale. These included recognition of rights to use forests for yak herders and distant users, and who had been excluded from community forests in Nepal, on condition that they comply with newly negotiated access rules; and enhanced or more reliable returns from new water management institutions and systems. In some cases disadvantaged communities and their CBOs mobilized to make payments to other CBOs for maintaining or restoring water systems in return for fair representation in decisions. This also highlights the role of governance innovations, particularly where conflicts arose between communities and across wider landscapes involving multiple communities and mixed uses of natural resources, involving changes in representation in decisions, new access rules and rights (for example recognising seasonal yak herders and agreeing zones and rotations for grazing), and diversifying CBO roles from forest or conservation to water management and agriculture. This has helped to resolve some conflicts where actors have different competing land use interests. More technical innovations were also a common component, particularly in water management, irrespective of scale and

included improvements to water supply and management infrastructure, and better adapted land uses and crops (reducing competition for scarce water).



The landscape approach highlights learning and adaptive management, and a focus of the action research was on the role and added value of horizontal adaptive learning across networks of CBOs in transforming conflict as well as broadening the scope of CBOs in commons management. All of the action research CBOs were members of larger networking initiatives, either existing formal federations or networks in the case of all the Bangladesh CBOs and the community forest user groups in Nepal, or project based sharing forums for the other Nepal cases. Learning networks played a particular role in cross-scale conflicts, notably in Bangladesh. CBOs learnt of new ideas such as innovations from other CBOs, and were encouraged to take up collective adaptations by sharing successes. Peer pressure played a role in changing CBOs that were perceived by other CBOs as lagging behind or failing to negotiate or adopt innovations. More importantly considering landscape issues, learning networks helped mobilize sets of nearby CBOs to help mediate in some cases or to coordinate. For example, in most of the southwest Bangladesh cases the active CBO network there tried to help in negotiation or mediation, influenced CBO leaders to adopt good practices, addressed conflicts between adjacent CBOs, and encouraged coordination of water management over larger areas in some cases.

Although the focus of this research was on community organisations and conflicts over common resources, all of these CBOs operate within wider governance frameworks and their rights and responsibilities are recognized by government agencies. Landscape approaches can be expected to rely heavily on adaptive collaborative management, and while no attempt was made to establish or change any existing co-management arrangements, the research introduced multi-stakeholder forums, primarily as a way to engage policy stakeholders with the action research thereby hoping to enable vertical or cross stakeholder learning between CBOs, researchers, practitioners and policy stakeholders and inform policy

processes. At district level these forums contributed to local transformation of conflict in a few cases. This arose by mobilising government officers to advise, mediate, or provide resources to CBOs for actions that they planned to overcome conflicts, improve adaptation, or bypass natural resource constraints. However, there proved to be limited scope for officers of sector based agencies at this level to respond to CBO demands and take initiatives that cross spatial or natural resource discipline boundaries due to lack of flexibility and decentralization.

7 Conclusions

Although the CBOs that participated in the research all started with a focus on managing one type of natural resource or commons (in part due to sectorally defined policies and projects), over time many of those studied have diversified their activities and attempt locally to resolve competition and overlapping interests in complex local social-ecological systems. This arose because households make use of multiple commons (as well as private resources), and particularly in Bangladesh because CBOs that had different original interests were involved in learning networks which resulted in sharing of resource management ideas for water, agriculture and fisheries that are common to all floodplain areas.

All of the action research sites faced one or more natural resource conflict, and this is an on-going dynamic. Action research with community organisations helped transform 78% of 79 cases of natural resource conflict into greater cooperation. Some local conflicts were between types of resource user and action research helped to resolve more of these. In general scale issues between different or multiple communities, beyond local areas, or with central government policies – landscape dimensions - rather than issues of interactions between different types of resource use, might be more challenging conflicts. Even in these cases half were transformed to greater cooperation- dialogue, incentives and especially learning networks between community organisations and governance innovations helped reduce even these more challenging conflicts. Better informed policy application also helped, but this was constrained by the limited authority for local officials to innovate or to cooperate and address conflicts between sectors or types of land use (for example between aquaculture and farmers and fishers; or between water supplies and forest management).

Adaptive learning should be promoted between community organisations managing different types of commons to encourage more integrated local management of complex commons. Continued on-demand access to facilitation services is needed for self-sustaining CBOs when they face new challenges, including those posed by climate change and the responses of elites and government to such changes. Flexible responses to local needs and to coordination over larger scales that recognise diverse natural resource users and their local institutions should be encouraged. Policies and government were found to follow a narrow sectoral or problem focus which is not in keeping with the multiple livelihood sources (including complex commons) of households in the areas studied, nor with the overlapping interests and innovation shown by local communities in local institutions

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References

Armitage, D., M. Marschke, N. Doubleday. 2008. "Adaptive co-management and the paradox of learning." *Global Environmental Change* 18(1): 86-98.

Armitage, D., R. Plummer, F. Berkes, R.I. Arthur, A.T. Charles, I.J. Davidson-Hunt, A.P. Diduck, N.C. Doubleday, D.S. Johnson, M. Marschke, P. McConney, E.W. Pinkerton, and E.K. Wollenberg, 2009. Adaptive co-management for social-ecological complexity. *Frontiers in Ecology and Environment* 7(2): 95-102.

Barnett, J., and W. Adger. 2007. Climate change, human security and violent conflict. *Political Geography* 26 (6): 639-655.

Bennett, E., A. Neiland, E. Anang, P. Banerman, A.A. Rahman, S. Huq, S. Bhuiya, M. Day, M. Fulford-Gardiner, and W. Clerveaux. 2001. Towards a better understanding of conflict management in tropical fishers: evidence from Ghana, Bangladesh and the Caribbean. *Marine Policy* 25: 365-376.

Borrini-Feyerabend, G., Taghi Farvar, M., Nguinguiri, J.C., V. Ndangang, V., 2000. *Co-management of Natural Resources: Organizing, Negotiating and Learning-by-doing*. GTZ, IUCN, Kasparek Verlag, Heidelberg, Germany.

Castro, A.P and E. Nielsen. 2001. Indigenous people and co-management: implications for conflict management. *Environmental Science and Policy* 4: 229–239.

Cox, M., Arnold, G. and S. Villamayor Tomás. 2010. A review of design principles for community-based natural resource management. *Ecology and Society* 15(4): 38. [online] URL: http://www.ecologyandsociety.org/vol15/iss4/art38/

Malla, Y.B. 2001. Changing policies and the persistence of patron-client relations in Nepal: stakeholders' responses to changes in forest policies. *Environmental History*, 6(2): 287–307.

Ministry of Water Resources. 2001. *Guidelines for participatory water management*. Dhaka, Bangladesh: Ministry of Water Resources, Government of the People's Republic of Bangladesh.

Ostrom, E. 1990. *Governing the commons*. New York: Cambridge University Press.

Paudel, N. S., Monterroso, I. and Cronkleton, P. 2012. Secondary level organisations and the democratisation of forest governance: Case studies from Nepal and Guatemala. *Conservation and Society* 10(2): 124-135.

Pomeroy, R.S. and F. Berkes. 1997. Two to tango: The role of government in fisheries co-management. *Marine Policy* 21: 465–480.

Ratner, B.D. R. Meinzen-Dick, C. May and E. Haglund. 2010. Resource Conflict, Collective Action, and Resilience: An Analytical Framework. CAPRi Working Paper No. 100. CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi), International Food Policy Research Institute: Washington, DC.

Reed, J. Deakin, L. and Sunderland, T. 2015. What are 'Integrated Landscape Approaches' and how effectively have they been implemented in the tropics: a systematic map protocol. *Environmental Evidence* 4:2 DOI: 10.1186/2047-2382-4-2

Sayer, J.A. 2009. Reconciling conservation and development: Are landscapes the answer? *Biotropica* 41(6):649–652.

Sayer, J., Sunderland, T., Ghazoul, J., Pfund, J-L., Sheil, D., Meijaard, E., Venter, M., Boedhihartono, A.K., Day, M., Garcia, C., Van Oosten, C. and Buck, L.E. 2013. Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. *Proc Natl Acad Sci U S A*, 110:8349–8356

Sultana, P and Thompson, P.M. 2010. Local institutions for floodplain management in Bangladesh and the influence of the Flood Action Plan. *Environmental Hazards* 9(1): 26-42.

Sultana, P. and Thompson, P. 2012. Learning through networking: Enabling an adaptive learning network of local communities for integrated floodplain management in Bangladesh. In H. Ojha, A. Hall and R. Sulaiman, (eds.) *Adaptive Collaborative Approaches in Natural Resource Governance: Rethinking Participation, Learning and Innovation.* London: Earthscan. pp 138-176.