Impacts of learning networks among floodplain community organisations in Bangladesh on poverty, risk coping and ecosystem sustainability[1]

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ABSTRACT

Bangladesh floodplains are complex commons in terms of property rights (private lands when flooded form seasonal commons for aquatic resources, and public waterbodies), scale, multiple uses, overlapping initiatives and institutions. Community based co-management started in fisheries and water management in the mid-1990s. This expanded to over 500 floodplain community based organisations (CBOs), most initiated by projects but with some self-organised. Individually there is evidence of improved access to natural resources for the poor, restoration of ecosystems and wild fish catches, and continued operation of local water management. This paper investigates the attributes and dynamics of networking among CBOs, its influence on poverty reduction and sustaining ecosystem services, and how CBOs and networks address risks and uncertainties surrounding commons.

Since 2007 we have facilitated networking among about 270 CBOs. Case studies indicate structured adaptive learning between CBO peers has brought multiplier benefits compared with the practices of isolated CBOs. Networking has diversified natural resource management, improved governance, encouraged CBOs to be more inclusive (for example of women), and enabled CBOs to overcome local conflicts and strengthen their ability to negotiate with multiple governance levels.

CBOs reported undertaking 51 types of collective action: many improve resilience and productivity by diversifying and enhancing crop-fishery-water management systems; some improve capacity to cope with risks (such as maintaining infrastructure or rescuing people); and the rest support cooperation and livelihood development. Through the learning process many CBOs have innovated practices that, without having that explicit objective, enhance adaptation to climate changes and stresses by taking a more integrated approach – for example promoting dry season crops that require little irrigation enhances drought resilience and helps sustain native fish stocks. These benefits remain threatened by conflicting policies regarding continued tenure, but federating has enabled CBOs to collectively raise these issues through legal processes and policy debate.

KEY WORDS

Community Based Organisation, Adaptive Learning Network, co-management, fisheries, floodplain, poverty, ecosystem

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BANGLADESH CONTEXT

Floodplains

Floodplains have always been under great pressure since they became the starting place of civilisation. Floodplains are amongst the richest ecological systems on the planet (Ramsar 2001) with the potential for highly productive arable farming when not flooded. In Bangladesh these remain an important source of livelihood - fish contribute about 60% of national animal protein consumption, and wetland plants are used for fodder, food and construction.

Human interventions to change their hydrological regime also began early (Hillel 1992). Floodplains are amongst the most densely populated and productive areas of almost all the countries of the world. For example, Bangladesh with about two-thirds of the country comprising floodplains in the Ganges-Brahmaputra delta (Brammer 2000) has the largest concentrated population of poor flood prone people in the world with about 1,000 people/km^2 and a gross domestic product of $US 539,000/km^2 in 2008, higher than a dozen of the States that make up the USA. Human settlement is at the cost of declining natural wetlands, and these populations will be at an increasing risk from flooding with climate change. However, whereas a process of draining floodplains for arable uses was largely completed by the end of the nineteenth century in western Europe (Wagret 1967), much of Asia's deltas remain wetlands, partly because they are used to grow rice.

These complex systems combine a range of property rights. Public lands are usually areas with permanent water. But seasonal floodplains have for many years been *de jure* or *de facto* private land: individuals have the right to sell the land and to decide what crops to grow there. Nevertheless these areas are a vital part of capture fisheries where fish breed and grow out during inundation, before moving to deeper areas for the dry season. Wetlands provide common pool resources such as fish, plants, grazing and other services which have been important but undervalued for the nutrition and income of poor people for generations. A new trend of private enclosure of floodplains for aquaculture is taking place in Asia, ostensibly this retains their wetland status but the extent and impacts on poor people, on aquatic resources, and on the wider floodplain system and vulnerabilities are unclear.

There are already many policies and strategies supporting sustainable development in Bangladesh. However, their implementation has been at best piecemeal and often constrained by contradictory policies. The challenge is nowhere greater than in the management of floodplain natural resources. The Ministry of Fisheries and Livestock (MOFL) is responsible for technical aspects of fisheries, but the ownership and administration of waterbodies rests with the Ministry of Land. Meanwhile agricultural development in floodplains has largely been driven by water management infrastructure built by the Bangladesh Water Development Board and Local Government Engineering Department, although technical support to farmers comes from the Department of Agricultural Extension. Each ministry and attendant departments has its own mandate and priorities and these are often not compatible. For example, the aim of productive fisheries that benefit the poor sought by the MOFL comes into direct conflict with the aim of increased government revenue from fisheries sought by the Ministry of Land.

CBOs

Since the early 1990s there has been considerable effort from a combination of development agencies, NGOs and Government of Bangladesh to improve local fisheries management and water resources management, most involve establishing some form of community based organizations (CBOs). This was influenced by international research on how local institutions regulate and manage common pool resources which gave rise to understanding of this complexity and recommendations on the design of more effective bottom-up management systems (Stern et al. 2002). Collective action covers a wide range of collaborations typically at the local level that involve establishing local institutions and may be formalised in local organisations. In fisheries and other natural resources management government involvement was often top-down, but a combination of local collective action and government working together in collaborative or co-management is increasingly seen as a more effective arrangement.

In recent decades community based management of commons has been emphasised, whether based on existing local institutions or new local organisations. Bangladesh has a long experience of establishing community based organisations (CBOs) to improve management of freshwater fisheries and floodplain resources since the mid 1990s. About 1000 such CBOs have been formed, aimed at: empowering local communities, especially the poor; sustaining common natural resource bases particularly fish and water; and achieving a fairer distribution of benefits. Initiatives have been project based, raising questions over sustainability of such arrangements, what conditions enable CBOs to sustain, and whether the institutions for commons management change over time.

These CBOs are non-profit organizations, they rely on voluntary contributions and act at the local level. They are registered with government as legal entities and were formed through projects which have phased out. Each takes responsibility for managing or coordinating a specific area of floodplain or a waterbody, and they usually have members from each village using that floodplain area. Each CBO has membership in the 50-800 person range, representing up to 2,000 households Typically each CBO has an executive committee of 9-15 members representing the whole organisation, and this committee or its office bearers make an annual plan and finalise this on the basis of general members consensus. Based on our 2010 assessment of 250 CBOs, 59% of the executive committee members are poor (owning <50 decimals (0.2 ha) of land) and 19% of members are women.

CBO networking

The various projects that helped establish CBOs were all time bound, but had the intention of establishing community management of fisheries, wetlands or water resources structures. The CBOs have graduated from those completed projects and are registered as independent legal entities with recognised rights and responsibilities to their resources. Each CBO already tried to do the best it could, based on its experience, but did this in isolation.

The isolation and local experience base of each of these CBOs limited their scope for adaptive management and learning. The solution attempted from early 2007 onwards has been learning among a network of CBOs, addressing issues identified by those CBOs. In terms of research we investigated how CBOs can improve their management by sharing lessons, good practices and problems, and jointly testing new ideas and practices. This covered resource management practices, information generation and monitoring, CBO governance, and the policy implications of the lessons. It was expected that the adaptive learning network process would improve on existing practices through:

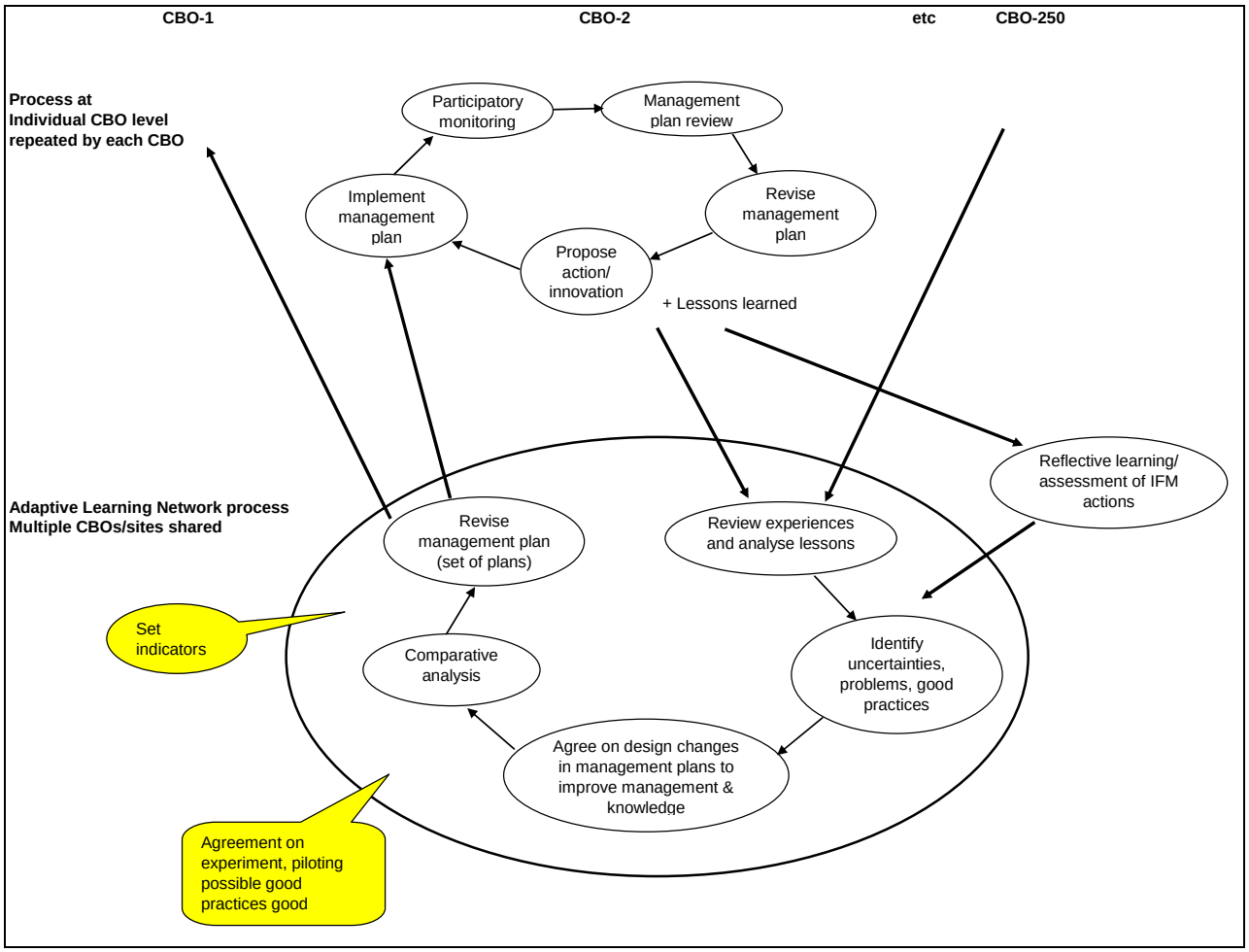
- the multiplier effect where the benefits and lessons generated among a network of similar units or CBOs is greater than the scope for learning separately by each individual CBO;
- identifying common constraints and gaps in knowledge of what works; and
- coordinated piloting of innovations and good practices that address a wider range of interlinked floodplain resource management issues than sectoral projects or isolated CBOs have usually addressed.

There was an enthusiastic response among the CBOs who saw the potential for a forum where they could come together, share their problems and opportunities, learn about innovations, try and adapt innovations in their area, and jointly influence practices and policies in favour of their communities. Initially 154 CBOs joined in, but in 2008 this was expanded to just over 250 CBOs, and by 2012 more than 280 CBOs had been involved in the network.

The adaptive learning network process that evolved is shown in Fig. 1. In each of four regions each CBO sends a representative to two larger workshops in a year covering the cycle of activities in the large bottom circle. The CBOs identify common issues and uncertainties; solutions already proven by some CBOs; opportunities and potential changes in their draft management plans; and other aspects of their decision making and resource management that they want to improve or experiment with. The individual CBOs started to make more systematic management plans and could see room for changing their decisions on the basis of combined experience. Options are fed back by CBO leaders to their members and changes to plans and actions are finalised by the executive committees of each individual CBO (top open circle). These plans are coordinated by the network of CBOs so that alternative views can be tested in the form of experimental designs where appropriate. In the workshops the CBOs also developed a set of common indicators for each initiative they would try. This process has allowed the networked CBOs to compare and assess impacts using their own monitoring. Subsequently the CBOs trying the same types of initiatives wanted to meet and explore why and how options worked or did not work. This has been added as local reflective learning workshops.

The CBOs decided to formalize their network, first forming regional committees and then in January they came together as a regional networking committee which finalised a constitution, and registered the network as a legal entity – the “Society for Water Resources Management” (SWRM). All of the participating CBOs have become members of this federation, which holds regular meetings and in 2010 held a convention of all CBOs.

Fig. 1 The adaptive learning process among a network of CBOs



METHODS

This paper is based on data and evidence from multiple sources generated over several projects working to facilitate networking of CBOs and to undertake research on the effectiveness and impacts of collective action in floodplain commons. In particular: process documentation of an adaptive learning network (Sultana and Thompson 2012a; Thompson et al. 20120), regular assessments of the performance of individual CBOs participating in this network (Thompson in press), an extensive survey of a wider range of CBOs based on focus group discussions, participatory monitoring of innovations taken up by CBOs, and detailed case studies and compilation of recent and past data for a set of representative CBOs. Those methods not discussed in other publications are elaborated below.

Focus Group Discussions

A purposive sample of sites with SWRM CBOs and other collective action initiatives related to risk coping was drawn. This was stratified to cover variation by risks associated with floodplain environment: drought prone areas, and main rivers with long floods and erosion in vulnerable islands (both in the north-west); low lying coastal areas prone to floods, salinity intrusion cyclonic storms (in the south-west);

and areas prone to rapidly rising (flash) floods along northern and eastern borders). The sites were also stratified by eight types of community organisation based on the primary purpose or function of the CBO/group which was usually associated with how it was formed (Table 1). The SWRM CBOs were stratified according to past focus (more on fisheries management or water management), but in practice most of these CBOs have to some extent adopted an Integrated Floodplain Management (IFM) approach. CBOs were selected from areas with recognised risks and within those areas sub-districts where the concentration of CBOs was high.

Table 1 Distribution of focus groups by environment and type of CBO (percentage of focus groups)

Type of CBO /collective action	Coastal – salinity, storm surges, drought	Main river floods including erosion	Flash floods	Drought prone	All environments
Sample size	n=174	n=71	n=58	n=35	n=338
Water management CBO (from SWRM)	9.2	19.7	27.6	45.7	18.3
Fishery management CBO (from SWRM)	16.7	8.5	6.9	0.0	11.5
Co-managed larger water management system	9.2	16.9	25.9	11.4	13.9
Union level (local government) disaster management	15.5	2.8	5.2	11.4	10.7
Community level disaster management	28.2	39.4	20.7	20.0	28.4
Informal/non-project collective action (e.g. farmer groups, fisher cooperatives)	7.5	8.5	13.8	11.4	9.2
Group livelihood enterprise	13.8	4.2	0.0	0.0	8.0
Total	100.0	100.0	100.0	100.0	100.0

Note: CBOs do not exist in all these categories.

At each survey site the research team collected background information on collective action and development initiatives, the communities (in many cases the site covered several villages), past hazard events, and rural economy. Separate focus group discussions (FGD) were held with each stakeholder category present in each site: landless women, fishers, farmers, and those coordinating the collective action (e.g. CBO executive committee members, group leaders, etc), separating those who are members of the CBO from others in the community who are not.

Topics covered included risks and hazards, hazard and environmental trends, how people prepare, respond and cope, sources of information and support for planning and coping with risks, measures taken through CBO/collective action, performance of CBO/collective action including benefits, problems or gaps

Case Studies

Case studies were conducted on 18 CBOs involved in natural resources (fish and water) management, purposively selected for having data available on their impacts, and for representing a range of environments and tenure arrangements over natural resources, with four selected for being less involved in networking (SWRM). Sites were selected where community management was established for some time, although the date of CBO formation ranged from 1994 to the mid 2000s. CBOs/sites with different types of data available and that represent different floodplain environments (floodplain/beel (seasonal wetlands), closed beels (lakes), haors (deeply flooded basins), rivers and coastal areas; and types of CBO (fishery, water or mixed natural resource management). Potential data available from a range of past projects that the authors worked with include poverty/socio-economic data

available at household level, fish consumption data, aggregate assessments of institutions, fish catches, biodiversity, cropping pattern and yields.

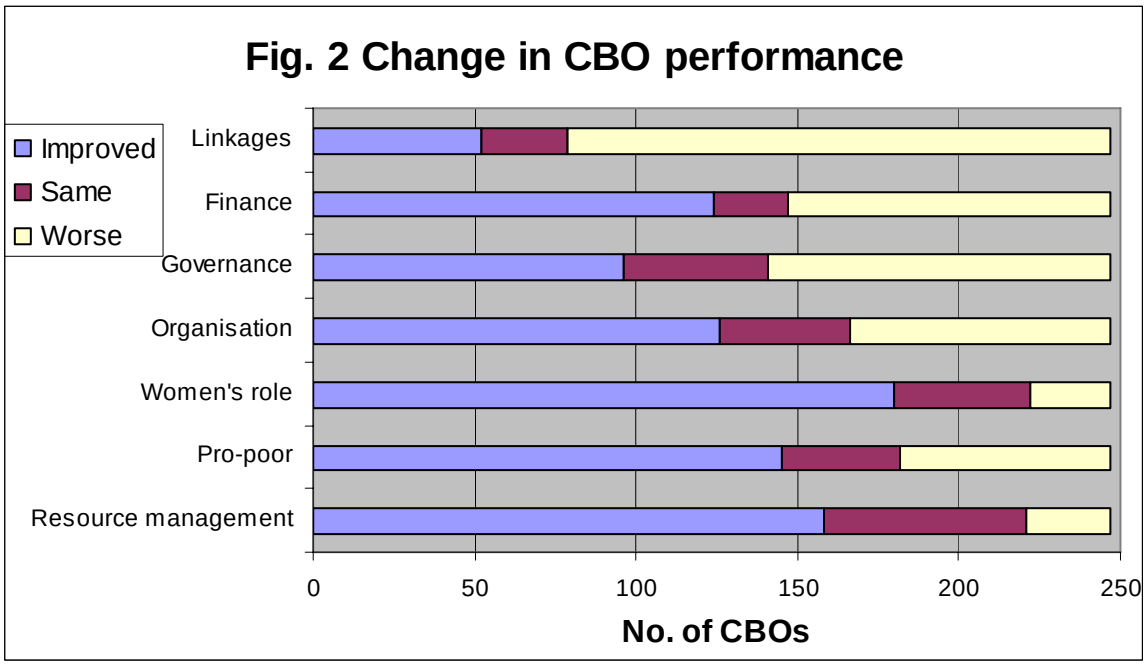
Piloting

Through the FGDs not only risks but potential common actions were identified by CBOs and through the CBO network 75 CBOs came up with possible adaptation measures. Those CBOs were given technical as well as financial support to pilot their identified risk mitigation measures such as alternative crops (flood, salt and drought tolerant rice, drought tolerant crops), canal excavation, sanctuary excavation and new sanctuary establishment, crab fattening, re-establishment of plants used for mat making in saline zone, tree planting, establishing common fruit gardens, and collective food banks (storage).

RESULTS

Networking benefits

Assessments of CBO performance indicate that the participating CBOs have improved their performance during this process. About 70% of CBOs involved the poor more in their activities and also improved natural resource management; and about half of the CBOs enhanced the role of women in their organisation and the organisations' functioning (Fig. 2). The capacity of CBOs has also been strengthened by the process of preparing scheme proposals and receiving small grants to test innovations. This results in bottom up planning, enhanced debate and decision making within CBOs, and greater transparency and accountability.



The CBOs also now understand how to access government services and funds, and by joining forces are more confident to bargain and demand better services. They

are now more organized and are able to stand together against threats that each may face. CBOs within a region help one another resolve local conflicts.

The most significant impact came from bringing together CBOs that previously had different focuses, for example CBOs that before had only concentrated on stocking carps learned about management of wild fish, and CBOs that had just managed water for rice learned about alternative crops and fisheries.

At the CBO level, resource management has consequently changed. Some CBOs had no idea about fish sanctuary. During adaptive learning workshops they learned from other CBOs that establishing sanctuaries can increase the catch of valuable wild fish. The CBO leaders went back and discussed the idea with their members, and then made plans for sanctuaries. Some CBOs who already had sanctuaries established more or larger ones. All of the CBOs now have a fair idea of appropriate sanctuary materials and size, and 72% now have fish sanctuaries. Those CBOs that had no sanctuary before reported up to a five-fold increase in their wild fish catch.

Alternative dry season crops (that are less water demanding than rice) have been tested by CBOs and are now well accepted by those communities. The CBOs observed that cultivating new crops can save water for fish in the dry season. Farmers found the crops to be profitable and are increasingly adopting these crops. For example, 21 CBO members from six CBOs tried no-tillage garlic in 2007, and by the start of 2012 this had expanded to 150 members, with the area per farmer also increasing. With dry seasons becoming drier in recent years, possibly linked with climate change, increasing numbers of farmers in floodplains in the southwest region are interested to cultivate crops with low water demand.

Networking has provided a forum were new problems have been raised and unexpected solutions have been tested. CBOs in the northwest region observed that some seasonal vegetables and fruits were not setting fruit, and some CBOs came up with the idea of bee keeping. Through the network ten CBOs tried bee keeping. Bee hives are moved from homesteads where fruit trees flower to mustard plots in the winter. These CBOs also planted jujube and mango trees which flower after mustard. Integration and a system view have been taken up as concepts by the CBOs.

Risk Coping and Collective Action

Through 338 focus groups the CBOs reported undertaking 51 types of collective action, the main ones have been grouped in Table 2. The most common actions that have been adopted separately by CBOs involved infrastructure repair and other rehabilitation works, and measures taken to improve resilience and productivity by diversifying and enhancing crop-fishery-water management systems. For example, canal re-excavation combines several dimensions of recovery and collective action – it is a form of environmental infrastructure repair or rehabilitation and it enables more surface fresh water to be stored and used for vulnerable crops in the dry season and also to support survival of native fish stocks, and to some extent re-excavation can also mediate floods by helping to store local rainfall and drain water out. Other collective actions include group enterprises, environmental improvements, and planning to better cope with hazards. Advocacy and awareness activities are relatively rare and show that individually CBOs have found limited opportunities at

local level to influence wider practice and policy contexts that affect them, and discussion confirm the limitations imposed by local power relations that constrain what individual CBOs can challenge.

Table 2: Percentage of focus groups reporting that their CBOs undertook different collective actions

Collective Actions	Coastal	Main river	Flash flood	Drought prone	Total
	n=174	n=71	n=58	n=35	n=338
Infrastructure repair	32.2	59.2	22.4	45.7	37.6
Canal re-excavation for dry season water	27.0	21.1	31.0	14.3	25.2
Alternative crop cultivation	20.7	25.4	31.0	17.1	23.1
Rehabilitation work after disaster	27.0	7.0	10.3	11.4	18.3
Roadside plantation and maintenance	9.2	22.5	27.6	25.7	16.9
Awareness training on disaster management	24.1	9.9	1.7	0.0	14.8
Running saving and credit programme	28.2	0.0	0.0	0.0	14.5
Fishing/fish culture	14.9	11.3	10.3	8.6	12.7
Livestock raising	9.2	14.1	12.1	5.7	10.4
Fish sanctuary management	1.7	11.3	22.4	8.6	8.0
Plinth raising	1.7	16.9	6.9	2.9	5.9
Organise meetings and rally	10.3	0.0	1.7	0.0	5.6
Pest control	5.8	4.2	5.2	5.7	5.3
Managing sluice gates	8.1	2.8	0.0	0.0	4.7
Awareness campaign	8.1	0.0	0.0	0.0	4.1
Reciprocal group cultivation	5.2	4.2	0.0	2.9	3.9
Making handicrafts from natural products	2.9	4.2	3.5	0.0	3.0
Marketing agricultural products	2.9	0.0	1.7	0.0	1.8
Flood tolerant rice cultivation	0.6	2.8	0.0	0.0	0.9
Storing paddy in paddy bank	0.6	1.4	0.0	0.0	0.6
Vermi-composting	0.6	1.4	0.0	0.0	0.6
Communal fish drying	0.0	0.0	3.5	0.0	0.6
Group poultry egg hatchery	0.6	0.0	0.0	0.0	0.3

Bold – collective actions that potentially are complementary in building water-crop-fishery resilience

By comparison with the reported collective actions, in the same focus groups open discussion on risk coping strategies adopted by those experiencing different hazards revealed that the cast majority of these strategies were individual household level strategies, even though the discussants were all participants in collective action. Table 3 shows the percentage of groups that experienced a hazard and took any action that reported different coping strategies. While borrowing, relief, distress sales of assets, and advances against future labour were all common in large scale sudden onset hazards (flood and cyclone), many of the responses involve adaptations and recovery in cultivation.

Table 3 Percentage of focus groups reporting risk coping strategies adopted locally, by environment

Coping strategies	Coastal	Main river	Flash flood	Drought prone
Total focus groups	174	71	58	35
Flood				
Number taken any measures	*68*	*66*	*57*	*28*
Obtained relief	44.1	50.0	8.8	46.4
Loan from NGO and Mahajan	42.7	37.9	64.9	35.7
Management of crop calendar	26.5	24.2	50.9	35.7
Cultivating short duration crops	16.2	15.2	38.6	25.0
Sold labour against cash in advance	16.2	19.7	19.3	14.3

Coping strategies	Coastal	Main river	Flash flood	Drought prone
Total focus groups	174	71	58	35
Sold household assets	2.9	6.1	1.8	3.6
Migration	14.7	6.1	19.3	0.0
Used savings	4.4	24.2	1.8	7.1
Fish culture	8.8	0.0	0.0	0.0
Sold fish against cash in advance	4.4	0.0	0.0	0.0
Cultivating flood tolerant varieties	1.5	0.0	0.0	0.0
Cyclone (tornado in non coastal sites)				
Number taken any measures	*132*	*51*	*11*	*16*
Obtained relief	55.3	9.8	45.5	0.0
Collect seed/seedlings to cultivate again	52.3	5.9	0.0	12.5
Loan from NGO and Mahajan	39.4	2.0	9.1	6.3
Sold household assets	22.7	13.7	54.6	12.5
Temporary migration	2.3	19.6	54.6	12.5
Sold labour against cash in advance	8.3	19.6	90.9	25.0
Repaired house after borrowing	26.5	9.8	100.0	25.0
Used savings	10.6	27.5	100.0	25.0
Mortgaged land	26.5	9.8	9.1	18.8
Drought				
Number taken any measures	*28*	*9*	*5*	*19*
Low water demanding crop cultivation	64.3	77.8	40.0	68.4
Sold household assets	78.6	22.2	80.0	31.6
Wise use of water	46.4	0.0	0.0	0.0
Borrow from Government/NGO	10.7	0.0	20.0	5.3
Timely use of sluice gate	10.7	0.0	0.0	0.0
Crop pests				
Number taken any measures	*34*	*53*	*35*	*27*
Sprayed crop field after harvest	20.6	35.9	82.9	29.6
Alternate crop cultivation	58.8	41.5	11.4	40.7
Used Integrated Pest Management	14.7	11.3	0.0	18.5
Cultivated repellent border crops	8.8	1.9	0.0	3.7
Did not cultivate same crop in same plot	8.8	9.4	8.6	7.4
Worked for other to recover loss	0.0	1.9	2.9	3.7
Cultivated pest resistant crops	0.0	11.3	0.0	0.0
Used saving to cope with crop failure	5.9	0.0	0.0	3.7
Did nothing	5.9	5.7	0.0	29.6
Soil fertility				
Number taken any measures	*22*	*42*	*27*	*14*
Used large amount of chemical fertilizer	36.4	14.3	51.9	42.9
Diversified crop cultivation	9.1	66.7	37.0	42.9
Used green manure	36.4	14.3	3.7	28.6
Deep ploughing of land	4.6	9.5	3.7	21.4
Used Zinc and Boron	9.1	4.8	3.7	7.1
Burning straw in the field	9.1	4.8	0.0	7.1
Used plant growth hormone	0.0	4.8	3.7	7.1
Salinity intrusion				
Number taken any measures	*25*	*0*	*0*	*0*
Salt tolerant crop cultivation	48.0	0.0	0.0	0.0
Use of organic fertilizers	44.0	0.0	0.0	0.0
Irrigation to remove salt	12.0	0.0	0.0	0.0

Note: Mahajan = moneylender

The experience of SWRM CBOs in piloting integrated management of water for crops and fisheries, and the focus of local people on agricultural hazards and coping actions for agriculture both as individual household actions and as CBO-community level actions, when discussed with CBOs pointed to a priority for adaptive collective actions in cultivation. As a follow on to the focus groups and to good practices identified by the CBO network, and options that they were interested to test. The most attractive approach for CBOs and their leaders has been for the CBOs to take on a new or stronger role as coordinators and extenders of new cultivation approaches and crops new to their communities. This was facilitated by CBOs learning of crop successes from other CBOs.

Consequently in 2011-12 CBOs took up in total 170 different crop-location trials (Table 4) – the vast majority of these with dry season crops that have significantly lower water demand than irrigated rice, but have been shown to achieve at least as good profits (such as maize, sunflower and garlic), see Sultana and Thompson (2012b) for data from previous trials in coastal areas for example. This has fitted well with a network learning approach since a set of farmers in each CBO has kept records and can then through the network they share results not just with other farmers in their area but between CBOs that are spread across and between regions and environments generating a stronger comparative assessment by the CBOs themselves with scope to learn what to do or not to do from practice among a spread of sites. This has become part of a rapid spread of some of these crops between CBOs and then among farmers within CBO command areas. It has a strong link to management of commons since water and hazards are common challenges and a move to less water demanding crops cannot be taken in isolation - neighbours need to adopt similar water management practices, sluice operation serves local sub-catchments, and the added benefit for fisheries is only achieved when there is cooperation to maintain some dry season waterbody areas as sanctuaries so that fish can survive to repopulate the seasonal floodplain later.

Table 4 Number of CBOs* that tested different crops by type of CBO and environment

Crop	Fishery mgt	Water mgt	Co-management	Income generation	Union level	Coastal	Inland	All
Maize	18	14	3	8	3	13	33	46
Wheat	15	12	6	5	2	3	37	40
Sunflower	15	8	7	6	4	11	29	40
Garlic	2	3	2	1	0	2	6	8
Sweet gourd	0	0	0	2	0	0	2	2
Onion	0	1	0	0	0	0	1	1
Arum	0	0	1	0	0	0	1	1
Rice (BRRIDhan28)	0	1	2	7	0	4	6	10
Rice (BRRIDhan47)	2	0	0	0	2	4	0	4
Rice (BRRiDhan51)	6	0	0	0	3	5	4	9
Rice (BRRIDhan52)	6	0	0	0	3	5	4	9
Total crop adoptions*	64	39	21	29	17	47	123	170

* Note one CBO could test more than one crop

Note: while rice is the dominant crop in Bangladesh these varieties are recently developed HYVs developed to address different hazards and constraints: 28 has a shorter growing period, 47 is salinity tolerant, and 51 and 52 are flood tolerant.

Ecosystem Impacts

Based on existing data from past surveys complemented by field visits, case studies of 18 CBOs were developed to investigate the influence of community based management and then adaptive learning processes on the ecosystem services and

products managed by CBOs and from that impacts on livelihoods of poor people. Floodplain ecosystems are diverse, but from a wide range of services and products, fisheries comprised the most relevant indicator – with data from more CBOs and representing common resources on which poor people are more dependent. Table 5 summarises changes in fish catches and diversity in these sites, in general with the first year of data being a baseline or from close to the start of community management. This reveals in general enhanced productivity where fishery management was an aim of the CBO, where there was a longer period of management, and where the CBO had secure rights through a lease.

Table 5 Ecosystem changes measured by most common indicators – fish catches and diversity

Environment/tenure	Site	Fish catch	Fish diversity
Haor		**1 of 1**	**1 of 1**
Fishery leased	Dumuria	1999-2010 doubled per ha (data available only for entire haor where both located)	69-81 sp; Small increase 1999-2010
	Baragangina		
Coastal		**0 of 2**	**1 of 2**
Fishery leased	Chandra	2010-12 unclear	31-33 sp; Same 2010-2012
Mixed NR	Baliatali	2011-12 same	0-14 sp; Increase 2010-2012
Closed beel		**3 of 4**	**1 of 3**
Fishery leased	Porakhali	2005-10 wild fish increased, stocked fish declined	Same 2005-10
	Chapandaha	2002-12 stocked and wild fish increase	35 sp; Same
	Dhumnadi	1991-2003 increase stocked and wild fish	38 sp; No trend data
	Nasti	1994-1999 increase then roughly constant to 2012	43-13 sp; declined
Floodplain		**4 of 4**	**3 of 5**
Fishery leased	Dhaki Baila	2000-10 about doubled per ha	63-84 sp; Same 2000-2010
	Atrai	2002-12 increase catch per person	19-38 sp, increased 2002-2012
Mixed NR	Goakhola	1998-2001 increase then partial fall to 2004	30-40 sp; same
	Solua	2002-05 increase and maintained by 2012 (before CBO declining)	23-47 sp; increase 2002-2004, maintained to 2012
	Noli	No trend data	29-17 sp; declined 2002-2012
Water management	Nawafali	No data	No data
	Holdia	No trend data	No trend data
River		**0 of 2**	**0 of 3**
Fishery no lease	Titas Ka	1997-2002 increase then return to same catch per ha; decline catch per person	34-66 sp; decline then increase 1997-2002
	Tangaon	2003-12 catch per person stable (fluctuates)	43-35 sp; decline 2002-2012
	Nabaganga Darimithapur	No trend data	15-10 sp; decline 2009-2012

sp. = species
Row in bold for each environment gives number of CBOs reporting an increase out of those with trend data

However, there is limited evidence that this has resulted in more diverse fisheries. In particular the closed beels are actively managed by the CBOs which release carp fingerlings in them each year. During the period after 2007 when these CBOs participated in the learning network with other CBOs they added sanctuaries and conservation measures and there is evidence that this increased catches of wild fish over and above the stocked fish. It may also have helped to maintain diversity of wild fish – as one of these CBOs (Nasti) soon dropped out of the learning network, did not take up conservation measures, and recorded declining species diversity – it is intensively managed just for aquaculture.

A short period of community management makes it difficult to determine a trend in the two coastal sites (both of which are locations where the IFM approach of re-excavating canals for agriculture and fisheries was adopted). In the three rivers CBOs were formed over 10 years ago, but catches have not increased and species diversity is declining. The challenges here have been two – the resource base is more open – with fish free to move up and down stream outside of a CBO's management area, and policy has not enabled the CBOs to limit access as clearly as in other waterbodies since there is no system of lease payments.

Poverty Impacts

Community management could improve the lives of poor people dependent on the floodplain natural resources if it strengthens their access rights, enhances the productivity of the resources, and/or reduces exploitation of the poor by better off people such as leaseholders, moneylenders and middlemen. In addition community management is expected to be in itself empowering and there is evidence that it has raised the status in local society of poor people through their active involvement in CBO decision making and commons management.

All of the CBO studied have substantial membership of poorer people although there is limited data to characterise the multiple dimensions of poverty – for example along rivers and closed beels most CBO members are professional fishers who tend to own very little land, but not all functionally landless professional fishers are poor in terms of fishing assets and other poverty measures. Accepting this limitation, Table 6 confirms that in most CBOs over half of general members are poor (owning under 0.5 acres – 0.2 ha - of land), the exceptions are in some of the floodplain CBOs which have a greater diversity of stakeholders in their membership and are focused more on agriculture as well as water and fish, and in the one closed beel CBO not involved in networked learning where the leadership has been suspicious of greater transparency. Hence active participation of the poor in decision making is likely to be considerably less than expected from membership.

Table 6 Poverty changes measured by most common indicators

Environment/ tenure	**Site**	**Food security**	**Income**	**Housing**	**Participation (poor & women) in CBO (2012)**
Haor		**1 of 1**	**1 of 1**	**No data**	**2 of 2 >40%**
Fishery leased	Dumuria	1999-2005 26% increase fish consumption; difficulty eating 3 meals/day declined	1999-2012 – doubled for fishers	No data on changes	GB: 60% poor; EC 47% poor
	Baragangina		No data		GB: 55% poor; EC 46% poor
Coastal		**2 of 2**	**2 of 2**	**2 of 2**	**0 of 2 >40%**
Fishery leased	Chandra	2010 5% hh unable to eat 3 meals/day all time, 2012 none	2010-12 40% increase (only 5% wild NR)	2008-12 improved (from 50% to 100% tin walls)	GB: 55% poor; EC 33% poor
Mixed NR	Baliatali	2007-12: fish consumption increased; % in food deficit fell from 20% to 10%	Hh owning <0.5 acres report increased incomes; 2010-2012 35% increase	2007-12 sanitary latrine ownership up from 60% to 90%	GB: 55% poor; EC 12% poor; 50% women; 1 of 2 key posts woman
Closed beel		**4 of 4**	**3 of 4**	**2 of 3**	**1 of 4 >40%**
Fishery	Porakhali	2007-09: food security	2007-09 52%	No notable change	GB: 80% poor;

Environment/ tenure	Site	Food security	Income	Housing	Participation (poor & women) in CBO (2012)
leased		improved for fishers but not landless	increase fisher income, but no NR impact other poor	2007-9	EC 25% poor; no women
	Chapandaha	2002-2007&09: months fishers ate 2 meals/day fell from 4-6 to <1	2002-2007 50-74% increase fisher incomes	2002-2007 &09 roofs improved 32% non tin fell to 0-10% non-tin	GB: 85% poor; EC 75% poor (1 woman)
	Dhumnadi	1997 81% in deficit; 2001: 50% in deficit; 2012: 50% in deficit (hh self assess)	2001-2010 incomes doubled; then fell in 2012 when lost fish income as lost secure access	Improved: 1997 65% tin roof, 2001 87% tin roof; sanitary latrine 1997 8%, 2012 60%	GB: 92% poor; EC 33% poor. No women
	Nasti	2012 none in deficit; say fish consumption improved since 2008	40% increase in member incomes 2007-2012	No data on trend; all members have sanitary latrine	GB: 30% poor; EC: 30% poor. No women
Floodplain		**2 of 7**	**6 of 7**	**1 of 1**	**2 of 7**
Fishery leased	Dhali Baila	2003-2012 % hh food deficit fell 20-25% to 6%	Extensive dependence on wetland NR but trend not clear	No trend data	GB: 70% poor; EC: 30% poor
	Atrai	2002-12 – small increase fish consumption but 30% hh still food deficit 2 m/yr	2002-12 professional fisher hh income doubled	No trend data	GB: 85% poor; EC: 75% poor
Mixed NR	Goakhola	1996-01 % hh deficit fell 57% to 16%, rose for fishing hh to 40% in 2009	1996-2001 22% increase incomes; 2009 double 2001 level	1996-01 roofs improved, no other data	GB: 30% poor; EC 24% poor; EC 41% women
	Solua	2002-12 little change in % hh in deficit or duration	2002-12 poor hh income doubled but most not NR	No trend data	GB: 60% poor; EC: 31% poor
	Noli	Small decline in fish but doubled vegetable consumption 2007-12	Incomes reported locally to have doubled 2007-12 (no survey)	No trend data	GB: 35% poor; EC: 25% poor
Water management	Nawafali	2007-12 % hh food deficit fell 30% to 20%	2007-12 61% increase incomes reported	No trend data	GB: 45% poor; EC: 40% poor
	Holdia	No change 2007-12 (lands eroding)	2007-12 reported 33% increase incomes	No trend data	CBO not active
River		**2 of 2**	**3 of 3**	**2 of 2**	**3 of 3**
Fishery no lease	Titas Ka	% hh food deficit: 1996 93%, 2001 68%, 2012 5%	1996-2009 income from fish/NR trebled	Tin walls: 1996 15% hh, 2002 60% hh; 2012 75%	GB: 65% poor; EC 75% poor
	Tangaon	No trend data; 50% hh say deficit	2002-12 reported 50% increase	No trend data	GB: 70% poor; EC 45% poor
	Nabaganga Darimithapur	2007-09 % fisher hh deficit 50% fell to 10%	2007-9 28% increase fishing hh	Thatch walls: 2007 70%, 2009 40%	GB: 75% poor; EC: 80% poor but limited involvement poor in decisions

Note: a simple definition of poor as owning under 0.5 acres (0.2 ha) of land was used in assessing CBO membership status. Depending on source incomes, food security and housing information is for CBO members, fishers, or poor (same definition)
Row in bold for each environment gives number of CBOs reporting an improvement out of those with trend data, except for participation column where it gives number of CBOs where over 40% of EC members are poor.
GB = general body or general membership of a CBO, EC = executive committee of CBO

Out of the available data from a variety of past surveys complemented by current opinions, three measures of change in poverty were considered – food security (incidence of food deficit or hungry months among households), reported income, and housing condition (variously wall or roof materials or sanitation. These measures strongly indicate reduction in poverty in the case study sites comparing recent surveys with the start of community management- although reported income changes are also affected by inflation, improvements in housing and food security indicate benefits for those dependent on natural resources. Even in rivers where there was a lack of definitive recovery of fisheries, CBOs appear to have strengthened access or at least capture of benefits for participating fishing communities to those fisheries.

The cases also reveal how dependent community management is on enabling policies. Many of the fishery CBOs have held use rights to waterbodies for the last 10 years under agreements between the Ministry of Land and Ministry of Fisheries and Livestock, these are now ending and for political reasons have not been renewed in a timely manner. Thus in Dhum Nadi the CBO has successfully managed the fishery for many years, but in 2012 the district administration tried to lease it out competitively. The CBO through the network joined with other CBOs in that district facing the same threat to obtain a high court order staying the leasing process, but this did not give it a recognized right to limit access and so it was unable to do its annual stocking and access became effectively open.

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

The evidence from Bangladesh indicates that community management of common fishery and water resources in floodplains has in general strengthened aspects of the ecosystems – notably natural fishery production which was in an overexploited condition before /without community management. These gains have translated into a reduction in poverty for those dependent on natural resources and institutionally have been based on involvement of poor people in decision making.

Added to the impacts of community management of commons has been a process of learning and networking between CBOs. Although the case studies provide only partial evidence for additional impacts of networking on ecosystems and poverty, wider information from the CBOs as a whole indicates that there have been changes in their decision making and governance, and in their diversification of resource management into an integrated approach, which for many involves addressing agriculture and water management improvements as well as fisheries. Risks and hazards had not earlier been an explicit concern of the network, and based on a wide range of sites with collective action much of the coping responses to risks are made at the household level, but CBOs have taken up initiatives to restore common infrastructure and cropping systems.

Policy implications and recommendations

Diversification of community initiatives to address system level challenges in natural resource management has been inspite of rather than encouraged by policies. One of the constraints identified has been a sectoral approach to development initiatives which does not make the best support of community interests and needs to enhance overall productivity and sustainability. This continues to mean that public investments are planned and implemented separately for water, fisheries, agriculture and hazard/disaster planning. There is a need to strengthen devolved and more integrated planning and recognise community initiatives in such processes.

Enabling policies and use rights or tenure have been vital to legitimise CBOs and their rights to set limits on fishing or control over water. While water management CBOs have permanent ownership of infrastructure handed over to them, fishery CBOs had at best 10 years of rights to public waterbodies. However good the CBO performance the reality is that a set of politically connected better off individuals and their followers are ready almost everywhere to step in and make quick profits from mining the fisheries restored back to health by CBO investments over the past decade. Government could easily overcome this threat and ensure long term use rights but buy-in to community and collaborative management is limited to the communities, local councils and Department of Fisheries; a combination of elites and land administration can benefit themselves by returning to a system of competitive leasing and hold the deciding powers. Networking among CBOs offers a way to advocate good practices, policy changes and to challenge threats, but to step up to national level challenges the CBOs need a stronger alliance with champions in media or with access to national decision makers.

This work has also shown the scope for a network of CBOs to take up efficient and coordinated testing of innovations, particularly where the results and lessons are relatively easy to assess and compare between them – such as crop innovations. This reveals the potential for community organisations to make efficient extension of innovations and government support, provided the latter is flexible and responsive to local priorities. Trying to assess impacts on poverty and ecosystems also reveals the limitations of existing data, CBOs themselves through a learning network have shown an interest in generating and using information, but it is patchy and often project bound. Piloting is needed to see how CBOs could better generate and make use of information and data in adaptive management, lesson sharing, and as an input to more responsive and relevant national level evidence and decisions.

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