NATURAL RESOURCES SYSTEMS PROGRAMME

The effectiveness of the PAPD method: a comparison of community organisation experience in the CBFM-2 project (DFID/NRSP Project PD131)

FINAL REPORT

February 2004-September 2004

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Contents

Main Report

ABBREVIATIONS AND GLOSSARY

Term	Meaning
ADR	Alternative Dispute Resolution
beel	Floodplain depression, a waterbody, may be perennial or seasonal
BELA	Bangladesh Environmental Lawyers Association (Bangladeshi NGO)
BMC	Beel Management Committee
BRAC	Bangladeshi NGO (formerly Bangladesh Rural Advancement Committee)
BS	Banchte Shekha (Bangladeshi NGO)
Caritas	Bangladeshi NGO
CBFM	community based fisheries management
CBFM-1	Community Based Fisheries Management project phase 1 (supported by the Ford Foundation)
CBFM-2	Community Based Fisheries Management project phase 2 (supported by DFID)
CBWM	Community-Based Wetland Management (project supported by the Ford Foundation)
CNRS	Center for Natural Resource Studies (Bangladeshi NGO)
CRED	Center for Resource and Economic Development (Bangladeshi NGO)
CPR	common pool resource
decimal	One hundredth of an acre, about 40 m^2
DFID	UK Department for International Development
DIP	deliberative inclusionary process
DOF	Department of Fisheries
EDA	Exploratory data analysis
ERA	Efforts for Rural Advancement (Bangladeshi NGO)
FGD	Focus Group Discussion
haor	Extensive low lying and deeply flooded area of floodplain in north-east Bangladesh bounded by natural river levees and containing several beels
IFAD	International Fund for Agricultural Development
IGA	income generating activity
IMF	Institutional Monitoring Form
IUCN	World Conservation Union (formerly International Union for the Conservation of Nature)
jalmohal	Government owned waterbody, a water estate, where fishing rights are leased out
kata	Brushpile used as a fish aggregating device (usually in a river)
khal	natural canal
kua	Man-made ditch or catch-pond in seasonally flooded beel
MACH	Management of Aquatic resources and Community Husbandry (project supported by USAID)
matbar	head of a samaj
MC	Management Committee (BMC and/or RMC)
NGO	Non Governmental Organisation
NR	Natural Resources
NRSP	Natural Resources Systems Programme (research program of DFID)
PAPD	Participatory Action Plan Development
para	A neighbourhood, informal division of a village
PC-VW	Problem Census – Village Workshop process (precursor to PAPD)
PRA	Participatory Rural Appraisal
Proshika	Bangladeshi NGO

Term	Meaning
QMR	Quarterly Monitoring Report
RMC	River Management Committee
samaj	community – based on locality - a village or neighbourhood (*para*) – and same religion
SEMP	Sustainable Environmental Management Project (supported by UNDP)
SPSS	Statistical Package for the Social Sciences (data analysis software)
SSM	Soft Systems Methodology
UNDP	United Nations Development Programme
Union Parishad (UP)	Local elected council for on average about 10 villages, lowest level of government
Upazila	Sub-district
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Participatory Action Plan Development (PAPD) was developed in Bangladesh through NRSP research to build consensus among local stakeholders on their common problems and solutions for natural resource management. The PAPD method is argued to be advantageous because it encourages different stakeholders to voice their needs and ideas, to share their opinions and analyses, and to agree on a common action plan that addresses shared problems.

This study provides statistical evidence that community based fisheries management is more effective in achieving desired outcomes when initiated with PAPD than where NGOs follow their normal approaches. The analysis used data from 36 sites of the Community Based Fisheries Management Project phase 2 in Bangladesh, half where a PAPD was the basis for collective action and institution development, and half were similar sites where PAPD was not used. In all cases an NGO facilitated development of community organisations and better resource management. Data from project monitoring and focus groups was used to test the hypotheses.

Allowing for the type of waterbody, which is associated with issues such as leasing which increases conflict, and other relevant factors, PAPD was associated with:

- a saving of about 100 days in the process of forming community-based organisations (CBOs);
- CBOs that hold 3-4 times more awareness raising events;
- CBOs that include representatives of more stakeholder categories, yet 66% of their membership is poor (compared with 33% in non-PAPD sites);
- participants rating significantly higher the improvements in social cohesion;
- participants perceiving more personal benefits and expecting more long term community (environmental) benefits to which they give greater importance;
- natural resource management actions that occur about 100 days sooner after CBO formation (and over 180 days earlier from the start of NGO support);
- an average of about three more resource management actions implemented within about two and a quarter years, and fewer plans that were not implemented;
- many fewer rule breaking incidents and conflicts, despite a similar number of fishing rules in place in PAPD and non-PAPD sites;
- recognition that more types of people were benefiting and higher ratings for the benefits to fishers and other stakeholders; and
- reportedly greater improvements in local government attitudes in favour of user community management.
- Yet participants spent about 200 hours per year less on resource management.

Case studies indicated that PAPDs have given a direction for CBFM activities and helped initiate the local institutions and community organisations. In the non-PAPD sites the NGOs had to make considerable piecemeal efforts to explain to local people their objectives and intentions. The history of leasing and conflicts over access were a major reason for slow progress in changing resource management in some sites (these tended not to have a PAPD and were perceived as being fisher-managed). Facilitation in general was probably better in the PAPD sites, and in the case study PAPD sites there were fewer reasons for conflict and disputes than in the non-PAPD sites. Generally the PAPD process appeared to generate plans as a focal point for action, greater unity among fishers and support from local leaders compared with the situation with NGO support but no PAPD.

KEYWORDS
Participatory action planning, consensus building, community based organisations, fisheries, research evaluation, Bangladesh.

EXTENDED SUMMARY

1 Background

Community based management or co-management of natural resources depends on facilitation and processes that ensure participation of the user communities. So a major question is how best to initiate such regimes and what participatory planning methods are effective given that there is diversity among the local communities. In Bangladesh a methodology has been developed for consensus building for floodplain resource management that has been named Participatory Action Plan Development (PAPD). The method was developed, refined and tested, and since has been promoted for uptake and adaptation through a series of projects supported by DFID's Natural Resources Systems Programme (NRSP) (R6756, R7562, R8306, etc, and programme development).

The purpose of this study was to determine whether there is evidence from the Community Based Fisheries Management phase 2 (CBFM-2) Project that the PAPD consensus building method has resulted in differential outcomes from the facilitation of community based management of natural resources.

1.1 PAPD

PAPD recognises heterogenous interests in natural resources (floodplains) and aims to be inclusive of these diverse interests. The methodology involves a series of linked local workshops where different stakeholders participate separately and together to develop a management plan for the common aquatic resources they use (Barr et al., 2000). The process is designed to ensure that poor people's interests are voiced and represented at least on an equal footing with more powerful stakeholders.

Box 1 (based on Sultana and Thompson 2004) summarises the steps in PAPD and how this phase fits into the overall process of establishing community based natural resource management. Stages four to eight involve participatory workshops with separate stakeholder groups and in plenary, and form the PAPD proper. The principle is that members of any stakeholder category, but especially the disadvantaged (such as fishers in Bangladesh) are better able to express their views separate from other (dominant) categories of people, but that this will fail to develop a shared understanding of common problems and possible win-win solutions (consensus building). Participatory planning just through multi-stakeholder plenary workshops is unlikely to give the poor a fair opportunity, or to result in an understanding of

Box 1 PAPD within the CBFM process

I. Scoping phase (*Stages one to three)*
   1. Situational analysis (summarizing local knowledge)
   2. Stakeholder identification and analysis (through key informants)
   3. Household census and invitations to a random sample of households to PAPD (stratified by stakeholder categories)

II. **Participatory planning phase -PAPD** (*Stages four to eight)*
   4. Problem census (with each individual stakeholder group)
   5. Compilation of problem rankings by facilitators (combining stakeholder group rankings)
   6. Plenary with stakeholders and local leaders (to review and agree on main problems for solution analysis)
   7. Solution and impact analysis (with each individual stakeholder group)
   8. Plenary with stakeholders and secondary stakeholders (to present the process, identify feasible solutions, discuss institutional arrangements and next steps)

III. Implementation phase (*Stages nine to thirteen)*
   9. Develop and adapt community organizations and institutions for resource management
   10. Community organization develops detailed plan to implement solutions agreed in stage eight
   11. Problem solving (review and adjust plans with community to mitigate or avoid any adverse impacts)
   12. Implementation of action plan
   13. Institutionalization of management arrangements including local policy support.

differences or common problems, therefore PAPD is structured to have two rounds of divergent and convergent sessions. Through this solutions that address problems shared by all stakeholders are found.

1.2 Community Based Fisheries Management

The Community Based Fisheries Management project phase 2 (CBFM-2), supported by DFID, started in September 2001 and is implemented by WorldFish Center working with several NGO partners[1] and Department of Fisheries. It offered an ideal opportunity to assess the effectiveness of the PAPD method. Improved fisheries management through community based organizations (CBOs) has been taken up in a wide range of sites. PAPD was used in 18 of its working areas covering 42 out of about 115 waterbodies under the project (mainly by Centre of Natural Resources Studies (CNRS), also by WorldFish Center working with Banchte Sheka and Caritas and in one site with a local NGO (Efforts for Rural Advancement - ERA)[2]). In the other (non-PAPD) sites the NGOs used their own approaches: reconnaissance studies, often some form of PRA, then forming groups of their target people (essentially fishers), providing training, savings and credit to these groups. They based membership of the CBOs on these groups, and the NGO has helped the CBOs plan activities in discussion with the primary groups but usually not with the wider community.

Eighteen non-PAPD sites were sampled, excluding CBFM first phase sites and closed stocked waterbodies that were not comparable to the 18 PAPD sites. This made it possible to compare PAPD and non-PAPD sites within the context of the same project structure and types of support for facilitation, organizational development and fishery management.

2 Research Activities

This study used data available from CBFM-2 and information collected for this study to address the key research question: "**Has PAPD within CBFM resulted in any benefits beyond those generated by CBFM without PAPD?"** This was operationalised, after reviewing available data and the scope to collect additional data, into testing 11 hypotheses.

Any differences between sites may be affected by factors other than the use of PAPD, both exogenous (such as the type of waterbody, existing social and user pressures on it, other use of the waterbody, number of poor fishers in decision making and other development activities), and endogenous (e.g. differences in the capabilities of NGOs in establishing CBFM organisations and activities). The study took account of these confounding factors in the data analysis. Several possible indicators were available for some hypotheses, so over 30 different sub-hypotheses were tested.

Within the CBFM-2 project PAPDs had been conducted in 18 locations, these formed sampling units for "with-PAPD." However, many of these covered more than one waterbody each of which after the PAPD has its own community based organisation (CBO) – either a River Management Committee or Beel Management Committee, and in one case more than one CBO was formed for one large floodplain. Therefore data from the respective CBOs were aggregated (averaged or summed as appropriate) for each sampling unit (a total of 59 CBOs were surveyed in these 18 sampling units). Eighteen project waterbodies without PAPDs were sampled after excluding "closed beels" (small well defined lakes with few

[1] Including, Banchte Shekha (BS), Bangladesh Environmental Lawyers Association (BELA), BRAC, CARITAS, Center for Natural Resource Studies (CNRS), Center for Resource and Economic Development (CRED), FemCom and PROSHIKA.

[2] In a related project for CBFM in South and South-East Asia (supported by International Fund for Agricultural Development – IFAD).

outlets) which are stocked by the fisher community since no PAPDs were conducted in this type of waterbody, and after excluding a few sites where there were major problems such as prior legal cases (none existed in PAPD sites).

Data that was used from the CBFM-2 project came from household censuses in 2002 plus: quarterly monitoring of implementation and project activities by waterbody, an institutional assessment survey, and transaction cost surveys; all were conducted in January 2004.

A substantial part of the data used was collected for the study using focus group discussions (FGD) in March-April 2004 using a participatory assessment method following a fixed structure. Two FGDs were held in each sample unit, one with about 10 members of the CBO and one with about 10 general poor fisher participants. This method ensured that mixed groups were avoided and scorings made by the participants were for the same questions/issues and could then be analysed along with other data, and also generated qualitative information for use in interpreting the results and helping build up an understanding of causation.

3 Outputs

Eleven main hypothetical/potential benefits of PAPD within the context of CBFM were identified based on the theory behind PAPD. Each hypothesis was tested using a general linear modelling procedure that generated an analysis of variance. Other determinants of the response variable were included so that the significance of the PAPD effect could be observed free from possible effects due to other variables likely to affect the response such as waterbody type and various confounding factors. In several cases one hypothesis was operationalised into several sub-hypotheses.

The outcomes of this analysis are summarized in Table 1. Overall this provides statistically significant evidence that PAPD works in most of the ways hypothesized. Care was needed in interpreting the results, and for this the focus group discussion write ups and the four case studies have been used to help explain the presence or absence of PAPD effects and the role of other factors, most notably type of waterbody which was often significant and represents the context in terms of resource access and resource base. In a few cases the sub-hypotheses tested were modified from those identified in the study design, according to the data available and collected through the participatory assessments/group interviews.

Table 1 Outcomes of testing the research hypotheses.

Research hypothesis	Sub-hypotheses tested	PAPD effect	Mean values	Other significant confounding factors	Overall model
Community Based Organisation (CBO) development					
i. PAPD results in faster setting up of CBOs	No. of days taken to form CBO	**Accept**	PAPD=263 Non=370	None	F=9.3; df 1, 34; p<0.01; R^2 = 0.22
ii. PAPD results in more active CBOs	Overall	**Unclear**		No difference or non-PAPD more active in routine operations of CBO, but in PAPD sites CBO more active in relations with others	
	Average no. of CBO meetings per month	Reject	PAPD=0.60 Non=1.26	None	NS
	% attendance at CBO meetings	Reject	PAPD=73 Non=80	None	F=4.6; df 1, 34; p<0.05; R^2 = 0.12
	No. of awareness raising activities with organisations outside the CBO	Accept	PAPD=15.8 Non=4.4	None	F=11.2; df 1,34; p<0.01; R^2 = 0.25
	% of conflicts resolved by CBO	Reject	PAPD=23 Non=32	None	NS
iii. PAPD results in the formation of CBOs that are more holistic, and where poor are better represented	Overall	**Accept**		Diversity difference not large, but stronger PAPD impact on representation of poor	
	No. of categories of stakeholders in the CBO	Accept	PAPD=3.6 Non=4.2	Waterbody type	F=2.9; df 4,31; p<0.05; R^2 = 0.28
	% of CBO comprises poor fishers and landless	Accept	PAPD=66 Non=35	None	F=19.5; df 1,34; p<0.001; R^2 = 0.36
Social capital					
iv. PAPD results in greater social cohesion	Overall	**Accept**		Several factors important, but allowing for these PAPD effect seen by those taking decisions and by poor fishers	
	Score for change in social cohesion in community	Accept	PAPD=4.4 Non=2.4	Waterbody type; other development activities; % better off in CBO	F=2.9; df 6,29; p<0.05; R^2 = 0.37
	Score for change in social cohesion - BMC/RMC	Accept	PAPD=4.7 Non=3.1	Waterbody type; other development activities; % better off in CBO	F=2.4; df 6,28; p=0.05; R^2 = 0.34
	Score for change in social cohesion - fishers	Accept	PAPD=4.1 Non=2.0	Waterbody type; other development activities; % better off in CBO	F=2.9; df 6,29; p<0.05; R^2 = 0.37
Sustainability of fishery					
v. PAPD results in greater community awareness and concern for collective sustainability and security actions.	Overall	**Accept**		Waterbody type important – use rights and range of non-fish resources	
	Number of own benefits	Accept	PAPD=3.0 Non=2.0	Waterbody type; number of non-fisher users; if respondent is in MC	F=10.9; df 9,60; p<0.001, R^2 = 0.62
	Own benefit importance (score)	Accept	PAPD=6.8 Non=5.5	Waterbody type; waterbody-PAPD interaction; number of non-fisher users	F=8.8; df 9, 60; p<0.001; R^2 -= 0.57
	No. of short term community benefits	Reject	PAPD=2.2 Non=1.9	Waterbody type	NS
	Short term benefit importance (score)	Reject	PAPD=6.9 Non=5.9	None	NS
	No. of long term community benefits	Marginal accept	PAPD=4.0 Non=3.2	Waterbody type, no. of other uses of the fishery, no. of people fish for an income	F= 6.1; df 9,59; p<0.05; R^2 = 0.48
	Long term benefit importance (score)	Accept	PAPD=8.1 Non=6.8	PAPD-waterbody interaction	F= 7.7; df 6,62; p<0.001; R^2 = 0.43

Research hypothesis	Sub-hypotheses tested	PAPD effect	Mean values	Other significant confounding factors	Overall model
Collective action					
vi. PAPD results in faster uptake of community actions for NR management.	Overall	**Accept**		Some waterbody types have a PAPD effect	
	No. of days from fielding NGO staff to first action	Accept	PAPD=308 Non=481	None	F= 23.2; df 1,34; p<0.001; R^2 = 0.42
	No. of days from CBO formation to first action	Accept, but	PAPD=66 Non=165	PAPD-waterbody interaction	F= 5.4; df 6,24; p<0.01; R^2 = 0.57
vii. PAPD results in more community/ collective actions for NR management	Overall	**Accept**		Conflicts etc. also limit plan implementation	
	No. of actions planned and not implemented	Accept	PAPD=1.0 Non=3.2	No. of conflicts, no. of other development activities, other uses of waterbody	F= 17.0; df 4,31; p<0.001; R^2 = 0.69
	No. of actions implemented	Accept	PAPD=4.7 Non=1.7	None	F= 62.4; df 1,34; p<0.001; R^2 = 0.65
viii. PAPD results in community actions with greater compliance.	Overall	**Accept**		Same number of rules and awareness, waterbody and access also an effect	
	No. of rules in place	Reject	PAPD=1.9 Non=1.8	None	NS
	No. of rule breaking incidents	Accept	PAPD=1.0 Non=5.5	Type of waterbody, waterbody area, PAPD-waterbody interaction	F= 11.9, df 7,28; p<0.001, R^2 = 0.75
	% of community know rules	Reject	PAPD=84 Non=86	none	NS
	Total no. of conflicts	Accept	PAPD=0.6 Non=8.3	none	F= 7.9, df 1,34; p<0.01; R^2 = 0.19
	No. of internal conflicts	Accept	PAPD=0.2 Non=3.0	None	F= 17.6; df 1,34; p<0.001; R^2 = 0.34
Livelihood outcomes and linkages					
ix. PAPD results in community actions involving wider coverage of communities that perceive benefits	Overall	**Accept**		More types of beneficiary benefited more, and fishers also benefit more	
	Number of stakeholder categories benefited	Accept	PAPD=7.4 Non=4.6	None	F= 11.9; df 1,34; p<0.01; R^2 = 0.26
	Extent of benefits for all stakeholders	Accept	PAPD=5.6 Non=4.4	None	F= 8.0; df 1,34; p<0.01; R^2 = 0.19
	Extent of benefits for fishers	Accept	PAPD=5.8 Non=4.5	None	F= 5.9; df 1,34; p<0.05; R^2 = 0.15
x. PAPD results in better links with local government	Overall	**Accept**		The number of government bodies with links and frequency of meetings do not differ, but other supports and attitude changes do differ	
	No of government bodies giving support and their scores	Reject	Not calculable / no difference	Not applicable	Not applicable
	No. of times received govt. support	Accept	PAPD=7.7 Non=4.5	None	F= 6.2; df 1,30; p<0.05; R^2 = 0.17
	Change in attitude score to CBFM in Union Parishad	Accept	PAPD=2.7 Non=0.9	None	F= 44.2; df 1,46; p<0.001; R^2 = 0.49
	Change in attitude score to CBFM in Upazila	Accept	PAPD=2.8 Non=1.6	None	F= 21.5; df 1,56; p<0.001; R^2 = 0.28
	No. of meetings fishers have with local govt.	Reject		Indicator/sub-hypothesis probably not useful	

Research hypothesis	Sub-hypotheses tested	PAPD effect	Mean values	Other significant confounding factors	Overall model
Time /transaction costs					
xi. PAPD actions require greater time input from participant communities	No. of hours per person involved in CBFM activities last year	**Reject**	PAPD=179 Non=391	If MC member or general fisher	F= 7.2; df 2,58; p<0.001; R^2 = 0.2

3.1 Hypothesis i. PAPD results in faster setting up of CBOs

The number of days was calculated from the date of signing of the MOU with each concerned NGO for its project implementation activities to the date that a CBO was first formed. In PAPD sites the time taken to establish a CBO was significantly less: on average it took a year in non-PAPD sites or 41% longer than in PAPD sites. This reflects the greater understanding and consensus in the sites with a PAPD where the planning process leads into CBO formation. In some cases the difference is because a CBO comprising different types of stakeholders could be established in a flexible way after PAPD whereas some NGOs in non-PAPD sites followed a fixed process that required forming and establishing user groups of fishers for some time before the CBO.

3.2 Hypothesis ii. PAPD results in more active CBOs

This hypothesis could not be accepted, partly because the main hypothesis was broken down into four sub-hypotheses which from the focus groups and case studies were found to have different implications. It was expected that more active CBOs would arise in sites with PAPD because from an early stage they had plans that were agreed among a wide range of stakeholders. To some extent the level of collective action (hypothesis vi) is also an indicator for this. Here the focus was on:

1. Frequency of meetings, but there were more frequent meetings in the non-PAPD sites, although the difference was not significant.
2. Meeting attendance rates were just significantly higher in the non-PAPD sites. This was not expected, but the focus groups indicated that a success of PAPD was that with a general consensus fewer meetings were needed, whereas in sites without that consensus more meetings were needed to discuss problems and conflicts. Reported attendance rates were high (over 70%) in both PAPD and non-PAPD sites.
3. There were almost four times as many awareness raising events targeted at non-CBO members in the PAPD sites compared with non-PAPD sites, and a wider range of types of awareness raising activities were involved. Although such events also involved the NGOs, this indicates CBOs that are more active at the community level.
4. There were many fewer conflict incidents reported in the PAPD sites compared with the non-PAPD sites (see hypothesis viii), but a higher percentage of conflicts in non-PAPD sites were reportedly resolved although the difference was not significant. The few PAPD sites with conflicts reported tended to be substantial ones.

3.3 Hypothesis iii. PAPD results in the formation of CBOs that are more holistic, and where poor are better represented

The analysis confirmed that in PAPD sites the CBOs have significantly more categories of stakeholders as members of the committee, although the difference is not great. This was partly because of higher representation of women in the committees in PAPD sites (poor women were one of the stakeholder categories that participated in all of the PAPDs). This pattern was also linked with the type of waterbody and NGO approach. Some NGOs, mostly

in non-PAPD sites that were not floodplain beels, formed CBOs comprising only people who fish for an income. Floodplain beels in general have more types of stakeholder involved since the land is private but seasonally flooded, so farmers catch fish and as owners of the area have to be involved in any management plans and activities.

A significantly higher percentage (66%) of CBO members in PAPD sites were poor (fishers and other landless people) compared with the non-PAPD sites (35%). Better off and more articulate or literate people tend to be nominated or chosen to represent communities in the CBOs, but 70% of households in CBFM-2 sites are poor (WorldFish Center 2003) and the CBOs in PAPD sites are close to this. There was more influence of DOF and NGOs on selecting participants in non-PAPD sites and this appears not to have been pro-poor but to have favoured inclusion of some local influential people and slightly better off fishers.

3.4 Hypothesis iv. PAPD results in greater social cohesion

PAPD as a consensus building method involving different types of stakeholder was argued as building social capital in NRSP project R6756, but measuring this is difficult. PAPD was expected to result in higher levels of trust, harmony, cooperation and collective action compared with CBFM sites without PAPD. The respondents in the participatory assessments were asked to score the change in social cohesion between just before CBFM started and the interview date on a scale of -5 to +5. Committee members and fishers reported increased social cohesion, except for a very few sites, such as ones where professional fishers now control a waterbody and exclude others from the community from fishing.

The hypothesis was accepted. Average scores for the change in social cohesion with the project activities were over 4 in PAPD sites for the community as a whole, CBO committee members and fishers, but up to 3 for the non-PAPD sites. The case studies and focus groups found this is largely because PAPD brought different stakeholders from different villages to know each other, to exchange ideas and to come in consensus among themselves. This relationship was further nurtured through working together for common interests after the PAPD. However, waterbody type, other development activities and the percentage of better off people in the CBO were significant confounding factors. Other development activities may have already brought gains, or may result in competition for resources. Involvement of more better-offs in the management committee reduces social cohesion as they tend to work for their own interests. Floodplain and river-beel areas showed greater social cohesion probably as they are not leased and had fewer conflicts.

3.5 Hypothesis v. PAPD results in greater community awareness and concern for collective sustainability and security actions

In the participatory assessments, Management Committee members and general fishers not involved in the committee separately assessed for their own benefit and short and long term (future sustainable) community benefits the number of types of benefit that they had/would receive, and the importance of those benefits on a scale of 1-10. This resulted in six tests – two for each type of benefit. Types of own benefit were similar, but on average respondents had one more own benefit and rated them more highly in importance in PAPD sites. PAPD had less effect in floodplains since the management bodies in non-PAPD floodplain sites also represent different users and everyone found some benefits.

Short term community benefits were few and did not differ with PAPD. About twice as many long term as short term community benefits were reported and long-term benefits were rated more important than short term benefits in both PAPD and non-PAPD sites. However, the number of long term benefits was barely significantly higher in PAPD sites. At this relatively early stage of establishing CBFM this is understandable. Both PAPD and non-PAPD sites emphasised fishery benefits such as increased biodiversity, conservation measures and

limiting fishing effort; but participants where there had been a PAPD regarded community participation and linkages with local government as important long term benefits, whereas in sites without PAPD establishing ownership and access for fishers was reported.

Waterbody type is therefore a key factor: in the river sites in general few long-term benefits were predicted as there has been less change in access and participants fear that open access means in future the resource could be captured by powerful people. In non-PAPD open beel sites, benefits only go to the fishers rather than to the entire community, and the whole community has only a vague expectation of long-term benefits. But the PAPDs in similar open beel sites involved the wider community and this was expected to give greater assurance of improved management continuing in future and a broader spread of benefits. The other key factor is the leasing system: the only waterbody type that is leased by the users in this study is the open beels. Open beels have a risk that in future powerful people may once again take them on lease and exclude poor fishers. In the few open beels with PAPD there was a consensus on new management among the wider community (including with local leaders and elected representatives) so this could mean that the participants in PAPD open beels see less risk of losing their access and benefits in the long term.

3.6 Hypothesis vi. PAPD results in faster uptake of community actions for NR management

This hypothesis was accepted. On average PAPD resulted in saving 170 days of NGO facilitation time in achieving the first community actions for natural resource management, and on average CBOs in sites with PAPD took about two months before they took their first actions compared with over 5 months in non-PAPD sites. The difference was largely because first actions took longer in open beel areas and especially in river areas among non-PAPD sites. There appears to be no effect due to PAPD in floodplain beels. In some PAPD sites, the community influence and awareness generated from the PAPD was so strong that the actions even started straight after the PAPD. For example, in Shuluar Beel, the CBO was formed during the last plenary session of the PAPD proper and the first activity they took up was restriction of use of harmful gears. The action was jointly planned with Department of Fisheries and implemented within a few days of the PAPD.

In the rivers there was a very large PAPD-effect on time taken between CBO formation and first management action. Before CBFM, most of the fishers had limited access in rivers because of intense fishing effort including many brushpiles made by better off people since they became open access in 1995. PAPD resulted in a general consensus on the problems amongst all local stakeholders including support of local influentials to end harmful fishing, and the formation of CBOs that included these different stakeholders. Therefore they started to remove cross dams and later they banned harmful gear use and restricted brushpiles. In the non-PAPD river sites CBOs were formed of fishers based on small groups developed by the NGOs. Fishers had difficulty establishing their rights and government recognition of their rights was delayed. Without PAPD a long process of awareness building among the community was needed after the fisher based CBOs were formed.

3.7 Hypothesis vii. PAPD results in more community/ collective actions for NR management

This hypothesis was accepted. The management committees in both PAPD and non-PAPD sites planned over five management actions on average, but the communities in the PAPD sites were able to implement most of their planned actions, whereas in the non-PAPD sites they could implement about a third of what they planned during about two years. This is not so surprising. The PAPD process generates plans that specify activities, whereas in non-PAPD sites identification of planned activities was not systematic or so widely supported. Also conflicts result in more planned actions not being undertaken.

3.8 Hypothesis viii. PAPD results in community actions with greater compliance

To assess this hypothesis five indicators were used: number of rules in place in the last year, number of rule breaking incidents in the last year, percentage of the community who know the rules, total number of conflicts in the last year, and number of internal conflicts (within the CBO). The hypothesis was accepted. Although after two years there are on average the same number of fishing rules in place in CBFM sites with and without PAPD, and most (over 80%) of the community reportedly are aware of these rules, there were five times more rule breaking incidents and many more conflicts in the non-PAPD sites than the PAPD sites.

Very few rule breaking incidents were reported in floodplain beels where there was a broader participation even in non-PAPD sites, whereas the highest incidences were recorded in non-PAPD river sites. Open access to rivers made rule implementation difficult and these sites had more conflicts. The definition of beneficiaries varies, in PAPD sites they include different stakeholder groups represented in PAPD. Similar multi-stakeholder committees were formed in non-PAPD floodplain beels, but only fishers were organized in the other non-PAPD sites. This explains the tendency of others to break rules that were developed by only a certain group in non-PAPD open beels and rivers.

Although PAPD itself does not resolve conflict, the study indicates less conflict in these sites. The PAPD increased confidence among the committee and they can negotiate or bargain with others within or outside the local community. Also there are cluster committees which coordinate among adjacent waterbodies within the cluster area (and more PAPD than non-PAPD sites are in such cluster locations). Moreover, PAPD has raised social cohesion.

3.9 Hypothesis ix. PAPD results in community actions involving wider coverage of communities that perceive benefits

It was hypothesised that more categories of stakeholders would perceive more benefits in the PAPD sites because the actions taken up address common needs of the community. Ideally this would be tested with data on the livelihood outcomes for households, but this was not possible as this study was carried out about two and a half years after the CBFM-2 project started and in many cases only a year after resource management actions started. Therefore information from the participatory assessments was used.

Although the same types of beneficiary stakeholders were recognized in PAPD and non-PAPD sites, significantly more stakeholder categories were reported to benefit in the PAPD sites (over seven with PAPD compared with under five without PAPD). In all cases fishers were reported to benefit, and were usually the most benefited group. In PAPD sites both management committee members and poor fishers more often mentioned that farmers, poor households, rich people and fish traders benefited. Farmers benefit from more fish from their own land and restoration of water for fisheries provides more moisture for the crops. The rich can buy more fish at a cheaper rate. Poor households can fish for food and to sell when they have less work. Fish traders get fish locally at a cheaper rate, which minimizes their carrying cost. In PAPD sites, one third of committee respondents mentioned women as beneficiaries because in most PAPD sites women are included in the committees.

The focus groups of respondents scored the extent of benefit for each stakeholder category on a scale of 1 to 10. The mean score for all types of stakeholder and just for fishers was significantly higher in PAPD sites. So people from sites with PAPD probably at this stage of developing CBFM are benefiting more than those in sites without PAPD.

3.10 Hypothesis x. PAPD results in better links with local government

As a key part of the PAPD process all concerned secondary stakeholders, such as local government and NGOs, attended the plenary sessions and they became aware of the problems, solutions and action plans proposed. Linkages between community members and these secondary stakeholders were supposed to be strengthened through PAPD. However, there was no significant difference in number of overall linkages with types of agency supporting the community/CBO. The Department of Fisheries is a partner in the project and has a role in co-management in all sites. Hence there was no difference in the number of meetings held with government between PAPD and non-PAPD sites. However, PAPD sites tended more often to have links and support from the local council (Union Parishad) which was always involved in the PAPD plenary sessions.

The focus groups reported support from local government was mainly in the form of advice and conflict resolution. The average PAPD site had received government help almost eight times compared with 4.5 times in non-PAPD sites. Members of local councils and the officials of the sub-district (upazila) administration appear to have changed attitudes. Both types of government officials thought the CBFM approach is new. Initially they had doubts about community involvement, setting fishing rules, and conflicts of interest. At the start they thought that the NGOs might take over the waterbodies. However, in both PAPD and non-PAPD sites their attitudes have on average changed. The focus group participants were asked to score the attitudes of these officials to the CBFM activities on a scale of -3 (most negative) to +3 (most positive) for the start of the project and present time, and the change in scores was calculated. The change in scores was significantly greater (close to 3) in PAPD sites compared with non-PAPD sites (about 1-1.5). Hence links with government were similar in both types of site, but PAPD was associated with greater perceived changes in government attitudes in favour of community based management.

3.11 Hypothesis xi. PAPD actions require greater time input from participant communities

The evidence rejects the hypothesis that PAPD requires participants to spend more time on CBFM. Instead people in PAPD sites apparently spent less time for community action in the last year. Management committee members spent more than double the time of poor fishers which was expected (equivalent to about 40 working days a year), although much of this includes for example observing that rules are not broken which can be done while they are fishing. The reduced time spent on CBFM in PAPD sites suggests that already after about two years those management actions that are in place are being observed voluntarily because of the general consensus reached with PAPD. The other factor is that poor fishers have less involvement in NGO groups in these sites than they do in the non-PAPD sites, and these groups take up time in addition to that related with resource management. Also conflicts and lack of consensus in the non-PAPD sites means that more time is taken up in conflicts and legal cases in some of these sites.

4 Case Studies

Case studies investigated causality of differences encountered and development of institutions and community actions. This expanded on the participatory assessments and gave more in depth information from four sites: Shuluar Beel (BS PAPD), Fatki River (CNRS PAPD), Chitra River (BS non-PAPD), and Shakla Beel (Proshika non-PAPD).

The PAPDs in both cases were found to have given a direction for CBFM activities and helped initiate the local institutions and community organisations under the project. In the

non-PAPD sites the NGOs had to make considerable piecemeal efforts to explain to local people their objectives and intentions. In one (non-PAPD) site the history of leasing and conflicts over access were a major reason for slow progress in changing resource management. Facilitation in general was probably better in the PAPD sites, and in the case studies there were fewer other reasons for conflict and disputes in PAPD than in the non-PAPD sites. The PAPD process appeared to generate plans as a focal point for action, greater unity among fishers and support from local leaders.

5 Contribution of Outputs

5.1 Implications for Participatory Planning

The extent that participatory processes are holistic, build partnerships, build local institutions, create synergies across sectors, foster local ownership, developing local partners and create enabling environments for the transparent and accountable delivery of services at the community level, has been questioned. This study shows that broader based community-led CBFM associated with PAPD was far more effective than narrower fisher-led CBFM associated with many of the non-PAPD sites.

The PAPD process differs from less structured approaches such as PRAs as it considers opinions of each stakeholder group separately and then presents each stakeholder group's plans to all stakeholder groups in a plenary session to see what others need, and then common and uncommon issues are considered for final planning. With good facilitation in PAPD there should be no scope for powerful people to dominate poor people's views.

It is argued that projects influence the way in which people construct their needs through participatory methods. However, in PAPDs all types of needs were raised by different stakeholder groups. The CBFM project was limited to addressing wetland and fishery management needs, but the NGOs addressed some of the other needs expressed in the PAPDs, for example providing tubewells for drinking water and sanitary latrines.

The danger from a policy point of view is that actions based on consensus may in fact further empower the powerful vested interests that manipulated decision making in the first place (Mohan 2002). In PAPD sites most (95%) CBOs were formed with representatives of different types of stakeholder yet are not dominated by local elites, and where fishers formed CBOs they have advisory committees composed of other influential stakeholders. But in non-PAPD sites most (78%) CBOs were formed just of poor fishers. In these non-PAPD sites the number of conflicts and court cases has been high. Another reason is that most PAPD sites are rivers and floodplains, while more non-PAPD sites are leased jalmohals, and leases are the usual focus of fisheries related court cases. These conclusions apply to the types of situations covered by this study. There is evidence from the Fourth Fisheries Project that CBOs developed without PAPD but including a wide range of local stakeholders tend to be dominated by elites where there are more valuable resources and funds to be handled by the CBO, for example jalmohals and sites with stocking (Aeron-Thomas 2003, Begum 2004).

5.2 Implications for Fisheries Co-Management

The CBFM-2 project is a co-management project involving government and communities with NGOs as facilitators. CBOs were formed for fisheries management in all the sites. PAPD was used in half of the studied sites. Government officials were invited in the final plenary of each PAPD to endorse the outcomes, but without influencing the planning process. In the other sites studied, resource management institutions were formed through simple discussion and facilitation by government and NGO staff organizing groups of fishers. However, the communities involved in CBFM are different in different sites. In PAPD sites

although NGOs prepared participant lists during PAPD it was endorsed by the participants. In non-PAPD sites participant lists were prepared by the NGO and the list was endorsed by the Department of Fisheries. The study shows that PAPD accelerated CBO formation.

In the leased jalmohals (which more often had no PAPD), DOF had a greater role and put pressure for the CBO to earn money from the fishery and to pay the lease, overlooking that CBFM is there because leaseholders did not conserve the resource and that leases are unsustainably high in some jalmohals. As leaseholders were locally influential, they were not obstructed by nearby landowners when they controlled fishing. Poor fishers cannot stop landowners from keeping fishing rights in floodplains and even in jalmohals. As DOF is ultimately responsible for paying the lease, they have no option but to force fishers to pay the lease, otherwise the fishing rights would be returned to the land administration.

Participation is a pre-requisite for co-management. However, participation in certain situations can force the participants to agree with the majority. In non-PAPD sites the participants fail to communicate their actual desire because they do not want to antagonise more powerful elders or neighbours. In this case the group members lead one another into misperceiving the collective reality. On the basis of this misperception actions are taken by the group that are actually contrary to what everyone would prefer and benefit most from doing. This leads to anxiety, frustration, anger, and the search for someone to blame.

In PAPD sites, resource management institutions involved all types of stakeholders in the community as everyone within the area is a wetland user in one way or the other. In most of the non-PAPD sites (except floodplain beels), fishers formed resource management institutions and other stakeholders have very little involvement. This created confusion, lack of ownership feeling and exploiting attitude within the community.

Although the average number of resource management activities planed was about the same for both PAPD (5.6) and non-PAPD (5) sites, the number implemented was 2.7 times more in PAPD sites. For example, in Fatki River the community agreed in PAPD that re-excavation of silted up parts of the river was needed. They discussed the plan with the Upazila Engineer and DoF engineer, and then organised the labour team. All types of stakeholders were involved in the process and there was no opposition. It can be argued that group discussion and strength leads to groups taking more innovative and risky decisions than they would have taken as individuals. Actual sharing of responsibility means that individual accountability for a given decision is blurred. However, in the non-PAPD sites more plans have not been implemented because they lack everyone's commitment and participation. For example, at Dubail Beel (non-PAPD) the participants took decisions on registration, excavation, and land purchase, but did not consider the risk that this could not be achieved without funds and consensus; conflicts arose and they could not implement their plan.

Co-management is expected to minimise conflict and rule breaking and increase cooperation and voluntary compliance among community members. Due to greater social cohesion, higher awareness and better coordination with different agencies, internal conflict among the participants in CBFM sites where there was a PAPD is less and rule breaking incidences were few. For an example, in Shuluar Beel there was no conflict between the community members after a PAPD was held, although in the previous eight months the NGO made little progress in raising issues and bringing together the community to manage this floodplain beel. In Shuluar Beel, all ditch owners were previously trapping fishes in their ditches during monsoon and were catching all the fish when water recedes by de-watering. During PAPD, the ditch owners committed not to dewater all the ditches to catch fish. There are also some ditch owners representing their group in the BMC. By following their commitment they reportedly observed an increase in fish population of 3 to 4 times in the next monsoon season after they left some water and fish in the ditches in the previous year. In Chitra River,

however, the adjacent beel community enjoys catching fish during the early monsoon when fish move from the river to the beel to breed and again when fish go back to the river after the breeding period. After seeing this people who had agreed to follow the CBO rules are following the same path as the people from the beel and also break the rules. Thus the planned management system is mostly inactive.

The number of days between staff recruitment and CBO formation depended on the capacity and skill of the staff and the approach adopted. Most of the NGOs recruited fresh graduates who did not have any previous experiences of forming groups. The number of days between staff recruitment and CBO formation was less in PAPD sites than in non-PAPD sites. In PAPD sites the community itself pushed the staff to provide necessary support when they started to implement their planned actions. In the non-PAPD sites staff spent a great deal of time to coordinate with the community for organising people for CBO formation. As there was no specific direction for starting fishery management action the staff were confused. Moreover, the community itself was not so sure about what activity they wanted and the expected outcomes. Several months after CBO formation, members were not sure about the objectives of the project, what support they might get, and the funding system was not transparent. In the case of PAPD sites, the participants were made aware of the project and they had an opportunity to ask any question to the implementing NGO, wider community and local representatives, and government agencies during the PAPD.

The initial transaction costs for management were expected to be high because PAPD and the following actions were predicted to take more time from participants (for workshops etc) than in non-PAPD sites. However, in the PAPD sites there were fewer conflicts and rule breaking incidences. When there was confusion among the community in the case study sites of Shuluar Beel and Fatki River, the management committee along with the DoF staff and local government representatives could resolve the issue before it became a conflict. This study found some evidence that transaction costs were less in the PAPD sites than in the non-PAPD sites, even including the time taken for the PAPD.

5.3 Contribution of Project Outcomes to Development Impacts

This study provides quantitative evidence that PAPD is effective in terms of more efficient and inclusive participatory planning and initiation of community management, and also show that it increases participation of the poor, brings more benefits faster, and reduces the time needed for community decisions and interactions later because of the consensus created.

The beneficiaries from PAPD sites mentioned income as a main benefit for themselves as a result they can send their children to school, can get better health care and improved family nutrition, especially for children. They now consume more fish which they translate as more energy through more protein intake. Some of the beneficiaries mentioned increased knowledge through PAPD, training, meetings and workshops and through facing visitors. They particularly mentioned the PAPD as the first gathering where they freely raised their own problems and they also proposed solutions (participation) which were taken into consideration. They felt that they were given attention and they were not controlled by anyone. The same types of benefits were reported in non-PAPD sites but fewer were achieved within the period assessed. Also in the focus group discussions respondents from non-PAPD sites said that decisions were taken in a big meeting where powerful people dominated decisions and the poor people were given less attention.

These benefits can be scaled up within Bangladesh through projects in the water, fisheries and related sectors all of which are increasingly taking a community based approach. They are also relevant internationally. Promotion of PAPD is already ongoing, but has not changed the practices of many organisations in Bangladesh so far. For example, in the CBFM-2 project all partner NGOs were oriented in and participated in a demonstration

PAPD in 2002, yet most did not use it. One reason is that most NGOs have a target group approach that focuses only on households within a specific poverty range and cannot see that a more inclusive PAPD approach and consensus can be merged with specific supports for poor fishers and other resource users.

PAPD is good in bringing all stakeholder groups to a consensus without any pressure. To design project activities in a site, all stakeholders' opinions on the feasibility of the project, pros and cons of the project, and assessment of the benefits and disbenefits to each stakeholder need to be judged. PAPD provides those opportunities. For community participation in the implementation phase, sometimes it is difficult to know who will be the best contacts to take responsibilities. PAPD identifies those people and also shows linkages of the villagers with the power structure, individuals and agencies. Finally, an action plan is prepared in a participatory way keeping in mind all stakeholders' interests and allowing for including mitigation measures for the people who may in addition be disbenefited (benefit in general but for example losing income during a closed season for fishing).

This study shows that for project design, factors such as type of waterbody, CBO composition, other development works, other uses of the waterbody, and number of poor households (fishers and non-fishers) need to be considered as they have a significant effect on the outcomes for CBFM. For example, PAPD did not result in specific actions to change access of poor people to waterbodies, in general use rights stayed the same and mainly did not involve jalmohals. This difficult issue of fisher rights tended to be an issue and addressed more in non-PAPD jalmohal sites and is one reason for differences found.

To make development plans, PAPD is very effective. There is strong evidence that plans prepared through the PAPD processes were mostly implemented, and it took less time to implement actions after the planning process and also after CBO formation. Therefore, PAPD results in more appropriate planning and saves time and costs in facilitating participatory management of natural resources.

Although PAPD was used for planning purposes, it raises awareness about the project and its objectives. Everyday different stakeholder groups were coming to the PAPD meetings and the curious neighbours asked them about the objectives of the PAPD and the project and what they did for the whole day. Moreover, it is an exciting experience for the participants as for most of them this is something very new. PAPD is a good start for awareness raising on natural resource issues and scope to improve their management.

Participation of poor people (fishers and non-fishers) in the PAPD in homogenous groups did let them express their own views without fear and anxiety. They feel honoured and confident in this situation. When asked about interaction with other stakeholders in the community and the government officers/agencies, they expressed their grievances and satisfactions. This information can help projects and government improve services. For example, in Shuluar Beel PAPD participants were very happy with their Union Parishad Chairman. They kept him as an advisor in the committee and said that they can tap resources from him. Moreover, through interaction with different people and exposure to outsiders as part of the PAPD plenary process they now became more confident and demanding.

Linkages with government were established during the PAPD plenary session where concerned government officers and NGO staff were present. Government officials also were happy to see local knowledge, skills, analysis, and proposals presented. Government officials also made commitments in the plenary. Based on these initial links the management committees were more confident when they had to meet different people in connection with their resource management activities.

The study assessed changes over only about two years. The time is too short to conclude on the sustainability of CBFM including the institutions developed from PAPD or from NGO support without PAPD. However, some of the indicators that were assessed, such as comparing own, short term and long term benefits that the participants mentioned showed that long term community benefits are anticipated to be significantly higher in the PAPD sites than in the non-PAPD sites. This translates into sustainability.

CHAPTER 1

BACKGROUND

Community based management of natural resources or common pool resources has become a key approach to improving resource management and empowering local communities in the past two decades. This has involved using local knowledge, recognizing local institutions, establishing common property regimes and developing partnerships and co-management between communities and government (Berkes et al., 1989; Ostrom, 1990; Pomeroy and Berkes, 1997). All such initiatives depend on community involvement and participation, so a major question is how best to initiate such regimes and what participatory planning methods are effective. This study assesses the effectiveness of a structured and phased process for participatory planning developed through the Natural Resources Systems Programme (NRSP) and which has been applied in Bangladesh in a range of fisheries and wetlands. The investigation considers the immediate outcomes of community based management during just over two years of implementation, and where possible the impacts, and is based on a comparison of wetlands where community based fisheries management has been introduced through NGO support with and without this specific participatory planning process. All these sites have been supported by a UK Department for International Development (DFID) supported project, except for two sites that have been supported by an International Fund for Agricultural Development (IFAD) supported project.

1.1 Project Purpose

The purpose of this study was to determine whether there is evidence from the Community Based Fisheries Management phase 2 (CBFM-2) Project that the use of the Participatory Action Plan Development (PAPD) consensus building method has resulted in differential outcomes or impacts at household or community levels

1.2 Origins of the PAPD Methodology

The methodology developed for consensus building has been named Participatory Action Plan Development (PAPD) and involves holding a series of linked local workshops where different stakeholders in a wetland or fishery participate separately and in plenary. Through this the stakeholders are expected to identify from among their problems and possible solutions ones that are common to different stakeholders and can be agreed to be win-win options[1], taking into account the interests of different stakeholders, which form a management plan for the common aquatic resources they use and is expected to improve the condition of the resource base and lives of users develop (Barr and Dixon, 2001). PAPD has been developed through a series of research grants under DFID's Land Water Interface component of its NRSP. It is now being further tested and adapted in Bangladesh and also is being promoted as a systematic method of participatory planning that develops consensus among diverse stakeholders using floodplain resources in Bangladesh and thus can facilitate community organization and natural resource management actions by communities.

[1] Actions that are agreed by all stakeholders to be beneficial to the community and do not make anyone worse off. However, this may not arise in locations which are strongly factionalised for other reasons, and even when there are is a consensus there may be a need for negotiation and compromises over the implementation of the plan where some people would lose in the short term (Sultana and Thompson 2004).

The original consensus building methodology had its origins in the NRSP project R6756 undertaken by Newcastle and Durham Universities and the Bangladesh NGO Center for Natural Resource Studies (CNRS). The first manifestation of the process was called the Problem Census – Village Workshop process (PC-VW). This was seen as essentially a two-stage process: problem census (PC), followed by a series of stakeholder and plenary workshops in the village (VW) (Barr *et al*, 2000).

The process was further evolved in Bangladesh by CNRS through action research in several projects including:

- Sustainable Environmental Management Project (SEMP), haor component, located at Jamalganj Upazila, Sunamganj District. CNRS implemented this component of a project developed through the National Environmental Management Action Plan, funded by UNDP, and managed by IUCN.
- Management of Aquatic resources and Community Husbandry (MACH) project. Located at Hail Haor, Sheerpur, and Kaliakoir (Turag-Bangshi floodplains), this project is funded by USAID, managed by Winrock International, and with CNRS as one of the implementing NGOs.
- Coastal Biodiversity Conservation Project. This project was funded by the Dutch Embassy in Dhaka.
- Ford Foundation-funded Community-Based Wetland Management (CBWM) project undertaken by CNRS.

In the course of this work it was recognised that the focus of the process was planning improvements to local environmental management, and that it allowed local people to participate in this planning. The process was so structured that by going through a series of steps, consensus could be built over what actions were needed to better manage natural resources, particularly common pool resources (CPRs). The process was thus renamed Participatory Action Plan Development (PAPD). PAPD as a consensus building methodology for management of CPRs was then tested, developed further and evaluated through assessment of changes in social capital in the NRSP project R7562 on consensus building methods. The main objective of R7562 was to test a methodology for building stakeholders' consensus for sustainable management of existing common property natural resources that could improve the condition of the resource base for users and would identify win-win options taking into account the interests of different stakeholders.

1.3 Philosophy behind PAPD

The original design of PC-VW addressed the need, emerging from systems research on the floodplain, for a more holistic approach to floodplain resource management. Thus two principles of holism underpin the approach:

1. Heterogeneity. This is the belief that the floodplain population is not socially or socio-economically homogeneous, and following on from this, that different socio-economic groups pursue different livelihood strategies. The approach promotes recognition of the concerns of all stakeholders in floodplain resource use. The systems approach in particular recognises that primary stakeholders are not an homogenous group; they have a diversity of resource use patterns, production activities, and livelihood strategies, which for any particular group may impinge on the production activities of other groups and *vice versa*.

2. Inclusivity. This is the belief that representatives of the different identified floodplain user groups (stakeholders) should participate in the appraisal and planning process.

Since the objective of the process is the identification of an intervention (or interventions) to improve floodplain resource management that is acceptable to all resource users, it is important that the perspectives of the different groups be explored and taken into account in a 'shared-learning' process.

The methodology developed for consensus building has been named Participatory Action Plan Development (PAPD) and involves a series of linked local workshops where different stakeholders participate separately and together to develop a management plan for the common aquatic resources they use (Barr et al., 2000). The method recognises that local socio-political structures may privilege the voice of some groups above others, and therefore that the process should seek to enable the voices of the disadvantaged and less powerful to be heard.

The philosophy and methodology of PAPD, along with Alternative Dispute Resolution (ADR) processes (Fisher and Ury 1981), has an emphasis on understanding the situation from the perspectives of the different players or actors in the situation. It also separates actors' 'positions' from their 'interests. This separation allows participants to project forward, beyond the non-consensual resource management they may presently be stuck in.

The processes all lead to joint learning about social and biophysical interdependencies among users, and between the resources they manage. In the context of managing common pool resources, this is an essential basis in the search for and implementation of improved resource management solutions. Many methods aim to raise individual awareness of resource management problems; PAPD raises collective awareness of the problems and on this basis joint action can tackle them most effectively.

PAPD draws on three key antecedents, none of which relate directly to consensual management of natural resources or common pool resources:

1 Soft Systems Methodology (SSM) (Checkland and Scholes 1990) which was developed to encourage a holistic approach to problem solving. It recognises the interconnectedness of problems, stakeholders and the effect of analysts themselves on 'problem' definition, and acknowledges the validity of the multiple perspectives of multiple stakeholders. SSM is more concerned with social learning, with engendering discussion, than in finding solutions to pre-defined problems. This emphasis on learning and participation, and an acceptance of the diversity of values and positions influenced the design of PAPD.

2 Work by Röling and colleagues on agricultural knowledge and information systems (Röling 1994) and related 'social actor' research (Long and Long, 1992). This work emphasises good information flow and transparency between actors and the creation of formal and informal decision-making institutions which are accessible to all stakeholders. Platforms for negotiation provide the opportunity for social learning by breaking down barriers and encouraging new relations. This, in turn, increases the likelihood of creative solutions to NRM problems through collective action rather than positional self-interest.

3 The Future Search methodology (Weisbord and Janoff 1995) which has as its underlying objective to give a broad cross-section of a community greater control over the process of change or improvement in their communities and organisations. Future Search processes can lead stakeholders to create a shared future vision for their community or organisation, they can enable all stakeholders to discover shared intentions and take responsibility for their own plans, and they can help people implement a shared vision. Future Search workshops are always run over a 3 day period and move between working in groups of mixed constituency to stakeholder

groups. They start with creation of a timeline recording past events and present trends, they then ask participants to describe ideal future scenarios. By focusing on the future, Future Search aims to avoid stagnating in the repercussions of past and present issues. Finally participants create action plans for implementing their scenario, and obtain commitments for achieving these.

PAPD and these contributing approaches may be considered to be what have been termed "deliberative inclusionary processes" (DIPs), or deliberative, inclusive and participatory (Holmes and Scoones, 2000). PAPD is designed to encourage participants to express their views while expressly avoiding domination by locally powerful and vocal people, and thereby to develop a shared framework of understanding about resource management. Hence it makes several of the assumptions identified by Edmunds and Wollenberg (2001) in approaches to multi-stakeholder negotiations, such as the desirability of consensus, the need for all stakeholders to be involved in the process, neutrality through fair involvement of all stakeholders in accessible (visual) ways, and sharing of information. However, it has been argued that this systematic approach addresses criticisms of participation as it is designed to ensure that poor people's interests are voiced and represented at least on an equal footing with more powerful stakeholders, and it has been used to complement existing institutions (Sultana and Thompson 2003). The method does not focus on negotiation or resolving existing direct conflicts between two parties over resources and is not appropriate in such situations, but it is appropriate where there are more diverse and multiple competing uses. Competing interests in natural resource use become clear during the PAPD process, but the process itself focuses on problems, needs and potential solutions that are shared, and the differences and similarities in views of stakeholder groups over them. After the PAPD proper (see below) community management approaches can be adaptive, encompassing negotiations at later stages to help achieve wider common aims and needs in a flexible way, and hence it fits within the range of good practice identified by Edmunds and Wollenberg (2001).

1.4 PAPD Method Summarised

Many methods such as Participatory Rural Appraisal (PRA) aim to raise individual awareness of resource management problems; PAPD raises collective awareness of the problems and is a process leading towards collective action that can tackle them effectively.

PAPD was originally conceived as a two-stage process comprising a problem census (listing and ranking of problems by different stakeholder groups) followed by stakeholder and plenary planning workshops. However, through application PAPD is now part of a three phase process that leads to long-term participatory resource management. Overall thirteen different stages in the process have been identified (Fig. 1.1) (Sultana and Thompson 2003). These comprise:

I. Scoping phase (*Stages one to three)*
   1. Situational analysis (summarizing local knowledge)
   2. Stakeholder identification and analysis (through key informants)
   3. Household census and invitations to a random sample of households to PAPD (stratified by stakeholder categories)

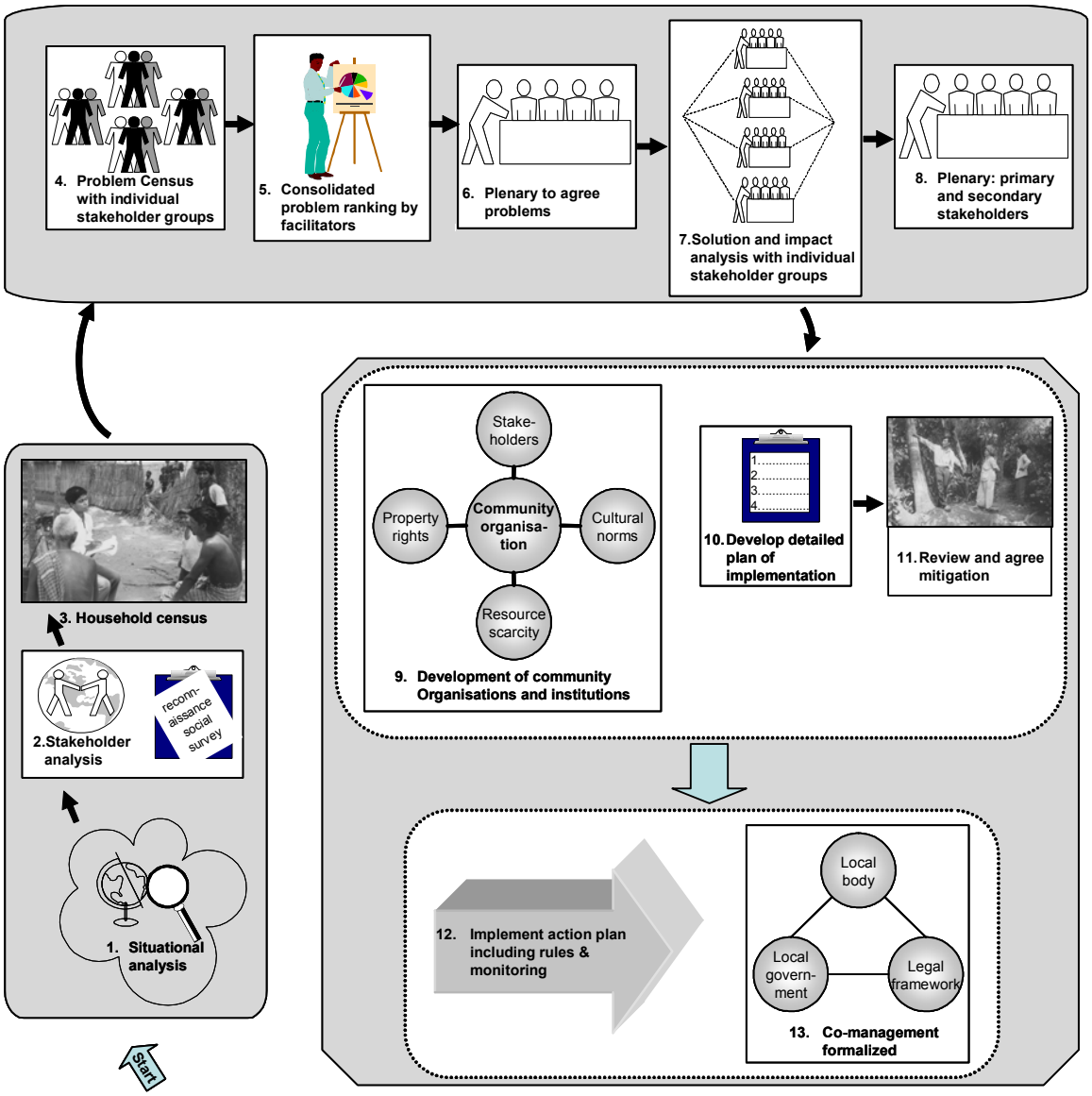
II. Participatory planning phase - PAPD (*Stages four to eight)*
   4. Problem census (with each individual stakeholder group)
   5. Compilation of problem rankings by facilitators (combining stakeholder group rankings)
   6. Plenary with stakeholders and local leaders (to review and agree on main problems for solution analysis)
   7. Solution and impact analysis (with each individual stakeholder group)

8. Plenary with stakeholders and secondary stakeholders (to present the process, identify feasible solutions, discuss institutional arrangements and next steps)

III. Implementation phase (*Stages nine to thirteen)*

9. Develop and adapt community organizations and institutions for resource management
10. Community organization develops detailed plan to implement solutions agreed in stage eight
11. Problem solving (review and adjust plans with community to mitigate or avoid any adverse impacts)
12. Implementation of action plan
13. Institutionalization of management arrangements including local policy support.

Fig. 1.1. The thirteen stages and three phases of the PAPD process.
Source: Sultana and Thompson (2003), adapted and developed from Barr and Dixon (2001).



At the heart of the process are stages four to eight that involve participatory workshops with separate stakeholder groups and in plenary. These stages form the PAPD proper. It is

important to note for this study that the other two phases (stages 1-3 and 9-13) have been followed by various NGOs facilitating community based fisheries management in Bangladesh but only some so far have used PAPD (see next section). Therefore here we summarise the key features of the second phase from the working paper by Sultana and Thompson (2003). Stages 4-8 form a framework for stakeholders to formulate and develop a common understanding of their problems and potential solutions. Participants identify the constraints on their livelihoods, particularly those related to natural resources, and share their views on how they may be overcome.

There is a paradox in participation because of the inverse relationship between people's willingness to express their views frankly and the number and diversity of people participating. Individuals are more likely to discuss issues freely on an individual basis than to express themselves in public. Participatory planning is expected to be democratic and is typically portrayed as being neutral and fairly representing all people's views, yet it tends to occur in public forums that may be manipulated by more powerful individuals or groups. Public events tend to result in generalisations and a single 'ideal' view of interests and issues that may mask distinct and possibly conflicting interests (Mosse, 1994); such compromises may rarely meet everyone's objectives (Edmunds and Wollenberg, 2001).

People may not contribute their ideas to a public discussion for several reasons:

- they do not consider their ideas valuable,
- they do not want to upset the status quo,
- they want to avoid offending others at the meeting, or
- it is not traditionally or culturally accepted for them to speak in a public meeting (for example, women and young people).

Participatory planning therefore tends to result in 'democratic' outcomes based on generalities bounded by what is acceptable to discuss in public rather than the sum of individual view. An alternative is for people to express their ideas in a less judgmental forum where they feel comfortable, for example with friends or people from similar backgrounds. Here they can express their real concerns rather than the perceived interests that these marginalized groups are usually accorded. However, these views are not aired in public and the diversity of views from different stakeholders does not contribute to shared understanding and mutual learning, and so there is no change in the status quo.

For complex problems such as stakeholder opinions and options in fishery management, our experience is that open public meetings face precisely these problems. Kaner (1996) argued that to reach new collectively-agreed solutions, participants must pass through three stages. First, divergent ideas must be expressed; second, stakeholders must participate in the process of trying to appreciate one another's perspectives - achieving a shared framework of understanding; and finally, there must be convergence towards a closure zone or decision point. The PAPD process has been designed with this in mind. The objective is to encourage the frank expression of diverse views on natural resource management and to find a representative common ground in the participant communities. No single activity, neither with small homogeneous groups nor with larger community-wide groups, will be able to achieve this, so the method aims to overcome this paradox through a series of linked separation and aggregation steps that together can result in a balanced view. The separation steps are exercises undertaken by stakeholder groups separately. The aggregation steps are facilitated plenary sessions where all groups are represented.

In a PAPD, such as those in the locations covered by this study, each stakeholder group undertook a one-day problem census workshop. They listed all their problems, agreed on some consolidation of their problems, then voted on their priority problems (each participant had five stickers to place against cards summarising and illustrating the problem, the votes could be

distributed among five or less problems according to each participant's individual assessment). The votes were summed and the stakeholder group as a whole analysed the causes and effects of the ten main problems. Because it would be difficult to manage plenary activities with all of the PAPD participants from each stakeholder group, each participant was asked in private to nominate five other participants as representatives from his/her group for the plenary. These votes were then summed and the most popular representatives were invited to attend the plenary.

The facilitators consolidated the problem rankings identified by the stakeholder groups. Natural resource-related problems were separated out from other development problems at this stage to give two rankings. In this way the overall priorities for natural resources issues/problems and other problems were ranked, and there was also a check to ensure that the priorities of poorer people were included in the top 5-6 problems.

This analysis and the top natural resource-related problems were reviewed and validated in the first plenary by representatives of each stakeholder group plus local leaders. Through small group discussions and rankings that were aggregated, the natural resources problems were further prioritized so that three problems could be taken further for solution analysis and action planning. In addition, the cause and effect analyses made by each stakeholder group during the problem census were consolidated by the facilitators, and those for the agreed priorities were presented in the plenary.

Following agreement on the priority problems in the first plenary, the separate stakeholder groups each again met to spend a day on solution analysis. Three activities are involved.

1 A stakeholder and force-field analysis of all other stakeholders affecting the participant stakeholder group's livelihoods is carried out to identify categories that have positive, neutral and negative influences.
2 A detailed analysis of the actions required for possible solutions to priority resource management problems is made, including identification of the objectives; identification of alternatives; assessment of their political, social and technical feasibility; and expected environmental impact and sustainability.
3 An assessment is made of the potential impacts of the solutions on all of the main stakeholders identified, thus highlighting feasibility and any critical adverse impacts.

The final plenary session links stakeholder groups and their problem and solution analyses with local administration and government. The outcomes of the stakeholder solution analyses were posted on the walls and mixed groups of participants and secondary stakeholders were walked through the process and outcomes. This gave an opportunity for local officials to understand and endorse the plans developed by the participants. This final plenary is where a consensus on feasible solutions and actions required could be reached, including identification of a plan that would not adversely affect any critical stakeholders or exert negative forces on the lives of poorer stakeholders.

1.5 Use of PAPD in CBFM-2 Project

Since 2000, PAPD has been used in several locations, mostly related to fishery and wetland management issues, and mainly by one of the originators of the method – Center for Natural Resources Studies (CNRS). The Community Based Fisheries Management project phase 2 (CBFM-2), supported by DFID and undertaken by WorldFish Center working with a number

of NGO partners[2] and Department of Fisheries offers an ideal opportunity to assess the impacts and effectiveness of the PAPD method.

The CBFM-2 project is implemented through a range of partners (NGOs and GOs). The main activities are undertaken thorough field based development NGOs working with DOF to develop and test community based fisheries management approaches in about 115 waterbodies and communities distributed as shown in Table 1.1 (WorldFish Center 2003). These regions include nineteen representative districts for inland fisheries scattered throughout Bangladesh. These "waterbodies" include subdivisions of larger physical units such as rivers. For example, physical and biological fisheries that were divided in the past for administrative revenue generation purposes, such as adjacent reaches or sections of the same river. The waterbody types involved are explained in Box 1.1.

Table 1.1 CBFM-2 waterbodies by region and type.

Region	River	Closed beel	Open beel	Floodplain beel	Small beel	Total
Sylhet	11	0	8	0	10	29
Mymensingh	11	5	11	13	0	40
Jessore	17	0	0	10	0	27
Rangpur	0	9	9	1	0	19
Total	39	14	28	24	10	115

Box 1.1: Waterbody Diversity

Waterbodies in Bangladesh are very diverse and this diversity has implications for fisheries management. Most permanent waterbodies are government owned *jalmohals* (water estates). The government leases out fishing rights in them through tendering to the highest bidder. In CBFM and similar projects use rights are reserved for fishers organized through the project under the umbrella of a Department of Fisheris project but the revenue still has to be paid. The waterbody types considered in CBFM-2 and this study comprise:

Rivers which have a perennial flow have been declared open access without any revenue collection since 1995. There are many smaller rivers, tributaries and distributaries that cross the countryside and have been divided up into a series of jalmohals.

Open beels are usually perennial deep depressions in the floodplain that are linked through canals to other waterbodies.

Floodplain beels are largely seasonal and comprise private land that is cultivated (often with deepwater rice in the wet season or fallow at that time). They are not jalmohals. Man-made ditches or catch-ponds in these seasonally flooded beels are called ***kuas***.

Haors are extensive low lying and deeply flooded areas of floodplain bounded by natural river levees often now raised by "submersible embankments". They may contain several beels, some of which are perennial. They cover a significant part of the north-east and include several sites in this study but are not analysed as a separate category.

Small waterbodies are jalmohals in beels and rivers below 8 ha (20 acres) in size, fishing rights in these are leased to youth groups at the local level.

Closed beels and baors are largely separate from other waterbodies (baors are oxbow lakes in the south west). Many of these old river channels are partly closed as fisheries by fences or netting so that they can be stocked. They were not covered in this study, although some are under CBFM project, as none have had PAPD.

Khals (natural canals) link beels to rivers and provide a channel for fish and water movements.

(See Khan et al., 1994, for a further description of different types of waterbodies).

In doing this work the CBFM-2 partner NGOs have used different approaches to developing participatory fisheries and wetland management with their target communities. One of these methods is the PAPD method that has been used in the CBFM-2 project mainly by the Centre of Natural Resources Studies (CNRS). PAPD has also been used by WorldFish Center working with its partner NGOs (Banchte Sheka and Caritas) and in one site in Bangladesh with a local NGO (Efforts for Rural Advancement - ERA) in a related project for

[2] Including, Banchte Shekha (BS), Bangladesh Environmental Lawyers Association (BELA), BRAC, CARITAS, Center for Natural Resource Studies (CNRS), Center for Resource and Economic Development (CRED), FemCom and PROSHIKA.

CBFM in South and South-East Asia (supported by International Fund for Agricultural Development - IFAD).

As part of its monitoring and evaluation system, the CBFM2 is collecting quantitative and qualitative data to assess the effectiveness of the project in facilitating and organising community action and on livelihood outcomes and impacts. This data includes a baseline surveys in 2003, an institutional assessment survey in 2003 and fish catch and household monitoring since mid-2002.

The earlier project (R7562) undertook PAPD in what were then prospective CBFM-2 sites in 2000, and now the communities have undertaken activities in their plans, and under CBFM-2 more PAPDs were carried out in 2002. There are 18 locations where separate PAPDs were conducted either by CNRS or by WorldFish with partner NGOs as an initial stage in establishing CBFM. The beginning of 2004 thus gave a 1.5-3.5 year interval between PAPD and the assessment. During this time community organisations for resource management have been established in each site and most have started to undertake resource management actions that were identified in their plans.

Over the same period similar CBFM actions and Community Based Organisations (CBOs) have been established in sites without a PAPD by partner NGOs following their own practices of group formation, meetings and PRAs. This means that in each non-PAPD site (the "controls" in this study) there is also a partner NGO working for establishing CBFM, and just as in the PAPD sites they aim to establish community based organisations that can manage the fishery and wetland resource sustainably by taking up various management actions. Both PAPD and non-PAPD sites have a beel management committee (BMC) or river management committee (RMC) for management and decision making in each waterbody comprising of users (fishers with or without other stakeholders). In the non-PAPD sites the NGOs have made reconnaissance studies and then formed groups of their target people – fishers except for Banchte Sheka which only forms groups with poor women. The groups are a basis for training, savings and credit, but they are also the basic membership for user based fishery management organisations. Participatory planning has not been structured as in PAPD, often some form of PRA has been conducted, and the NGO has helped the management committee plan activities in discussion with the primary groups but usually not with the wider community.

1.6 Assessing the Effectiveness of PAPD

Project R7562 tried to assess the impacts of the PAPD process immediately after the second phase workshops, using the sustainable livelihoods framework (Carney, 1998) but focusing only on measuring changes in social capital – the networks, relationships, values and attitudes that make and position a community. More specifically it considered "cognitive social capital" which refers to values, beliefs, attitudes, and social norms that predispose people and communities towards collective action. 'Values' include co-operation and 'the trust, solidarity and reciprocity that are shared among members of a community and that create the conditions under which communities can work together for a common good' (Krishna and Shrader, 1999: 10). This assessment had obvious limitations since no follow up actions had taken place after the PAPD workshops in Bangladesh, and even in the Vietnam case study reported in Sultana and Thompson (2003) there was limited time for any new institutions to function.

PAPD was used to initiate CBFM in some CBFM-2 sites but was not used in others that have the same levels of NGO and government support for Community Based Organisation (CBO) formation and introducing CBFM. Therefore, it was possible in this study to focus on a more quantitative assessment of differences in resource management actions and in structural social capital (the composition and practices of formal and embedded in informal local institutions that

serve as instruments of community development) embedded in the CBOs established through the CBFM-2 project.

Table 1.2 lists the sites covered by this assessment. All 18 sites with PAPD were included in the study, but in four the PAPD was conducted before CBFM-2 started, and so for some parts of the analysis they had to be omitted. The 18 non-PAPD sites were sampled after excluding closed beels (which have different management practices, no sites of this type are among the PAPD sites), and sites from CBFM-1 since management activities and CBOs were established during 1996-1999. The site locations are shown in Fig 1.2.

Table 1.2 CBFM-2 Sites covered by this assessment of PAPD impacts.

No	Site name	Region (District)	NGO	Type	Waterbodies covered
PAPD sites					
1	Hakaluki Haor Cluster part 1	NE (Moulvi Bazar)	CNRS	Open beel (haor)	83/82 Padma Beel, Chander Beel O Chander Chapti, Ramerkuri Puratan Nala, Pabijuri, Gaimara Mekri Beel, Kupidubi
2	Hakaluki Haor Cluster part 2	NE (Moulvi Bazar)	CNRS	Open beel (haor)	Chirua O Baia Beel
3	Halir Haor Cluster part 1	NE (Sunamganj)	CNRS	Open beel-river (haor)	Goniar Beel, Horinagar Putia Nodi, Kaju Doba
4	Halir Haor Cluster part 2	NE (Sunamganj)	CNRS	Open beel-river (haor)	Surang-er Beel, Dighalia Beel & Kurir Khal, Beheli Nodi Part 1 and Part 2
5	Kaheterdi Beel (Pakundia cluster)	NC (Kishorganj)	CNRS	Floodplain beel	Kaheterdi Beel
6	Beel Bhora (Pakundia cluster)	NC (Kishorganj)	CNRS	Open beel	Beel Bhora
7	Posna Beel (Kalihati cluster)	NC (Tangail)	CNRS	Floodplain beel	Posna Beel
8	Charan Beel (Kalihati cluster)	NC (Tangail)	CNRS	Open beel	Charan Beel
9	Fatikjari River (Kalihati cluster)	NC (Tangail)	CNRS	River	Salanka jalkar (Part of Fatikjari River, Part-1), Meghakhali Fishery (Part of Fatikjari River, Part-2), Fatikjani Nadi (Part of Fatikjari River Part-3), Sapai Nadi (Part of Fatikjari River Part-4)
10	Fatki Nadi Cluster part 1	SW (Magura)	CNRS	River	Fatki nodi Jolmahal (Moshakhali), Fatki nodi Jolmahal (Dhanashargati), Fatki nodi Jolmahal (Chhani Arpara), Fatki nodi Jolmahal (Khilagati to sangdha Laxmipur)
11	Fatki Nadi cluster part 2	SW (Magura)	CNRS	River	Fatki nodi Jolmahal (Dakhin Dodi Laxmi pur), Fatki nodi Jolmahal (Bhatioali), Fatki nodi Jolmahal (Kapashati), Fatki nodi Jolmahal (Chuki nagar), Fatki nodi Jolmahal (Arpara)
12	Fatki Nadi Cluster part 3	SW (Magura)	CNRS	River	Fatki nodi Jolmahal (Alokdia to Dorisholoi), Fatki nodi Jolmahal (Borosholai), Fatki nodi Jolmahal (Borolchara)
13	Fatki Nadi Cluster part 4	SW (Magura)	CNRS	River	Fatki nodi Jolmahal (Kuwatpur), Fatki Nodir Jolmahal (Kulia to Beel Buruli), Fatki Nodir Jolmahal (Kuchiamora to Dakhin shumulia)
14	Dalner-Kumaria	SW (Narail)	CNRS	Floodplain beel	Dhalner Beel Kumaria Beel
15	Shuluar Beel	SW (Narail)	BS	Floodplain beel	Shuluar Beel
16	Kathuria Beel	SW (Narail)	BS	Floodplain beel	Kathuria Beel
17	Digshi Beel	NW (Pabna)	CARITAS	Open beel	Digshi Beel (reaches 1 and 2)
18	Chatol Beel	NE (Sunamganj)	ERA	Open beel (haor)	Chatol Beel

No	Site name	Region (District)	NGO	Type	Waterbodies covered
Non-PAPD					
19	Beel Shakla (Titas Cluster)	NE (Brahmanbaria)	PROSHIKA	Open beel	Beel Shakla Jalmahal
20	Titas Nodi Block 'KA' (Titas Cluster)	NE (Brahmanbaria)	PROSHIKA	River	Titas Nodi Block 'KA' (Goshaipur-to Sitarampur)
21	Titas Nodi (Urkhulia-Bijoy Nodi) (Titas Cluster)	NE (Brahmanbaria)	PROSHIKA	River	Titas Nodi (Urkhulia-Bijoy Nodi)
22	Dopi Beel (Mithamoin cluster)	NC (Kishorganj)	PROSHIKA	Open beel (haor)	Dopi Beel
23	Kutir Beel	NC (Kishorganj)	CRED	Open beel	Kutir Beel
24	Dubail Beel	NC (Kishorganj)	BRAC	Open beel	Dubail Beel
25	Ghora Dubi Beel (Kalmakanda cluster)	NC (Netrakona)	CARITAS	Open beel (haor)	Ghora Dubi Beel
26	Meda Beel (Kalmakanda cluster)	NC (Netrakona)	CARITAS	Open beel (haor)	Meda Beel
27	Nizkakra Beel	NW (Bogra)	BRAC	Open beel	Nizkakra Beel
28	Telian Kalpani Beel	NW (Gaibandha)	BRAC	Open beel	Telian Kalpani Beel
29	Nandinar Beel	NW (Rangpur)	BRAC	Open beel	Nandinar Beel
30	Atrai Beel	NW (Rangpur)	BRAC	Open beel	Atrai Beel
31	Chitra River	SW (Jessore)	BS	River	Chitra River (Beel Jaleswar to Dhalgram)
32	Debbhog Beel	SW (Narail)	BS	Floodplain beel	Debbhog Beel
33	Maliate Beel	SW (Narail)	BS	Floodplain beel	Maliate Beel
34	Atadanga Baor	SW (Gopalganj)	CARITAS	Floodplain beel	Atadanga Baor
35	Beel Hural	NE (Brahmanbaria)	PROSHIKA	Open beel	Beel Hural Fishery
36	Nainda Beel	NE (Sunamganj)	ERA	Open beel (haor)	Nainda Beel

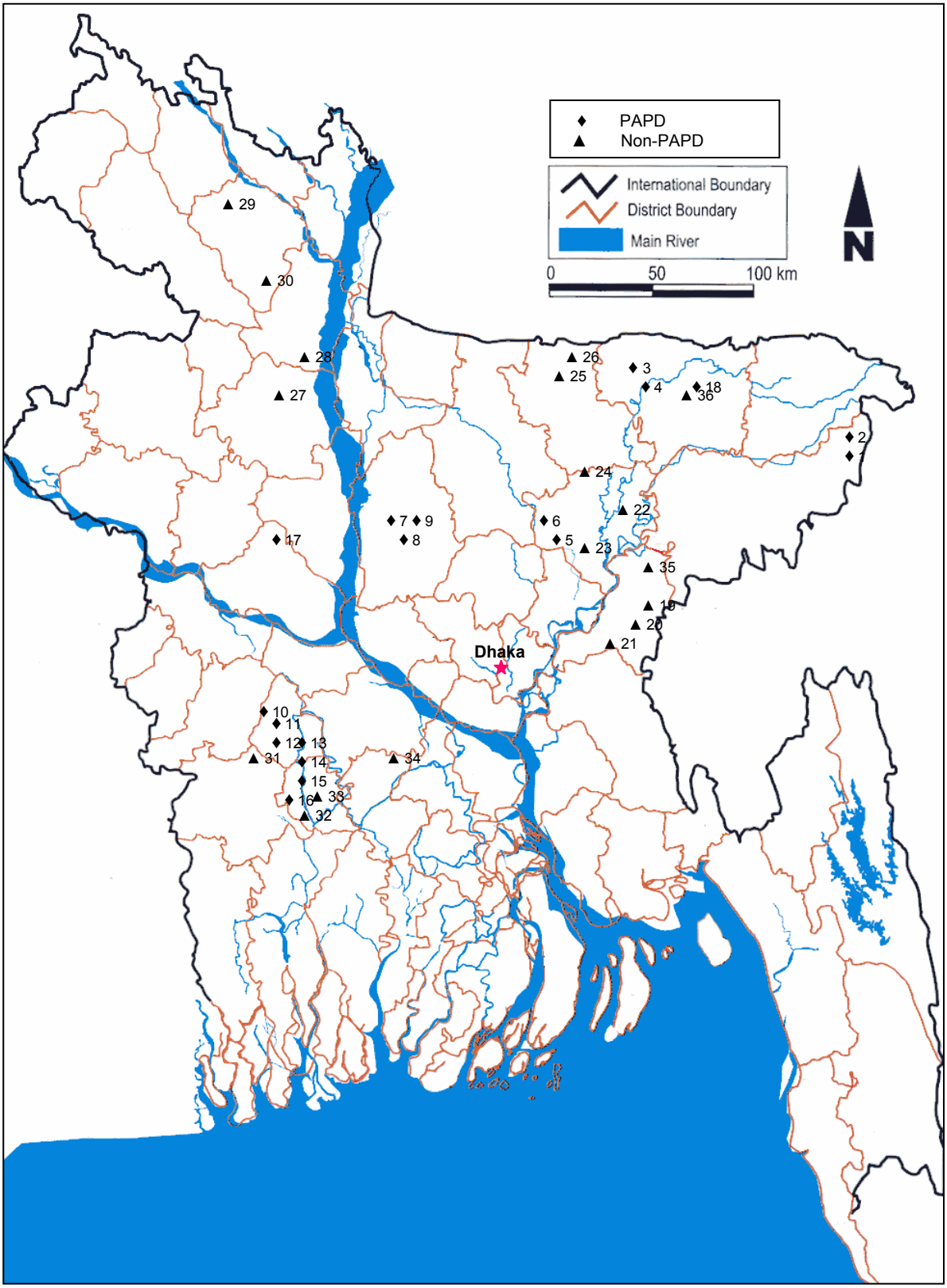


Fig 1.2 Locations of CBFM-2 sites covered by this study.

CHAPTER 2

RESEARCH ACTIVITIES

2.1 Research Methodology

2.1.1 Research questions and hypotheses

The strategy of this study was to answer a series of questions regarding the differential effectiveness, and reasons for this effectiveness, of the PAPD method using monitoring and evaluation data collected within the CBFM-2 project plus additional information collected using additional NRSP research funding. Some of these questions are specific to the need for the Natural Resources Systems Programme to establish evidence of, and reasons for, the outcome and impact of the NRSP research product (the PAPD method). Some questions are designed to provide an improved understanding of the causal linkage between a consensus building method and subsequent (development project) outcomes and impacts and are of interest to a larger number of stakeholders in the CBFM-2 project as well as more widely.

The initial research questions identified were as follows based on the assumption that use of PAPD was associated with certain NGOs:

1. *Are there differences in CBFM-2's effect on community action and on livelihood outcomes and impacts that can be attributed to implementing organisation? If so, what are these differences?*

2. *Is there evidence that comparative effects on community action and on livelihood outcomes, and impacts between organisation are related to the difference in the consensus building method used between organisations? If so, what is the causal linkage between the methods and the outcomes and effects?*

3. *Are there generic lessons from the study that will enable development projects based on community action to better identify and explain project outcomes and impact in terms of the methods and processes used to work with communities?*

The question that underlies this assessment of the effectiveness of PAPD is "**Has PAPD within CBFM resulted in any benefits beyond those generated by CBFM without PAPD?**" A first step in the PAPD sites was to assess the number and extent to which priority problems and solutions identified in the PAPD have been addressed since the PAPD.

Review of the sites where CBFM-2 is working and where PAPD had and had not been used, indicated that assessing on the basis of NGO as a proxy for PAPD would not be appropriate since several NGOs with their own approaches had worked without PAPD, one NGO had only worked using PAPD in its approach, and PAPDs were also used in four sites under three different NGOs (see Table 2.2), and generated a set of basic hypotheses. The main focus was, therefore, to test the hypotheses in Box 2.1 (all comparing CBFM sites with and without PAPD).

Any differences between sites (and NGOs) may be affected by other factors, both exogenous (such as the type of waterbody, existing social and user pressures on it, other use of the waterbody, number of poor fishers in decision making and other development activities), and endogenous (the resources and skills available and used by NGOs in establishing CBFM organisations and activities). The study took account of these factors

(termed here confounding factors) in the data analysis. It also used a case study approach (focus group discussions and key informants) to investigate causality of differences encountered and development of organisations / institutions and community actions.

Box 2.1 Main Research Hypotheses

1. PAPD results in faster development of community organisations.
2. PAPD results in more active CBOs.
3. PAPD results in development of community organisations that are more holistic (involve more stakeholder categories).
4. PAPD results in greater social cohesion.
5. PAPD results in greater community awareness and concern for collective sustainability and security.
6. PAPD results in faster uptake of community actions for natural resource management.
7. PAPD results in more community/collective actions for natural resource management.
8. PAPD results in community actions that have greater compliance.
9. PAPD results in community actions involving wider coverage of communities.
10. PAPD results in better links with local government (Union Parishads and Upazila Administration).
11. PAPD requires greater time input from participant communities.

Therefore the modified research questions are addressed as follows:

1. Are there differences in CBFM-2's effect on community action and on livelihood outcomes and impacts that can be attributed to implementing organisation? If so, what are these differences? **Modified to assess differences according to whether PAPD was used based on statistical analysis (Chapter 4).**

2. Is there evidence that comparative effects on community action and on livelihood outcomes, and impacts between organisation are related to the difference in the consensus building method used between organisations? If so, what is the causal linkage between the methods and the outcomes and effects? **CBFM sites where PAPD was used are compared with sites where NGOs followed their own approaches without PAPD. The study does not consider alternative methods of participatory planning, since no other systematic approaches were used in the project. The case studies and NGO approach profiles (Chapter 3) give some insight.**

3. Are there generic lessons from the study that will enable development projects based on community action to better identify and explain project outcomes and impact in terms of the methods and processes used to work with communities? **Lessons are drawn from case studies and analysis in Chapter 5, but they are limited by the diversity of individual sites.**

2.1.2 Development of the hypothesis matrix (includes data requirements and sources)

Each of the research hypotheses set up in the project proposal was reviewed along with data availability, and specific variables that contribute to answering each research question were identified along with how any derived variables would be calculated. Initial data files of information coming from CBFM quarterly monitoring reports and institutional assessment forms were reviewed (see later section). Some gaps were identified and data were eventually collected from NGO reports and other available data sources. The initial database helped in assessing variables actually required, further data items to be collected and procedures for validating the data through logical checks and other standard procedures.

The hypothesis matrix went through several revisions, and possible confounding factors (i.e. variables that may obscure the PAPD effect) were considered, and the feasibility of collecting data relating to these confounders was also considered. The final hypothesis matrix appears in Table 2.1.

Table 2.1 Research hypotheses and data sources identified.

Achievable research hypothesis	Main response variable(s) to address hypothesis	Variables (with data file names) contributing to main response (& data source[1])	Confounding factors and variables relating to data structure (and source)
CBO development			
i. PAPD results in faster setting up of community based organisations (CBOs)	Number of days from start of CBFM activities to the formation of a water body management committee (CBO)	Date of NGO signing contract to undertake CBFM work (**contdate**) and date of first forming the CBO (**cbo_dt**) - from Quarterly Monitoring Report (QMR).	Waterbody type (**typeid**)
ii. PAPD results in more active CBOs.	(a) Average number of CBO meetings per month since start of CBO. (b) % attendance at CBO meetings (c) Number of awareness raising activities with organisations outside the CBO group. (d) Number of conflicts resolved by CBO	(a) and (b): No. of CBO meetings and % attended are recorded as variables **meet** and **att,** obtained from CBO QMR. (c) from FGD-BMC (variable **awarenos**) (d) Variables **conresol**, **int_conf** and **ext_conf** from IMF (only where conflicts did take place)	(a) None (b) None (c) Waterbody type, because floodplains have less fisheries activities during dry season (d) Size of waterbody(**wbarea**); type of waterbody.
iii. PAPD results in the formation of CBOs that are more holistic, and where poor are better represented.	(a) Number of categories of stakeholders involved in the CBO. (b) Proportion of poor fishers and landless in CBO	(a) Number of different stakeholder types (fishers, farmers, landless, official, other), on scale of 1-5. (b)Number in membership of fishers and landless, and total number of members All above from WPMF.	(a) & (b) Waterbody type and size (For some sites, estimates but not accurate information on area were available from CBFM-2).
Social capital			
iv. PAPD results in greater social cohesion	(a) Measure of the degree of change in social cohesion in community (b) Proportion of categories of stakeholders in the group reporting increased social cohesion	(a) From FGD, an average over participants' –5 to +5 measure of the change in social cohesion since start of CBFM. (b) From FGD, number of categories reported to have changed as a proportion of total number of categories in group	For both (a) and (b): (i) waterbody type. (ii) number of other development activities and categories of other uses of fishery(new) (iii) Date since CBO formation (QMR) (iv) proportion of fishers in the waterbody catchment area who fish for an income (census) (v) proportion of males (landed and official) in CBO membership (QMR) (vi) Proportion of "better-offs" in community (from Census)
Sustainability of fishery			
v. PAPD results in greater community awareness and concern for collective sustainability and security actions.	Measure of community interests in sustainability and security of the fishery as judged by benefits to self and family, short-term benefits to community , long-term benefits to community	Sum of scores given by FGD-BMC for importance of benefits they list. Sum of scores given by FGD-Fsh for importance of benefits they list. Six summaries will result (BMC-Fsh vs 3 groups of benefits)	(i) Waterbody type (ii) Total number of fishers (ff_inc) - census (iii) No. of categories of other uses of fishery (new)

[1] QMR – Quarterly Monitoring Report; IMF – Institutional-Monitoring Form; FGD-BMC – Focus Group Discussions with BMC; FGD-Fsh – Focus Group discussions with fishers.

Achievable research hypothesis	Main response variable(s) to address hypothesis	Variables (with data file names) contributing to main response (& data source[1])	Confounding factors and variables relating to data structure (and source)
Collective action			
vi. PAPD results in faster uptake of community actions for NR management.	(a) Number of days between action date (date first key fishery management action was implemented) and start of CBFM activities (fielding of staff). (b) No. of days between action date and CBO formation.	(a) From QMR, **staff_dt** (date CBFM started) and **actdate**, date first action implemented. (b) From QMR, **cbo_dt** (first formation of CBO) and **actdate**, date first action implemented	Waterbody type for both (a) and (b)
vii. PAPD results in more community/ collective actions for NR management.	(a) Number of actions planned and not implemented. (b) Number of actions implemented.	Cumulative numbers from QMR, variables **pl_plan, pl_done**.	Number of conflicts from IMF. Number of categories of other uses of the fishery (new) Number of other development activities in area (new)
viii. PAPD results in community actions with greater compliance.	(a) Number of rules in place out of total relevant (b) Number of rule breaking incidents (c) % of community reported know of rules (d) Number of conflicts	All from IMF. (a) number of_rules (and number of actions planned (ticked) on page 1 of QMR) (b) **part_bre + other _br** (c) **gp_know** (d) **int_conf+ext_conf**	Waterbody type, and waterbody size % fishers in CBO - QMR Number of categories of other uses of the fishery (new) Number of other development activities in area (new)
Livelihood outcomes and linkages			
ix. PAPD results in community actions involving wider coverage of communities that perceive benefits.	Number of stakeholder categories that may benefit (or have benefited) from CBFM	FGD – number of categories benefited, yes/no if reported that key stakeholders (poor, fishers, poor women) benefited	Number of different stakeholders in FGD
x. PAPD results in better links with local government	(a) Whether stakeholders get support from government and form of support (b) Attitude and understanding of CBFM in local government (c) Number of links fishers have with outside groups (government or otherwise)	(a) FGD – types and numbers of government support incidents – BMC group only (b) FGD – UP and Upazila attitude rating, assessment by BMC members of officials understanding – BMC group only (c) FGD – number of links with local government organisations and others.	None that can be realistically collected.
Time /transaction costs			
xi. PAPD actions requires greater time input from participant communities.	Number of person days involved in CBFM activities in general.	Transaction cost assessment from FGD for (a) CBO leaders (as a group) and (b) for general resource users.	(a) Number of CBO members (b) None

2.1.3 Development of instruments for FGD/participatory assessment

A checklist was prepared to collect data on social cohesion, measures of community interests in sustainability and security of the fishery and beneficiaries, links with neighbouring communities and local government institutions, level of government support, attitude of the local government officials towards CBFM and level of awareness. However, the checklist

was then converted into a fixed questionnaire to keep the level of information similar across all sites and to catch responses systematically. Each question included two parts - one for the responses itself and the other for weighing the responses from their own experiences. Perception of changes in social cohesion since the start of CBFM activities was weighed on a +5 to –5 scale. The point on the scale was recorded after the discussion on the following question on the page had taken place. For other questions a 1-10 scale was used. However, for rating the attitude of the local officers a scale from -3 to +3 was used.

The questionnaire was then tested, remodelled and finally administered in 36 sites. A field instruction was prepared for the field assistants (Annexes 1 and 2 contain the FGD/participatory assessment format and the instructions).

2.1.4 Statistical and sampling methods

Initially 46 CBFM-2 sites were selected for the study and assessment of PAPD impacts including the FGD/participatory assessment. However, later considering problems in availability of data and field support, it was agreed that fewer control sites could be visited without undue loss to the outcomes of the research. It was decided to retain all 18 PAPD sites, but to reduce the number of Proshika sites from 10 to 5 and the number of BRAC sites from 8 to 5, the choice in each case being made at random. This resulted in a total of 18 PAPD sites and 18 control sites. Table 2.2 shows the distribution of the study sites across different NGOs.

Table 2.2. Distribution of CBFM-2 sites covered by this study according to use of PAPD and NGO involved.

PAPD	CNRS	BS	Proshika	Caritas	BRAC	ERA	CRED	Totals
Yes	14	2	0	1	0	1	0	18
No	0	3	5	3	5	1	1	18

The comparison was mainly between sites where CNRS is working and PAPD has been conducted (plus two sites of Banchte Sheka where PAPD was conducted, and one each where Caritas and ERA are working), compared with similar sites where Banchte Sheka, Caritas, BRAC, Proshika, ERA and CRED are working and where no PAPD was undertaken. There is therefore a possibility of the PAPD effect being confounded with the NGO effect. This concern is addressed in Chapter 4, section 4.12.

The PAPD sites are mostly rivers and floodplain beels, plus only two open beels that are jalmohals (government fisheries where the fishing community leases the fishing rights by paying the government revenue). The non-PAPD sites under CBFM-2 selected for this comparative analysis therefore excluded closed beels (where communities under the project stock fish, since no sites of this type have had a PAPD), and excluded first phase sites where communities were organised from 1996 for CBFM (except for one Caritas site where CBFM-1 started in 1996 and where a PAPD was conducted in 2000).

Resource limitations limited the in-depth work to just four case-study sites. Clearly it was important to ensure there were two PAPD sites and two control sites. However, it was also relevant to take into consideration the type of waterbody. The choice shown in Table 2.3 was followed. The inclusion of two Banchte Sheka (BS) sites, one PAPD and one control was intended to provide an indication of the PAPD effect within one NGO.

Table 2.3. Sites selected for in-depth case study work

PAPD	Waterbody type	CNRS	BS	Proshika	Total
Yes	River	1 (Fatki River)	0	0	1
Yes	Beel	0	1 (Shuluar Beel)	0	1
No	River	0	1 (Chitra River)	0	1
No	Beel	0	0	1 (Shakla Beel)	1

A clear definition of the different types of stakeholders having an interest in CBFM activities was found to be challenging and complex due to the diversity of the different types of livelihoods that exist in CBFM-2 project areas. Initially it was decided to categorise the stakeholders according to the classification used in the CBO quarterly monitoring report, i.e. as fishers (poor fishers who do 100% fishing); landless (poor with no land but who would fish for an income); landed (poor farmers with little land who may do part-time fishing); official (persons who have some official status, e.g. Upazila Fisheries Officer, UP member, etc) and others.

Another categorisation was used in the CBFM-2 census questionnaire and has five categories based on poverty level, dependence on fishing and expected livelihood patterns:

- Poor fisher household (who fish for income or both for income and food, usually does labouring work, and possess no agricultural land) = category I
- Poor household (who does not fish for income, has no agricultural land, usually does labouring work, but not service or professional jobs) = category II
- Moderate poor fisher household (who fish for income, has some agricultural land but less than 100 decimals (0.4 ha), or if occupation includes service or professional job and has thatched house) = category III
- Moderate poor household (who does not fish for income, has some agricultural land but less than 100 decimals (0.4 ha), or if occupation includes service or professional job and has thatched house) = category IV
- Better off households (who may or may not fish for income, have land more than 100 decimals (0.4 ha) and/or have someone with a service or professional job and a tin house, or has a pucca (concrete) house) = category V

However, neither of the above seemed to give a unique set of categories, so it was eventually decided to regard the primary stakeholder categories as comprising poor full-time fishers, poor part-time fishers, poor subsistence fishers, and fish traders (i.e. those who trade in fish but do not fish themselves). This classification will be used for purposes of providing a profile of participants contributing to the FGDs (see also Annex 4).

2.1.5 Gender issues in study design

It will be seen that women were not considered as a specific stakeholder category in these categorisations. In general in Bangladesh women do not fish as a source of income, and from CBFM-2 data women only fish for subsistence in a few locations. To a varying extent women and children collect other aquatic resources for various uses, such as snails to feed ducks and shrimps, plants for food and fodder. In addition women from traditional fishing communities in some locations, mainly rivers in the eastern side of the country, dry and ferment fish as a source of income. In the PAPDs one of the standard stakeholder categories that participated in the whole process was poor women, and there are women representatives in almost all of the management committees in those sites and several of the non-PAPD sites but often the combination of social norms against women speaking up and their limited role in catching fish or even visiting the waterbodies means that those women are not very active in the committees.

The exceptions related to this study in one of the PAPD sites (Kathuria Beel) and in two of the non-PAPD sites (Maliate and Debbhog Beels) many women in these Hindu communities actively catch fish. Moreover the NGO working in all three of these sites (Banchte Sheka) is focused on women's development and only forms groups for livelihood support with women. In two of these sites it has supported management committees comprised of a mix of stakeholders, including women, and in Maliate Beel it has helped just women to form a Beel Management Committee.

Therefore with limited resources and considering that women have a limited role in the management committees and direct fishery resource use, it was decided not to hold separate focus groups with women. Except that the focus group with the Maliate Beel Management Committee was of course held just with women. This would have made an interesting case study but it would not have been typical of the non-PAPD sites. It is also a location covered by another NRSP project (R8306) which will generate case study material on the role of women in this unique case.

2.1.6 Research issues and limitations

The field work was supposed to complement analysis of quantitative and qualitative data including information already collected by the CBFM-2 project. However, due to some restrictions on use of data, most of the data were collected afresh.

Existing information that was used from CBFM-2 project is summarised in the next section and included data from: household censuses in 2002, monitoring of implementation and project activities by waterbody, an institutional assessment survey and transaction cost surveys which were conducted in all project sites in January 2004. Because of the variability in floodplain fishery catches due to variation in flood conditions and the lack of a series of several years data after CBFM interventions (which have mostly occurred from early to mid-2002 onwards), it is unreasonable to expect any measurable changes in fish catches or their trends within the still relatively short time of CBFM implementation. Also it was uncertain what differences can be expected between PAPD and non-PAPD sites in household livelihoods, since in the non-PAPD sites the NGO partners have focused more on traditional group formation, training and income generating activities which might yield more immediate household impacts than changes in resource management such as fish conservation and habitat restoration actions that are expected to be enhanced and accelerated by PAPD. Therefore there could be at least as much impact on fisher household livelihoods overall in the short term in non-PAPD as in PAPD sites.

One more complication was that all of the sites where PAPD has been conducted in CBFM-2 are waterbodies and communities within "clusters" of waterbodies – that is a set of physically linked waterbodies such as adjacent sections of river, or beels and floodplains connected with each other by canals (khals). The coverage of each PAPD and the appropriate resource management unit was assessed to identify the units of analysis, which in several cases involve several individual waterbodies that were covered by one PAPD and that formed part of a larger cluster. Data for analysis was therefore kept to the waterbody level except that it was aggregated to the area covered by a PAPD where this involved more than one small waterbody within a "sub-cluster."

Finally, the distribution of PAPD and control sites across NGOs as shown in Table 2.2 raises the question of whether any observed PAPD effect could be mixed up with the NGO effect. This issue is discussed fully in Section 4.12.

A list of variables extracted from various sources and the calculation of some derived variables in shown in Annex 4.

2.2 Data Collection (methods and procedures used to collect the necessary information)

Three sources of data from the CBFM-2 project have been used in this study, all other data has been collected specifically for the study. The existing data comprises: a household census with limited basic household data, quarterly progress monitoring, and an institutional monitoring survey (associated with the last survey was a short survey on transaction costs). The following sections summarise the methods used and type of data available and are based on the CBFM-2 annual report for 2002 and unpublished information.

2.2.1 CBFM-2 household census and categorisation

A single round household census was carried out in all CBFM-2 project waterbodies at the start of the project. The main objective of this census was to identify the waterbody users and potential NGO target stakeholders from all households living around each waterbody (defined as the adjacent villages, those who either do or are prospective users of each waterbody). The household census started in September 2001 and ended in April 2002, except for sites from the first phase project which had been censused earlier in 2000-2001. The concerned NGO staff, assisted by WorldFish Center staff in some sites, carried out the survey.

Overall more landless households do not fish than do the landed households, however relatively more landless households fish for an income than do the other households (Table 2.4). There are also some important regional differences – for example the high incidence of fishing for an income in the north-east and low incidence in the two western regions.

Table 2.4 Fishing involvement of households by landholding category in CBFM-2 sites (percentage of each landholding category except for totals).

Landholding category ->	0 dec agri land				1-100 or 1-50* dec agri land				>100 or >50* dec agri land				Overall			
Region	Fish for income	Fish for food	Not fish	% of Total	Fish for income	Fish for food	Not fish	% of Total	Fish for income	Fish for food	Not fish	% of Total	Fish for income	Fish for food	Not fish	Total Nos.
North	28	25	47	44	20	45	35	31	10	42	48	25	21	36	43	35,552
Northeast	42	38	19	44	28	50	22	27	23	57	20	28	33	47	20	4,346
East	38	9	53	45	39	17	45	22	27	19	54	33	34	14	52	16,984
Southwest	21	29	50	27	16	50	33	36	13	58	29	36	16	47	36	26,693
Northwest	18	22	60	50	12	33	55	29	7	36	58	21	14	28	58	26,365
Total	26	23	51	42	20	41	40	30	14	42	44	28	21	34	46	109,940

Source: CBFM-2 project 2002 Annual Report (WorldFish 2003)

From the census, the five sub-categories of household presented in the previous section were developed. Any estimates of annual income would be unreliable in a census. The two poor categories approximate to the bottom poor category referred to in recent poverty studies in Bangladesh, but distinguish those fishing for an income from others in the same category. The moderate poor category was widened slightly to include up to one acre (0.4 ha) of land, and “tomorrows poor” were not distinguished. The landholding categories used in the census coincide with those used in national statistics, with the next category being 100-250 decimals. However, the data from the last census of the CBFM-1 sites did not permit use of 100 decimals (0.4 ha) as a cut-off between categories III/IV and V, instead for those sites 50 decimals (0.2 ha) was used.

Table 2.5 summarises the characteristics on average of the five categories of household for all of the new CBFM-2 waterbodies including those covered by this study. Some obvious differences can be highlighted such as almost 25% of households that own no agricultural land also have no homestead land (living on public land or other people's land); whereas more category V households have larger homesteads and larger tin roofed houses.

Table 2.5 Characteristics of households in CBFM-2 project working areas in 2002 by socio-economic category (see text).

Attribute	Category	I	II	III	IV	V	Total
Agricultural land	None	100	100	2	2	8	40
	<=50 decimals	0	0	59	55	5	19
	50-100 decimals	0	0	39	43	6	15
	101-250 decimals	0	0	0	0	45	14
	251-750 decimals	0	0	0	0	27	9
	>750 decimals	0	0	0	0	9	3
Homestead land	None	21	24	5	4	4	11
	1-10 decimals	69	64	72	65	37	56
	>10 decimals	10	13	23	31	60	33
Type of house	None	5	5	7	4	6	5
	One room, thatch roof	20	16	10	11	2	10
	Multiple room, thatch roof	8	7	7	6	2	5
	One room, tin roof	59	62	59	59	43	55
	Multiple room, tin roof	9	10	18	20	42	23
	Concrete roof	0	0	0	0	5	1
Fish for income	%	100	0	100	0	11	19
Any fishing gear	%	91	31	92	49	57	53
NGO participant	%	37	33	34	29	17	27
Mean household size	(number of people)	5	4	5	5	6	5
Number of households		7,848	23,892	5,373	21,748	27,287	86,148

100 decimals = 1 acre = 0.004 ha
Source: CBFM-2 project 2002 Annual Report (WorldFish 2003)

2.2.2 Institutional monitoring and assessment

Institutional sustainability is a critical aim of developing CBFM and is an objective that PAPD should contribute to. If community organisations for fishery management developed by the project are not able to withstand a range of shocks and trends then any improvements in fishery management and resultant improved fishery condition and household livelihoods anticipated by the project would also not be sustained. In the past fisher cooperatives have been taken over by local elites and ex-leaseholders, while some community organizations and groups managing fisheries have collapsed with the end of project support or lost access to resources.

The CBFM-2 project developed a format and system for summarizing and monitoring the performance of local community organizations and institutions in fishery management. WorldFish staff crosschecked and triangulated with CBO leaders and local staff of the partner NGO and Department of Fisheries (DOF), following a fixed monitoring format (Annex 1-3). One round of monitoring had been conducted in 2003. A second round was carried out for each CBO (Beel or River Management Committee) in early 2004. The data from this second round were used in this study for part of the analysis, but have been aggregated (as averages or sums, as appropriate) for each site used in the analysis (more than one waterbody or CBO was covered by one PAPD).

2.2.3 CBFM quarterly monitoring

In early 2003 the CBFM-2 project started implementation monitoring for each waterbody. At first it retrospectively monitored and recorded activities for 2002, and thereafter on a quarterly basis the project monitored implementation activities. Staff of the WorldFish Center visited each waterbody each quarter and met with the concerned NGO and DOF staff, as well as usually the CBO leaders, and completed for the previous quarter the form in Annex 1-2 comparing progress against plans made by the NGO for the year. This monitoring focused on types of fishery management interventions taken up by the CBO, management committee structure and activities, the primary groups of poor fishers formed by the NGOs, training, credit, revolving funds and grants. The data collected was then compiled by WorldFish Center to provide an updated database of status and progress to the end of the latest quarter, and was used for quarterly review meetings with each NGO. This study made use of the monitoring data collected in early 2004 covering the period up to 31 December 2003.

The units covered were the same – waterbodies and CBOs as used in the institutional assessment survey, and so the same aggregation was necessary to generate data covering the units covered by some PAPDs.

2.2.4 Transaction costs

At the same time as the institutional survey and quarterly progress monitoring, a short survey to estimate the time and cost involvement of participants was undertaken specially for this study but using a survey method and instrument based on that developed for another research project - R8195. For this a member of the management committee (BMC/RMC) and a general fisher participant, taken at random from those available from the institutional assessment group interview, were interviewed separately using the format in Annex 1-4. In some cases more than one respondent from a given category was interviewed together and their averaged data was recorded. As with the related progress and institutional monitoring the same type of aggregation was needed for some sites for this study. With hindsight estimating this from recall has limitations, some categories of time costs are more memorable (such as trainings and events) while others such as monitoring and checking on fishing are combined with normal fishing activities. A more subjective assessment as part of the FGDs to obtain the group views on changes in their time use and compare their views on the costs and benefits from time spent on CBFM and PAPD would have helped in the assessment.

2.2.5 Participatory assessment (Fishers and BMC members)

The issues on which data were not available from the CBFM-2 data sources or from the newly collected data in January 2004 were discussed in two groups – members of Beel or River Management Committee (BMC/RMC) and poor fishers (other participants/members who are not so much involved with the committee) in each site. In each site the NGO was asked to invite for separate participatory assessment (focus group discussion - FGD) sessions all BMC/RMC members (whoever turned up) and 10 persons who are beneficiaries of the beel/river (fishers). This made a total of 36 FGD with committee members and 36 FGD with fishers, in this way relatively small and homogeneous groups were convened (averaging 7-9 persons) with the aim of avoiding the problems of diverse groups influenced by a few people noted earlier. Thus the leaders of the participants (committee members) were separated from general fishers, and other stakeholders were not considered (since separate focus groups with them would have been beyond the resources of the project). The actual numbers of respondents in the group discussions are shown in Table 2.6.

Table 2.6 Number of respondents in the participatory assessment meetings.

	PAPD			Non-PAPD		
	BMC	Poor fisher	Total	BMC	Poor fisher	Total
Full time fisher	36	37	73	30	36	66
Part time fisher	49	47	96	44	46	90
Subsistence fish	51	52	103	38	48	86
Fish trader	6	10	16	1	4	5
Kua/katha owner		5	5		4	4
Fish processor				3		3
Group Total	142	151	293	116	138	254

Each group was asked to provide their opinions and to rate them on the specified scale. Some non-invitees also were present, but they only validated the answers the group members provided. Individual opinions on social cohesion were obtained as shown on cards, recorded on the questionnaire, and then averaged. Other responses were group-wise responses. The group gave their common view, they discussed this between the participants, sometimes arguments were raised between subgroups (full time fishers, part time fishers, etc.), but after reaching a consensus or acceptance of one answer they put their ratings. For the questions about linkages with other organizations only the BMC members were asked as they were mostly involved in the field level activities and interaction with the formal officials. The local government officers' attitudes were also judged after interviews with the officials wherever possible to check consistency between respondents' ratings and the officers' attitudes towards the CBFM-2 project. Each group gave their responses on the flip chart and then the researcher transferred those onto the format.

In view of the criticisms of participation in diverse groups, the study tried to limit the FGD to groups of people with similar interests in respect of CBFM. The extent of fishing dependence did still vary, and the committee members were diverse to the extent that the committees are single interest or include people of different occupations and social backgrounds. But the researchers were familiar with the villages and respondent groups and were able to limit presence and influence by people not invited for the FGD.

2.2.6 Case study interviews

Four case studies were conducted in four sites. This was done in parallel with the FGDs in order to find out any causality. Two case studies have been done at PAPD sites and two at the control sites. For benefits of comparison, one CNRS (PAPD) site and one BS (PAPD) site were chosen to represent PAPD sites, while one BS control site and one Proshika control site were chosen as controls. Note that they divide up according to waterbody type as river (CNRS-PAPD, BS-control) and beel (BS-PAPD, Proshika-control).

2.3 Data Analysis

2.3.1 Data entry

All FGD data were entered in SPSS files. This formed the master data file and enabled sub-unit information to be entered into different sheets to facilitate merging of the data to the analytical sampling units level. The data entry format was set up in SPSS files for this purpose. Similarly all data from other sources were either originally SPSS files or were converted into SPSS files for aggregation and merging.

2.3.2 Data analysis methodology

a) Analysis objectives and variables for analysis

The first stage of data analysis required careful consideration of how the main research objective(s) would be addressed through the formulation of clearly defined research questions, then to determine the data needed to address these questions, and finally to think through, and document, the steps in the data analysis process. In this study, the main objective was to investigate the effectiveness of the PAPD consensus building method. To address this objective, a number of research hypothesis were specified in the hypothesis matrix given in Section 2.1.2, and data required to answer each research question have been noted.

The main comparison was between sites where PAPD has been used (referred to as PAPD sites) and sites where the PAPD method has not been used (the control sites). For purposes of discussing statistical issues, the above comparison was referred to as the *PAPD effect.* Again in statistical terms, this is a 2-level *factor*, i.e. the two levels being whether or not CBFM activities at the site have been done via PAPD or not.

The data analysis also took note of other factors that may influence the study of differences between PAPD sites and control sites, e.g. the type of waterbody and existing social and user pressures on the waterbody. These have also been noted in the hypothesis matrix in Section 2.1.1 as possible confounders.

b) Organising the data for analysis

The second stage of data analysis involved a clear identification of the specific ***sampling unit*** for the analysis, and the underlying ***data structure***. The sampling unit for data analysis was the waterbody management area selected for CBFM activities. Many of the PAPD sites however, have several smaller waterbodies making up a cluster of waterbodies at that site, with waterbody management committees (CBOs) set up to manage each of the individual (smaller) waterbodies within the cluster. For example, the Halir Haor cluster in Sunamganj district covers Goniar Beel, Horinagar Putia Nodi and Kaju Doba as the individual waterbodies within the cluster. This means that data collected from the CBFM quarterly monitoring reports (QMR) and the institutional monitoring forms (IMF), were available for all the individual CBOs (this gave a total of 77 records covering the 36 sampling units in this study), whereas the sampling unit for data analysis was the entire area covered by the cluster.

Thus, in analysing the data for purposes of investigating the PAPD effect, since the PAPD methodology has been applied in several cases at a cluster level and not at the CBO level, the analysis had to follow the same sampling units and aggregate data in those cases from more than one CBO that had arisen from a single PAPD. This problem did not arise for the non-PAPD sites. Hence the analysis was done with a data set comprising 36 rows of data, one for each of the 36 sites chosen for the study. The data from the QMR and IMF (after omitting sites not chosen for the study) were aggregated to the cluster level (i.e. the analytical sampling unit level) for analysis, giving a summary of a total of 36 rows of data.

c) Analysis tables

i) Profile of respondents

For the FGD/participatory assessments an overall profile of the respondent groups was created since it is their collective views that were used to make an assessment of the effectiveness of the PAPD method with respect to some of the research hypotheses.

ii) Exploratory data analysis (EDA)

The initial tables included:

- Simple descriptive summaries for all variables selected for analysis.
- Frequency tables of variables having only a few likely values.
- Where the main variable for analysis was quantitative, tables giving counts and mean values of this variable across the PAPD effect.

iii) Analysis through general linear modelling

Analysis for testing the research hypothesis using quantitative response variables was based on a general linear modelling procedure in SPSS to assess whether there is a PAPD effect, i.e. by comparing the mean value for the response at PAPD sites with the mean value across control sites. The PAPD effect (variable papd) was included in all the models since this is the main determinant of interest. Other determinants of the response variable were included so that the significance of the PAPD effect can be observed free from possible effects due to other variables likely to affect the response.

The modelling procedure leads to an analysis of variance table. Its general form appears in Table 2.7.

Table 2.7 General form of the analysis of variance for a quantitative response variable.

Source of Variation	Degrees of freedom (d.f.)	Sum of square	Mean square
Type of waterbody*	3		
Degree of responsiveness of NGOs to CBO requests[#]	2		
No. of households involved in fishing activities**	1		
PAPD effect[##]	1		
Etc			
Etc			
Residual (error)	By subtraction		s^2
Total	*35 (=36-1)*		

** Categorical variable (factor) assumed to have 3 levels: river, flood plain beel, open beel*
[#] Categorical variable assumed to have 3 levels: low, medium or high.
*** Covariate (data of type interval-sc)*

All likely interactions between variables entering the analysis above were considered, but their inclusion was prohibited by the lack of sufficient degrees of freedom to measure the residual variation. The aim was to ensure at least 12 degrees of freedom in the analysis to measure the residual variation. Confounders that did not have a statistically significant contribution to the model were then omitted until a model based on PAPD effect and any other significant variables was estimated.

CHAPTER 3

CASE STUDIES

3.1 Overview

As discussed in Section 2.1.4, in addition to statistical assessment of the effectiveness of PAPD, the study also compiled four case studies to better understand the causality of any PAPD effects by comparing case studies of PAPD and non-PAPD sites in river and beel locations. This chapter presents the case study findings, and is included before the main statistical analysis to help give the reader an idea of the types of sites and activities and processes that have taken place in CBFM-2 with and without use of PAPD. Table 3.1 summarises information from the case studies, including output/outcome information used in the statistical analysis and qualitative factors found in the case studies to have a causal influence on these outcomes.

Table 3.1. Comparison of case study sites, and factors influencing the processes of CBFM there.

Indicator	**Beel Shakla**	**Chitra River**	**Shuluar Beel**	**Fatki River** (Dori Laxsmipur to Arpara)
If PAPD	Non-PAPD	Non-PAPD	PAPD	PAPD
NGO	Proshika	Banchte Sheka	Banchte Sheka	CNRS
Waterbody type	Beel	River	Floodplain	River
Maximum area (ha)	163 ha	114 ha (plus unknown area of seasonal floodplain)	1120 ha (seasonal)	39 ha (plus adjacent flooded areas)
Days taken for formation of CBO	506	309	217	341
Process for forming CBO (executive committee membership)	General meeting (19)	Elite meeting (17)	PAPD (13)	PAPD (15)
Any changes in CBO composition/ arrangement and main factors for this	Yes, conflicts and breaking rules among some members, also dissatisfaction with some leaders	Fishers withdrawn but again rejoined	Not overall, but executive committee adjusted according to demand of general members	No change
Existence of management plan/ plan of actions	Management plan was prepared in a meeting in July 2003 but not followed	Management plan was prepared in a meeting in July 2003 but not followed	Management plan exists from 2002 and followed	Management plan exists from 2002 and followed
Process for development of plan of actions	BMC meeting	BMC meeting	PAPD	PAPD
Days taken to implement first action	675	491	370	341
No. actions implemented by end of 2003	2	2	5	5
NGO expenditure (to Sept 2003)	Tk 422,000 (Tk 238/ household)	Tk 649,000 (Tk 138/ household)	Tk 393,000 (Tk 415/ household)	Tk 720,000 (Tk 229/ household)
No. of NGO staff	1 field staff, overall field coordinator and project coordinator help him where and when necessary	1 field staff supported by one senior level project staff	1 field staff supported by one senior level project staff	1 field staff oversees different sections, field coordinator helps him
Capability of NGO staff posted	NGO staff are capable of handling some problems but	NGO staff are weak and cannot stand up to local level	NGO staff was very capable and dedicated.	NGO staff are capable but depended on inputs

Indicator	Beel Shakla	Chitra River	Shuluar Beel	Fatki River (Dori Laxsmipur to Arpara)
	their role was dominated by DoF staff	influentials and DoF staff		from central office (has limited power delegated to take local level decision)
Leasing history	Leased to outsider (non-fishers) for long time	Leased up to 1995 by fisher cooperative	Private land never leased	Jalmohal, but open access for community for decades
Present lease	Tk. 457,063	Tk 0	Tk 0	Tk 0
Leaseholder and fish aggregating device role	Wanted to control it by paying NGO. When failed, organised owners of ditches to fence their area and catch fish including from the leased area	No leaseholder, open access	No leaseholder, private land. Ditch owners agreed not to fish by complete dewatering and to keep some fish in their ditches for next year	No leaseholder, but brush pile owners and fixed engine owners agreed to reduce piles and fixed engines
Local council (UP) role	Local UP chairman has very limited role	Local Pourashava chairman tried to dominate over decisions of the RMC	Local UP chairman is very interested and takes part in all events whenever he has time	Local UP chairman has very limited or no role
Non-fisher elite role	No non-fisher is involved in BMC or CBFM activities	Dominate in the RMC and take all decisions	Help in resolving problems, linking committee to local administration, and bargaining with NGO to fund activities	Help in resolving problems, linking committee to the local administration /local MP, and raising fund for RMC
Fisher elite/leader role	Those who were in the committee were blamed by the general fishers for misappropriation of fish sale proceeds	Work with non-fisher elites to dominate decisions and allow their own people to fish in the sanctuary	There is no fisher elite	Dominate decisions but they have good relations with the general fishers
DOF role/actions	DoF was very active and tried to dominate the BMC as the beel is officially under DoF However, the AFO is very helpful.	DOF involvement not well coordinated with RMC or NGO, supports some in RMC	All DoF staff are very actively involved in the BMC activities. They attended all the meetings and PAPD	DoF staff have good relation with NGO staff but not with the local community
Political interventions	Local MP supported the previous lease holder and his followers	None	None	MP supported fixed engines and brush pile owners but acted as negotiator later
Between stakeholder consensus or disputes	Frequent disputes between fishers and farmers/ditch owners	Dispute with the beel section influential fishers	No dispute, consensus among all stakeholders	Dispute at the beginning but later came in consensus through PAPD
Within fisher consensus or disputes	Some fishers refused to pay their share of lease cost and later along with other influential stakeholders formed an opposition group	Influential fishers take decision without considering poor fishers. Poor fishers unhappy because the sanctuary was established in best fishing ground	No conflict	No conflict
Resource constraints	High lease value. Poor fishers cannot repay cost of last three-year lease	Limited help from the project	Limited help from the project	Established brush pile to raise fund for the committee

3.2 Beel Shakla

CBFM-2 has been implemented in Beel Shakla in Mashihata and Bashudevpur unions of Brahmanbaria Sadar upazila (eastern Bangladesh) through a national NGO – Proshika – since late 2001. Proshika is a national NGO working on development issues since 1972, as part of their programmes they already worked with fisher communities, especially in riverine areas. Beel Shakla is connected to the Titas River through five different canals. The official area of the jalmahal is 65 ha, but in the monsoon it covers about 163 ha. It is under government leasing system as the government treats this as a closed waterbody. The total lease value of the waterbody when it was handover to DOF for the project in 2001 was Tk. 523,624. Ten years before the lease value was only Tk. 93,194 (lease value increases through competitive bidding but is supposed to increase by at least 10% every year, a 25% increase on the last lease was imposed by Ministry of Land when it handed over responsibility to DOF for the project). The lease was reduced to Tk. 457,063 due to VAT exemption in 2004. About 1,774 households (38% poor, and 17% fisher households) live around the beel. The jalmohal area is not in one piece, but is piecemeal within the larger floodplain area. The government has also leased out other public land within this floodplain to people for cultivation. These people dug 131 ditches (kuas) in their land to trap fish at the end of the rainy seasons before the beel was handed over for the project. The number of ditches increased to 188 in 2003. Moreover, people cut earth from the bund around the beel and put fences around their land in the late monsoon and catch fish when water starts to recede.

For the last 15-16 years the local fishers were trying to get the lease of the beel but influential individuals of the area got the lease each time it was auctioned (each time for 3 years). Although the fishers formed a cooperative, they were not well organised and could not offer to pay a high enough lease value. They had no access to the waterbody, and the leaseholders were so strong that land owners were not allowed to harvest fish from their ditches. When the project partner NGO, Proshika, came and said that government allocated the waterbody in favour of them for 10 years they were confused. They thought the NGO has taken the lease and wanted to cheat them. Then the NGO went to each household and explained the purposes of CBFM-2. However, this NGO was politically involved with the present opposition party when it was last in power, and became a victim of anger of the present ruling party. Their local office was attacked, looted, and burned and their staff were threatened by the local politicians. In this situation the NGO workers had to work hard to keep good relations with the people.

In each village the NGO formed a village sub-committee and made a list of the people who were interested to join CBFM activities. The NGO motivated people and at the end people from four villages around the jalmahal joined. In open general meeting with people a 27-member Beel Management Committee (BMC) was formed on 30 May 2002. About 120 people attended the general meeting and 88 genuine fishers from 4 villages who agreed to pay the lease value formed the general body of the BMC. Later the number of committee members was reduced to 19 (18 male and 1 female members) representing the 88 fishers. Each of the members were supposed to pay Tk 670 in the first year towards the lease, but 13 failed to pay their contribution to the lease, leaving 75 (65 male and 10 female). The total amount formed 10% of the lease value and the NGO paid Tk. 377,750 from the project fund as a no-interest loan but repayable to the joint revolving fund of NGO and BMC for the next season. As the amount was not sufficient to pay all the lease and the cost of the net, fences etc. the BMC also borrowed Tk 100,000 from two fish traders with the condition that they sell fish to them at lower rate.

During the first year some members and associates were expelled for fishing during the closed period (the BMC had made a rule not to use any net from mid-August to mid-November). Those people were caught red handed by the participants during guard duty and

were socially expelled, in retaliation the expelled fishers burnt the guard shed and fences. A conflict then started and the opposition group sought political help from the local MP. When the fishers wanted to file a legal case against those criminals the MP asked the local police station not to accept any case. Later the Assistant Fisheries Officer of Department of Fisheries and Proshika representative went to the police station and explained the situation, the police officer in charge went to the spot for investigation and reported to the MP. Seeing no alternative the MP then ordered the police officer in charge to try to negotiate with the fishers. Proshika spent Tk. 22,000 related to this which was passed on as a burden to the BMC.

In addition the bund around the beel was very low and they decided to put a fence around the lower part of it to stop fish from escaping. A storm in November 2002 blew down the fence. All the members and their families tried to build a bund to stop fish escaping but a portion of the fenced in fishes escaped. They sold fish worth Tk 875,000 in late 2002 to early 2003. The BMC and NGO decided to give no benefit to the members, rather they kept that amount in the bank for future use.

In 2002 there was a good growth of aquatic plants in the beel, which are believed to be beneficial as feed for the fish. That year there was good growth of fish. Moreover, due to dense plants in the beel engine boats were not plying through the beel. In 2003 there were few aquatic plants in the beel and the BMC decided to provide feed for fish for a month which increased the cost of production. Lots of engine boats ran through the beel and the environment was disturbed. The committee took a late decision to make a fence because of high water level, but water level decreased suddenly and fishes still escaped. The BMC controlled all the fishery management activities. The BMC allowed poor non-participant fishers to fish in the less productive area but on condition of payment according to gear/BMC decision of 25-75% of the per participant lease cost contribution calculated for each participant for the year. Some of the influential BMC members kept all the income, expenditure and book keeping under their control. The general fishers received no benefit. The BMC sold fish worth Tk. 475,000 in 2003. The general members lost their faith in the committee and some of the executive committee members also withdrew themselves from the committee.

In 2003 the former lease holder of the jalmohal organised the agriculture land lease holders in the area and put a huge number of fences around their own ditches for trapping fish. The BMC tried to negotiate with the ditch owners but failed. The same people also tried to catch fish by force from the waterbody. The BMC members tried to resist them and there was a conflict. The opposition group filed a legal case against the BMC members. Later at the request of local government representative and village leaders, they withdrew the case. Over confiscation of fine mesh net (harmful gear, illegal to use) a conflict arose between the BMC and the net users. The BMC wrote to the Upazila Fisheries Officer who is supposed to enforce the law against such gear and he minimized the conflict.

The CBO members were very new to this role because outside leaseholders controlled the beel for so long, and had no experience in handling this beel fishery. They are also poor and socially weak. However, two villages out of four are better off and the leaders of those villages were strong and wanted to take over while the other two wanted to withdraw. A discussion was going on about who would take over and how they would handle the fishers of the other two villages when this study ended. At that point the BMC had been dissolved and after five meetings they were not sure what to do as they already had taken in total Tk 950,000 from the NGO for paying the lease and for boat and net purchase.

Conclusions

- Motivation and targeting by the NGO seem appropriate.

- The fishers were involved and tried to take appropriate management actions, but lack an overall management plan.
- Despite forming a BMC, the poor fishers have very little access to any benefit from the change in management, some influential BMC members took most decisions and organised fishing.
- The BMC is not so strong to negotiate with the ditch owners or force them to refrain form harvesting fish from the ditches by dewatering which is illegal
- Only fishers were involved. The wider community and fishers were not in consensus on beel management, fishers dominated decision making as the non-fishers did not join the general body (this would have meant them paying a share of lease value and also would imply non-fishers getting fishing rights). A mechanism for successful consensus or negotiation between fishers and others was not found.
- Department of Fisheries involvement is strong and the NGO helps to coordinate this with the BMC.
- Political issues handicapped some of the project activities.

3.3 Chitra River

Chitra River is situated in the southern district of Jessore. Located in Bagharpara upazila (sub-district), the section of the river covered by CBFM-2 project is 114 ha in area. After independence in 1972, the whole river was divided into three sections - jalmohals (fishing estates) and fishing rights in each were auctioned separately. To get the lease three fisher cooperatives were created. Besides catching fish in the river with various gears, the cooperatives also made brush piles as fish aggregating devices and fenced off parts of their areas to control the fish. This system continued up to 1995 when government policy changed and the river was declared open for all and the cooperatives lost their exclusive fishing rights. About 4,200 households live in 23 villages along 12 km of the concerned jalmahal, of which 25% are very poor people and 3% depend exclusively on fishing for their livelihoods. Most of the people around the river fish in the monsoon season for both food and income. The river is connected to a seasonally flooded depression or beel (Beel Jawleshar) which is flooded every year during the monsoon but is heavily cultivated in the dry season, and has been included in the fishery management unit for CBFM-2.

The Community Based Fisheries Management phase 2 (CBFM-2) project activities here are undertaken by a local BGO – Banchte Sheka (BS). Banchte Sheka has a long history of working in this area with women to empower them through credit and training for income generating activities to thereby improve their household economic condition. This NGO was involved in the first phase of CBFM project when it introduced CBFM in one floodplain beel in an adjacent Upazila. Its activities in Chitra River started at the beginning of 2002 with a household census in early 2002 to know the poverty status and livelihoods situation in the area. It then held discussions/workshops in each village for awareness raising on fisheries management and the necessity of fish conservation. One initial problem for the NGO's approach was that fishing here is done just by men, but BS only works with women for its normal programme, and hence the question of whether to form male groups was a critical issue for the NGO which delayed its process.

Other problems faced in 2002 were that some people in the community thought that the NGO planned to take over the river for fish culture and deprive them of their fishing rights. There were also a mixture of administrative and local disputes over the waterbody. The river passes through two upazilas - Bagharpara and Narail which were each interested to control access and there was also confusion and disputes over whether it was an open or closed waterbody (open waterbodies have no lease fee collected, in closed waterbodies fishing rights are leased out). The site was already designated for the project and for the administration of fishing to be handed over to the DOF from the land administration, but

confusion over its status delayed DOF activities and its endorsement of NGO activities. At the same time with this confusion local influential people were trying to grab the resource, while the District Fisheries Officer was not so much in favour of the site being under CBFM-2. Ultimately the status of the waterbody under the project was resolved.

The NGO then organised a workshop with concerned government officers of Bagharpara Upazila, elected members of the Union Parishad (local council), local leaders and fishers all together to inform them about the project and future plans. The meeting was dominated by the Upazila Fisheries Officer and Union Parishad representatives. The different stakeholders in this general meeting proposed to form a 53-member River Management Committee (RMC) (comprising 40% fishers and the rest mainly influential people) and the RMC was finally formed on 3 October 2002. Also they formed a 17-member Executive Committee out of the RMC, and a 3-member "central committee" (actually an advisory body comprising the UFO, pourashava (municipal) chairman, and UP chairman) the latter meets once every three months. One local journalist was made the RMC president. However, representatives of the community living around and using Beel Jaleshwar (beel adjacent to the river but not included into the Jalmahal by government) were not invited to any meeting or consulted separately. Some people from the beel prevent fish from returning to the river after breeding in the beel. They did not agree to follow the decisions of the committee on gear restrictions and closed seasons.

This Community Based Organisation (the RMC) is run by the men of this area where most of the people are Muslim and the men traditionally do not allow women to be involved in fishery activities. Their argument in support of not allowing women in the RMC is that women do not fish and they will not be able to work in the same way as men (e.g. guarding the sanctuary at night, fishing, etc.). Finally after persuasion from BS, they agreed for the NGO to form female credit groups. Another issue then was absence of female staff for the project. On the demand of the beneficiaries BS later recruited some female field staff. Since BS as an organisation does not allow men in its credit groups, BS did hold a meeting with other NGOs working in the area to try to encourage them to provide assistance direct to men fishing in the river, and to make those NGOs aware of the project approach and objectives to avoid other NGOs taking up any conflicting programmes.

Some BS staff received training on PAPD during the piloting of methods for consensus building for management of common property resources (R7562), and some also helped conduct PAPD in Shuluar Beel (see that case study), but BS did not decide to use PAPD for Chitra.

In the second RMC meeting a sanctuary was proposed but no consensus was reached. In the third meeting a decision to establish a 10 acre sanctuary was taken but was opposed by the fishers. Their claim was that the land proposed for a fish sanctuary was the best fishing ground in the river as it is the deepest part of the river. People take bath here also. When the area was marked as a sanctuary all use was ended. The fishers then withdrew themselves from the RMC as they were not happy about the sanctuary. However, officially their names have not been withdrawn although they never attended any meeting thereafter. The Upazila Fisheries Officer and the local influentials then tried to bring them back. Some of the fishers then rejoined under pressure but were not happy. The RMC was very much dominated by the non-fishers. The sanctuary was established and fish increased. Those leaders let their relatives and friends fish in the sanctuary on the argument that this is amateur fishing (angling). The sanctuary brushpiles were trapping water hyacinth coming from the upstream through the bridge near the sanctuary. This water hyacinth created a problem for water transport and local water use of the people which has not been resolved.

In the RMC monthly meetings, presence of members in each meeting was never more than 65%. The RMC decided to expel members who failed to attend more than 3 meetings. As a

result the number of RMC members was reduced to 35 in early 2004. One annual general meeting was held. Conflict over fishing by the beel residents started from the late monsoon of 2002 (first year) and has arisen five times between October 2002 and March 2004.

A municipal council was newly formed for Bagharpara town (which is on the banks of this section of the river) and in 2003 the new municipal chairman claimed that the RMC should clean water hyacinth from the river. This would cost a huge amount of money and the RMC created pressure on the NGO to pay the amount. Water hyacinth blocks the waterway, rots at the end of the rainy season, and pollutes water, so it was agreed that this was a problem. The RMC got most of the money needed and charged the project/NGO for their supervision time, there was no voluntary work or participation and no contribution was made by the community.

In early 2003, without any discussion with the RMC, NGO or local people in general, the DOF as one of its CBFM-2 activities started to excavate a nursery pond next to the river but did not complete it (although the RMC had not planned to stock fish in the river). They also released some carp fingerlings on the occasion of fish fortnight, but the amount was small.

The CBFM-2 project designed a series of workshops to cover each and every waterbody/site of the project to review progress, plan future activities and share experiences in 2003. The "level-1" discussion meeting for Chitra River was held in mid 2003 involving the RMC and fishers and NGO, here there was a general agreement and decision to re-excavate part of the river and to build a community centre. Excavation of the river did not happen up to the time of this study, but the project did pay for making the community centre within the study period.

During first pre-monsoon rains fish from the river move to the beel to breed. The people in the beel area were setting cross dams and "fixed engine" (fences, traps, etc.) for catching fish here during the early monsoon, and also did the same after fish bred at the end of the monsoon when the beel dries out and fish want to move back to the river. Fish in the river were reportedly decreasing because of this. The RMC decided to remove fixed engines placed in the connecting beel. Although this is an illegal practice, conflict arose over the decisions made, but the local Upazila Fisheries Officer supported the RMC. The RMC tried to observe a closed season from April-June, but poor fishers opposed this and poaching increased. Fishers from the river section argued why would they stop fishing when fishers in the other parts of the river and beel do not follow the same rules. Overall it is reported that use of harmful gears in the river is reduced but is still continuing in the area.

Conclusions

- All concerned stakeholders are not represented or active in the committee, and fishers not in a lead position.
- The main role was played by the local influentials and officials in making decisions.
- Fishers have no active role in decision making.
- People from the beel connected to the river jalmahal were intended to be covered by and involved in the project activities but no clear mechanism for this was developed and they did not reach a consensus with the people from the river part of the site.
- No viable, clear or long term management plan was developed, actions have been based on sporadic decisions which came through meeting resolutions. The committee insists on its decisions, the NGO and fishers have little or no say.

3.4 Shuluar Beel

In Shuluar Beel the CBFM-2 partner NGO (Banchte Sheka) started their work from September 2001. They first arranged a series of meetings with the inhabitants of seven villages around the beel. Some of the same problems were encountered regarding targeting (men or women) as in Chitra River. The WorldFish Center with the help of the NGO conducted a PAPD in this beel in July 2002. In the plenary meeting local elites, government officials, local government (council) representatives and different stakeholders were present. The participants proposed to form a 39-member Beel Management Committee (BMC) during the PAPD (including the UP Chairman). During the PAPD the different stakeholder categories identified declining fish as a common problem and prepared the following resource management plan:

1) Stop fishing during breeding season (mid-April to mid-June).
2) Stop making fences and bunds and using set bag nets in the canals.
3) Reduce use of destructive gears (nylon monofilament net and nets with less than 1 inch mesh size).
4) Stop collecting aquatic plants (*Nymphaea nouchali*).
5) Stop collecting snails and crabs during breeding period (mid-April to mid-July).
6) Establish sanctuary for dry season fish conservation.
7) Stop fishing kuas by complete dewatering between mid-February and mid-March.
8) Re-excavate canals.
9) Keep sluice gate open to ensure fish entering in the beel during breeding season.
10) Stop jute retting in canal to reduce pollution.

The structure of the BMC was finalized in a meeting on 7 August 2002 organized by the partner NGO and the village representatives. Local elites, representative from WorldFish Center and NGO worker participated. More than 70 people from different villages attended. After a long debate they confirmed the same committee structure. The UP Chairman and local elite also supported this committee. About half of the members were fishers, the other half were farmers, kua owners, local leaders and UP representatives.

As they thought the BMC was too big to take decisions efficiently, a second meeting was held after a week and a 9-member Executive Committee was selected through support by a majority of the larger committee. The 9-member committee comprised of a President, a Secretary, a Cashier, five members from fisher community and an honorary Vice-President who was a local school teacher. Most people were eager to participate in regular meetings, but in practice attendance in general meetings is not always so high (65%), so they have problems taking decisions on beel development issues. The general body meets annually and since the PAPD up to May 2004 they have held two meetings.

Meanwhile the NGO, which had faced resistance from men in the area to forming groups of women (Banchte Sheka only forms groups with poor women, and started working newly in this Muslim area under CBFM-2), formed seven groups covering 123 households. Five group were formed with poor households who were not interested to participate in regular NGO activities e.g. savings and credit. The NGO motivated them to participate in forthcoming activities such as awareness raising and savings. The other two groups were formed with 33 fisher households and the NGO disbursed Tk 3,000 as credit to each of them.

After formation of the BMC, its members were very enthusiastic to implement the actions identified in the PAPD. They decided to observe a ban on catching brood fish in the canals and beel from mid March to mid May every year. Accordingly, they implemented this rule. Some of the fishers had problems finding work during the ban period. The executive committee members helped find day labouring work for them by negotiating with big farmers.

Another important decision was a ban on use of harmful gear in the beel. With the help of the DoF officer, they decided to have a mobile court and they confiscated hundreds of monofilament nets (*current jal*).

The BMC has rented four kuas for dry season fish sanctuaries for three years. The committee decided to guard the sanctuaries themselves. They later proposed to construct a guard shed next to the kua sanctuaries, but they did not get help from the project. There was evidence in some other CBFM project floodplain beels that after one year the kua owners denied to re-rent the kuas as sanctuaries because normally kua owners harvest kuas every year. If after one year of renting out to the community a kua as a sanctuary, the owner gets the kua back then he can sell several times more fish than in the previous years and part of the benefit of a community sanctuary will be lost to the kua owner. The committee then revised its plans and understood that they need to have permanent kua sanctuaries rather than changing kuas after few years. Finally they managed to buy 2 acres of land in different locations in the beel to excavate for permanent kua sanctuaries. CBFM-2 project paid the cost. The concerned NGO registered the land on behalf of the BMC.

On the request of the Chairman of the Union Parishad, in the second general meeting the participants decided to increase the number of Executive Committee members from 9 to 13 by including active participants. A decision was also taken to exclude anyone who fails to attend 3 consecutive meetings and has no valid reason.

Although it was not originally planned to register the BMC for its legal identity during the PAPD, later in 2002 they and the project management realized that they need to have an official identity. The concerned NGO opposed this plan because they thought that the BMC would become self-sufficient and would not depend on or listen to the NGO. However, in the face of constant demands from the general and BMC members, the NGO helped them to prepare a constitution and registered the CBO with the Social Welfare Department. According to the registration requirement the BMC executive had to be extended to 17 members. They were registered in June 2004.

Initially the NGO staff wanted the BMC to have quarterly meetings, but the BMC members decided to have monthly meeting instead because they thought 3 months was too long a gap. The CBFM-2 project has a provision to fund making small community centers, and a community center was built on land donated by one of the general committee members. When the project started local people had a negative attitude and were conservative towards this project, but now they are more interested to participate. They became more-or-less liberal regarding the project activities and agreed to some women groups being formed.

At the end of the monsoon when water starts to recede, many fish escape to the canal as it is the only drainage route from this beel. The drainage canal in the beel has been managed by a group of fishers living in Shuluar village with the local elites, including the UP chairman. The UP chairman fixed a lump sum (Tk 10,000-15,000) lease rate every year for the fishers to pay for fishing. The amount collected has been spent for the development of *madrasha* (Muslim religious school), *mondir* (Hindu temple) and sometimes for the Union Parishad's costs. When the BMC banned set bag net use in 2003 nobody leased the canal. Fishers complained that as a result all fish escaped to the river. In 2004, the BMC decided to use set bag net in the canal and raise some funds for the BMC and pay the rest to the madrasha and mondir.

In the first year fish increased in the beel due to ban period, gear restriction and sanctuary. However, in the connected adjacent beels (also under CBFM-2 project), there was no such restriction or rules. Villagers around Shuluar Beel then started complaining about this to the concerned NGO (CNRS) and the BMC representatives of the adjacent two beels (Dhalna and Kumaria). They invited them to have a meeting. After the meeting in December 2003,

they formed a 15-member cluster committee with representatives from all three BMCs. The objectives were to co-operate with each other, to resolve problems together, and to establish similar rules in all the connected beels. The cluster committee was supposed to meet every two months and they had 3 meetings in the first half of 2004. They prepared a joint action plan in their second meeting.

The Shuluar BMC has not been able to re-excavate in the beel because they did not get any fund, but why they did not get fund from the project was not known to them. They reported that the adjacent beel under the same project received fund for re-excavation of canal. Problems due to pollution from jute retting which were prioritized in the PAPD have continued, but they have not been able to resolve this yet. In 2004 under the NRSP project "Better options for integrated floodplain management – uptake promotion" (R-8306), a training course on alternate jute retting methods was arranged in another beel in the upazila, and two BMC members from this beel participated in this training. They are following the new methods for demonstration to the others.

Thus the initial CBO structure and set of resource management actions came directly from the PAPD in Shuluar Beel, but afterwards there have been adjustments based on experience of the community, project and administrative opportunities and constraints, and issues of coordination with neighbouring areas.

3.5 Fatki River

Fatki River is situated in Salikha Upazila in the district of Magura in southwest Bangladesh. The 35 km of river has been divided into 15 sections along its length, each a jalmohal, for administrative purposes. This case study focused on five adjoining sections of the river (Dori Laxsmipur, Bhatoial, Kapasati, Chukinagar and Arpara) where one PAPD was done. The total area of the river in this PAPD site is 38.7 ha within 12.5 km length. About 3,150 households live in 13 villages in this area, of whom 9% are full time fishers and 24% are very poor people who used to be fishers but now with increasing pressure on the resource they cannot earn enough from fishing and switched to fishing part time and do some other works to supplement their incomes.

During British regime the local zamindar (landlord) gave use rights to the fishers who were all lower caste Hindus. The fishers paid the zamindar a tax for fishing in the specified area. After independence from Britain in 1947, the local zamindar sold the land right to the local fishers which they were using exclusively. After independence from Pakistan in 1971, the rights of the local fishers to the river without government involvement were abolished but the fishers filed a legal case against Bangladesh Government to prevent it being leased out. This legal case continued until 1994. In 1995 along with all other flowing rivers, the river was declared open access. The fishers along this part of the river use 11 big "fixed engine" (fences and big lift net, catching fish worth Tk.100,000 per net) and 44 small lift nets (catching fish worth Tk.20-25,000 per net).

The NGO partner for CBFM-2 here, CNRS, is a national NGO working on wetland management. They have most experience in wetland management, and also worked to develop the PAPD method, but their experience in traditional income generating livelihood activities and credit is much less. They mobilized their field staff in February 2002 and started the CBFM activities with motivational work. They mobilized local youths who along with the staff raised awareness among the villagers on the necessity of fish conservation and future situation of the wetland resources without conservation. In all the river sections the NGO did household census and RRA for situational analysis. They also did wealth mapping and conducted land use survey. In each village they conducted general meeting to explain the aim and objectives of CBFM.

After these meetings they invited representatives from each village and stakeholder category for the PAPD. The PAPD started on 18 July 2002 with four different stakeholder categories: fisher, farmer, women and landless. Other important categories especially those who put fixed engines and brush pile owners were not separated because these people are also fishers or farmers who therefore fell within the four categories. However, besides those in the PAPD, the rest of these people did not agree with the PAPD outcomes on fixed engine and brush pile removal and a conflict arose. The local MP also supported those people. Later, when the NGO explained the objectives of this action, the MP himself discussed with those people and resolved the problem.

After PAPD the NGO, on the basis of local community consensus, formed 19 village committees/village groups with different types of stakeholders within the five river sections covered by this PAPD. In the river sections (2 out of 5) which were handed over by the district authority for the project the village organisation group is called a village committee, in the other sections they are called village groups. Each section covered by the PAPD formed a River Management Committee (RMC) with members from the village committees/groups selected by the general members. The RMC has its own 15-member executive body of which two members are women. Attached with each RMC there is an advisory committee, the number of members here varies between 10 and 15 from section to section. .A cluster committee was formed with some of the adjacent sections. The number of village committee members in a river section varies between 50 and 124 depending on the size of the village and number of village committees in each section. The total members in all 13 village committees for this PAPD section was 472. These are the general beneficiaries of the waterbody. In addition the NGO formed 13 credit groups with 137 women.

During the PAPD, the following actions were agreed by the stakeholder representatives including the local administration:

1. Re-excavation of river bed.
2. Breach embankment of Alamkhali River to ease water flow.
3. Raise awareness among community on fish conservation and the provisions of the "Fish Act".
4. Establish riparian plantation.
5. Remove water hyacinth from the river sections.
6. Remove fixed engine from all the river sections.
7. Stop using harmful gears.
8. Stop/reduce catching brood fish.
9. Control fish disease.
10. Provide alternative income generating activities.
11. Provide training.

All the sections of the river adopted the same action plan. The first action was delayed in 2003 due to delays in taking a decision on fund allocation and feasibility of works by the CBFM-2 project. It was later decided by the RMC that the second action was not appropriate and it was abandoned. Awareness was created among the community through miking, street drama, posters, leaflets and rally arranged by the NGO. Street drama was staged by trained local artists. Different important days, such as world environment day and world wetlands day were observed by the beneficiaries. Planting trees had not been done up to the end of 2003. However, each household received some saplings from the NGO for their homestead. Water hyacinth was removed from two sections where the problems were severe by the RMC members on payment. Before PAPD there were 55 fixed gears in these five sections. After PAPD, the RMC removed 36 of those with the help of local administration and political leaders. In addition there were 101 brush piles in these sections, and the RMC managed to remove 32 by changing the attitude among the brush pile owners. The brush pile owners

also reduced the area of their remaining brush piles. The RMCs made four sanctuaries in these five sections and set six brush piles for generating fund for RMCs. Certain fisheries rules, such as a ban on use of harmful gears and catching brood fish were only partially achieved due lack of support for alternate income generation activities for poor fishers. The NGO could provide very little credit and/or IGA support to the fishers within this period, one reason was a delay until the end of 2002 in obtaining government approval under the project for its micro-credit component. Actions against or treatment for fish disease have not yet been identified but cleaning water hyacinth from the river reportedly helped a little. The members attended several training and exposure visits to enhance their knowledge and to exchange views on fish conservation.

The overall achievement against the activities planned in the PAPD, as evaluated by the beneficiaries, was on average 31%, varying between 25% and 75% in different sections. The achievements do, however, appear to have been due to the initiative of the RMC and the community originating from a common understanding achieved in the PAPD. The river sections controlled by Muslim fishers (two) have shown very limited progress, because they were not originally fishers and have very limited knowledge about fishery.

The linkages of the RMCs with local administration and local government representatives are very limited, in some cases none. The NGO has kept good communication with local officials and has managed to get their support by its direct interactions with them, but the participants and RMC members reported that they did not have any links with them. The NGO role in facilitation is very strong here which has helped to keep implementation of the plan from the PAPD roughly on track but it was reported by the fishers that the NGO made decisions most of the time regarding implementation of the plan, only involving some of the influential executive members of the RMC.

Conclusions

- The PAPD resulted in a clear action plan agreed among the community.
- Most of the PAPD decisions were partially established within a year and a half.
- There was little conflict regarding actions, partly because the site had not been leased for decades and so there have been no attempts by others to grab resources during the project period, and partly because the NGO maintained good linkages with the district and upazila level officials and with community participants.
- The local MP was convinced in favour of the project objectives and helped overcome some opposition by his own initiative.
- The institutional set-up for CBFM is complex, and the executive of the RMC is dominating over other tiers of the institutions
- Some actions appear inconsistent and they are not so well defined or are not shown in any changes in the plan, for example brush piles were established by the RMC for its fund generation when they are also talking against private brush piles as a harmful gear, this may be affecting compliance with the plan.

3.6 Overview of causal linkages and NGO approaches

The PAPDs in both cases were found to have given a direction for CBFM activities and helped initiate the local institutions and community organisations under the project. In the non-PAPD sites the NGOs had to make considerable piecemeal efforts to explain to local people their objectives and intentions. In one (non-PAPD) site the history of leasing and conflicts over access were a major reason for slow progress in changing resource management. Facilitation in general was probably better in the PAPD sites, and in the case studies there were fewer other reasons for conflict and disputes than in the non-PAPD sites,

but the PAPD process appeared to generate plans as a focal point for action, greater unity among fishers and support from local leaders.

Finally, the approaches adopted by each NGO to CBFM are summarised in this section as an overview of how similar or different they are. Some differences arise because of the type of waterbody chosen by the NGOs, but some of the main NGOs have taken quite similar approaches. There were no systematic planning processes or workshops except in the PAPD sites. But in mid 2003 in all sites the responsible NGOs held review workshops with the participant communities and community organisations.

3.6.1 CNRS

The approach adopted by CNRS is based on its experience in earlier projects that introduced habitat restoration for fisheries and involvement in earlier NRSP research projects that developed PAPD (Barr and Dixon 2001). It selected sites where there were several waterbodies (rivers or beels) and floodplain wetlands connected to each other, and started through PAPD to identify community priorities for wetland and fishery management and to develop community organisations including fishers and other stakeholders to implement the plans developed in the PAPD. Relatively few of the sites include jalmohals where revenue is paid. There has been a relatively greater emphasis on habitat restoration (excavation) than in the sites supported by the other NGOs, and although groups of poorer people have been formed this is more as a support for some credit and they are not the basis of a membership organisation of fishers.

3.6.2 BRAC

The approach adopted by BRAC is modified from its previous experience in CBFM-2, Oxbow Lakes Project II, and it's own baor program (Apu *et al*. 1999; Hossain 1999). Groups of poor people (essentially people who fish for an income) and who may or may not have as a nucleus an existing fisher's cooperative society, were formed to take exclusive control over beels. The aim was for the organised fishing community to manage the fishery itself through its own committee where all members have equal rights and shares of costs and income. BRAC works to empower the poor organised fishers and so ensure that the groups are no longer dominated by richer people. In some cases BRAC was effectively attempting to reform existing fisher cooperative societies which already held rights over a beel/baor through leasing. This involved gradually excluding those who were not directly involved in fishing or are rich, and making management more transparent and accountable to the general members.

3.6.3 Caritas

The approach of Caritas is similar to that of BRAC. Groups of fishers were purpose-formed for the project. In some sites all of the professional fishers using the beel were included in these groups, in other sites some fishers using the waterbody were not included in the groups as they did not meet the poverty criteria of the NGO or were in dispute with another part of the fishing community. Most subsistence fishers from the same villages and using the same waterbodies are not organised into groups. Beel Management Committees (BMC) were formed as the decision making body of a membership organisation comprising all their groups, and these groups and committees then take measures for improving fishery management. Some grants to help in starting these management interventions were provided, along with credit for gear, stocking and to pay government revenue. Credit was also provided for alternative income generating activities.

3.6.4 Proshika

Proshika focused on flowing rivers and connected beels, but rivers have became free access resources following a government decision in September 1995 (Ahmed et al., 1997). In some sites fishers exploiting the project waterbody were organised by Proshika and by paying government revenue tried to exert exclusive control. But in general in the rivers there were more pressures from both poor and rich people to have open access to these resources, and by some influentials to grab control of them by having them declared non-flowing and therefore leasable. In addition to resource management, Proshika's main strategy was organising traditional fishers in groups and providing training and credit for both fishery related investments and alternative income sources. In several sites the groups involved traditional fishers and others who do not fish for an income, which diffused some of the potential focus on fishery resource management. A particular focus was on support for women and men to process (mostly sun-drying) fish when they are in abundance and market them when prices are higher.

3.6.5 Banchte Shekha

Fishing is generally done by men, and while the other NGOs have formed groups of women from the fishing communities, this was less closely linked with fishery management (except where those women are involved in fish processing). Banchte Shekha, however, only works with women. It works in non-leased mainly seasonal floodplains where it formed groups among women, preferably those in Hindu communities who actively fish (mainly for subsistence). Thus the primary target group and type of fishing involvement differed substantially from the sites and strategies of the other NGOs. To represent the different interests, including landowners in seasonal floodplain beels, Beel Management Committees included representatives of its groups of women, male fishers, farmers, and local leaders. This approach and some of its impacts is discussed in Sultana et al. (2002).

3.6.6 CRED

CRED is a local NGO formed by some of the local influential people of the area it mainly works in (in Narsinghdi District), with the aim of improving the livelihoods of people in their area. Besides organising groups of fishers, their main activity was to work with local leaders (elected local council members and influential people from the area) to help them establish a management committee with the fishers, and to support measures to improve management.

3.6.7 ERA

ERA is a local NGO in Sunamganj District, working to generally improve the livelihoods of poor people in the area, but with an interest in fisheries. It has organised poor traditional fishers in a struggle to gain access to medium sized jalmohals within a large haor area and adopted use of PAPD in the local planning process. Its activities started after the other NGOs as it is supported by a separate but linked grant from IFAD.

CHAPTER 4

HYPOTHESIS TESTING

This chapter sets out the results of testing the 11 hypotheses and associated response variables listed in Table 2.1. The first three relate to the formation and development of the CBOs (River and Beel Management Committees), the fourth relates to social capital, the fifth to sustainability, the sixth to eighth to collective action, the ninth and tenth to livelihood outcomes, and the eleventh to transaction costs.

4.1 Formation of Community Based Organisations

The number of days from the start of CBFM activities to the formation of the waterbody management committee (CBO) is shown in Table 4.1. The data indicate that PAPD has enhanced CBO formation compared with non-PAPD sites. The process of formation of CBOs in the PAPD sites was also different from the process in the non-PAPD sites. In PAPD sites in most cases CBO structures were agreed during PAPD and in most cases CBOs were formed during or just after PAPD. However, in the non-PAPD sites two routes to forming CBOs were followed, either the NGO waited until it had formed smaller groups of fishers and then formed a committee (CBO) of representatives of those groups, or ad-hoc committees were formed including local influential by the NGO, local influentials and DoF. Later they included fishers for the formal CBOs but still some were dominated by those influentials. In some jalmohals where a lease is paid or where there is open access in a river, DoF had a substantial influence CBO formation and structure.

Table 4.1. Mean number of days from start of project to CBO formation.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	370	24.8	319.4	420.1
PAPD	263	24.8	212.6	313.3

The number of days was counted from date of signing of the MOU with each NGO for the project implementation activities to the date that a CBO was first formed, this was subjected to analysis of variance procedures, allowing for type of waterbody. The waterbody type has no influence on the number of days of formation of CBOs after contract signing.

The observed data shows evidence that PAPD is associated with faster CBO formation in PAPD sites and analysis showed the number of days to CBO formation are significantly ($p<0.005$) different between the two tested categories of sites (Table 4.2). One factor is that while in all sites the NGOs have formed groups of participants, this was generally not a necessary pre-condition for CBO formation in the PAPD sites, but it was in non-PAPD sites where the group representatives form the beel or river management committee. However, the underlying reason perceived compared with other factors is lack of consensus between stakeholders, local power structure, and the DoF. For example, in the non-PAPD sites of Dubail Beel and Dopi Beel a high number of conflicts, and in Beel Hural several court cases in relation to the control of the waterbody happened, which delayed CBO formation.

Table 4.2 Model for days to CBO formation as dependent variable.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	102643.700(a)	1	102643.700	9.289	.004
Intercept	3603490.160	1	3603490.160	326.093	.000
PAPD	102643.700	1	102643.700	9.289	.004
Error	375717.467	34	11050.514		
Total	4081851.327	36			
Corrected Total	478361.167	35			

a R Squared = .215 (Adjusted R Squared = .191)

4.2 CBO Activities

It was hypothesised that PAPD was associated with more active CBOs, and four sub-hypotheses or indicators were identified to test this: average number of committee meetings per month, percentage attendance in meetings, number of awareness raising activities to reach other people, and number of conflicts resolved.

4.2.1 Frequency of meetings

The CBO executive members in all waterbodies planned to meet each month. However, if any emergency arises they meet more than once, especially during conflict within themselves. In the meetings they discuss problems and progress, plans for the future, and how to implement those plans and who will be responsible.

In the PAPD sites CBOs failed to meet once in a month. The reasons reported by the CBO members were that they were busy with their other work during crop planting/harvest period and jute retting period. If there is no emergency during those periods they do not meet. The test of significance showed no evidence of a difference between PAPD and non-PAPD sites (Table 4.3a, $p>0.05$) in terms of number of monthly meetings. However, CBOs in PAPD sites met less than once in a month, but in non-PAPD sites they met more than once a month. In some non-PAPD waterbodies the slightly high number of meetings was due to a greater incidence of problems of conflict, court cases and fights over power (Table 4.3b).

Table 4.3a Model for number of CBO meetings per month.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.867(a)	1	3.867	1.988	.168
Intercept	31.168	1	31.168	16.022	.000
PAPD	3.867	1	3.867	1.988	.168
Error	66.139	34	1.945		
Total	101.174	36			
Corrected Total	70.006	35			

a R Squared = .055 (Adjusted R Squared = .027

Table 4.3b Mean number of CBO meetings per month by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	1.258	.329	.590	1.926
PAPD	0.603	.329	-.065	1.271

4.2.2 Attendance in CBO meetings

However, there is evidence that the number of members who attended different meetings just differs significantly ($p<0.05$) between PAPD and non-PAPD sites, but with a slightly

higher attendance rate in non-PAPD sites (Table 4.4a and 4.4b). There is no evidence of a difference between waterbody types. There was a complaint from the CBOs that members are not interested to attend meetings in general as they see no gain in it unless they have a vested interest. This is true for non-executive members. It was also reported that the influential executive members of CBOs as well as the NGO and DoF staff do not care to consider other members opinions for setting meeting date which creates problem for others to attend meetings. Generally the meeting date is set in the previous meeting on the basis of consensus of all the committee members, or in some sites they have a set date for the CBO meeting such as on the first day of the month or 15th of the month, etc. Most CBOs also have a rule to expel members who do not attend three consecutive meetings.

Table 4.4a Model for mean percentage of committee members attending CBO meetings.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	426.956(a)	1	426.956	4.615	.039
Intercept	210681.383	1	210681.383	2277.347	.000
PAPD	426.956	1	426.956	4.615	.039
Error	3145.400	34	92.512		
Total	214253.739	36			
Corrected Total	3572.356	35			

a R Squared = .120 (Adjusted R Squared = .094)

Table 4.4b Mean percentage of committee members attending CBO meetings by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	79.944	2.267	75.337	84.551
PAPD	73.056	2.267	68.449	77.663

4.2.3 Awareness raising

Awareness raising was one of the tasks of the CBOs. This task was done with the help of the Department of Fisheries and NGOs, but it was expected that more active CBOs would take up this initiative themselves. The types of awareness raising activities and their frequencies are shown in Table 4.5.

Table 4.5 Total number of times awareness raising events happened in all waterbodies.

Type of event	PAPD	Non-PAPD
Public meeting	276	243
Meeting with local government	46	48
Posters	41	17
Signboard	85	24
Articles in newsletters	8	4
Billboard	7	1
Miking (loud speaker announcements)	51	32
Participation in annual Upazila fair	4	2
Folk Theatre	24	11
Video/workshop	19	11
Training	14	21
PAPD	18	.
Rally	4	3
Red flag	58	21
Folk song	13	3
Painting competition	2	

There was strong evidence in support of the hypothesis that PAPD results in more active CBOs in terms of their involvement in more activities to inform others, in the community and beyond, about fisheries management issues and their activities. The number of such events

per waterbody was significantly more ($p<0.01$, Tables 4.6 and 4.7) in the PAPD sites than in the non-PAPD sites. This is also supported by evidence in the PAPD sites from another NRSP project (R8306) that knowledge, attitudes and practice have been changed.

Table 4.6 Model for number of awareness raising activities.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1161.863(a)	1	1161.863	11.221	.002
Intercept	3650.509	1	3650.509	35.255	.000
PAPD	1161.863	1	1161.863	11.221	.002
Error	3520.561	34	103.546		
Total	8332.934	36			
Corrected Total	4682.424	35			

a R Squared = .248 (Adjusted R Squared = .226)

Table 4.7 Mean number of awareness raising events/activities held to date by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	4.389	2.398	-.485	9.263
PAPD	15.751	2.398	10.877	20.625

4.2.4 Conflict resolution

In Section 4.8.4, it is evident that the number of internal conflicts in the PAPD sites was less than that in the non-PAPD sites. However, the initial hypotheses considered that the percentage of conflicts resolved by the CBO would be one piece of evidence for an active CBO. Only sites where conflicts occurred were included in the analysis, i.e. 9 PAPD sites and 15 non-PAPD sites.

There was insufficient evidence to indicate a difference between PAPD and non-PAPD sites with respect to the percentage of conflicts resolved. However, the mean percentage of conflicts resolved (Table 4.8b) is a bit higher in the non-PAPD sites. This is contrary to expectation since at PAPD sites, people were made aware of the project activities during PAPD and village meetings, but in non-PAPD sites there was not the same consensus building activity and this would have been expected to make conflict resolution more difficult. Thus the non-PAPD sites reported more conflict incidents but also that a higher percentage of these were resolved (and yet also had more incidents of rule breaking among the community). It appears that those conflicts that were more straightforward to resolve such as disputes among fishers in the non-PAPD sites (mainly rivers) were addressed and reported solved, leaving a smaller number of unresolved conflicts. In the PAPD sites the conflicts that arose appear to have been more complex to solve. However, the number of sites involved is small and in fact only two working areas among the PAPD sites had low rates of conflict resolution. All four sites in Hakaluki Haor, where CNRS conducted PAPD, faced conflicts over access and leases to the fisheries only some of these have been resolved, also in Digshi Beel there was a PAPD in 2000 but it was not effectively used or followed up to address conflicts that started from non-fisheries issues.

Table 4.8a Model for percentage of conflicts resolved

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	450.017(a)	1	450.017	.476	.498
Intercept	19694.010	1	19694.010	20.815	.000
PAPD	450.017	1	450.017	.476	.498
Error	20815.000	22	946.136		
Total	40959.028	24			
Corrected Total	21265.017	23			

a R Squared = .021 (Adjusted R Squared = -.023)

Table 4.8b Mean percentage of conflicts resolved by whether PAPD or not

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	32.000	7.942	15.529	48.471
PAPD	23.056	10.253	1.792	44.319

4.3 CBO Structure

4.3.1 Number of stakeholders in CBO

It was hypothesized that PAPD results in the formation of CBOs that are more holistic in terms of having a wider range of stakeholder categories in their membership. However, the number of different male stakeholder types in the CBO committee does not vary between PAPD and non-PAPD sites ($p>0.05$, Table 4.9a). Even for female stakeholders there is no significant difference (Table 4.9b) between the number of stakeholder types. The CBOs comprised of either only fishers or fishers and other stakeholders. The lessons learned from CBFM-1 project have evolved into three types of CBO approaches in CBFM-2: a) fisher managed fishery with only fishers in the CBO, b) community managed fishery, and c) women led fishery with women and other stakeholders involved (WorldFish 2003). For the community managed fishery approach, the institutional models allow involvement of different stakeholders and most of the PAPD site waterbody management committees are multi-stakeholder. Consequently on average the PAPD sites had more female committee members, with the exception of the one non-PAPD site that is following a women led approach.

Table 4.9a Mean number of stakeholder categories (male) in CBO.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	3.056	.239	2.570	3.541
PAPD	2.779	.239	2.293	3.264

Table 4.9b Mean number of stakeholder categories (female) in CBO.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	.444	.179	.081	.808
PAPD	.724	.179	.361	1.087

When males and females are considered together, there is some evidence that the number of stakeholders in PAPD and non-PAPD sites are different ($p<0.05$, Table 4.10a and 4.10b). However the corresponding means do not display much difference between the PAPD and non-PAPD groups. The CBO members in both PAPD and non-PAPD sites represent approximately four different stakeholder groups from the community. The type of waterbody has an influence on the categories of stakeholders involved. For example, people of the

floodplain communities are the owners of the land which forms a seasonal waterbody and these waterbodies dry up during the dry season, and therefore there are less fisheries activities during the dry season. If CBOs were formed only with fishers, land owners might not co-operate with fishery activities or follow fishery rules. During PAPD, the landowners agreed to co-operate with the CBO in fishery management and they agreed to allow anybody to fish in their land during the monsoon. During PAPD the kua (ditch) owners agreed not to catch fish by dewatering their kuas. Although they are not fishers they have a stake in the fishery, if they were not involved in the CBOs for decision making and information dissemination, there could be more conflicts and the fishery management would be difficult.

Table 4.10a Model for mean number of stakeholder categories in CBO.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	5.462(a)	4	1.366	2.945	.036
Intercept	531.174	1	531.174	1145.420	.000
PAPD	2.188	1	2.188	4.719	.038
Type of waterbody	4.554	3	1.518	3.274	.034
Error	14.376	31	.464		
Total	551.013	36			
Corrected Total	19.838	35			

a R Squared = .275 (Adjusted R Squared = .182)

Table 4.10b Mean number of stakeholder categories in CBO by whether PAPD site or not.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	4.158	0.222	3.706	4.611
PAPD	3.615	0.176	3.256	3.973

4.3.2 Proportion of poor (fisher and non-fisher) in the CBO

There is a strong evidence (p=0.000, Table 4.11a) that PAPD results in formation of CBOs where the poor are better represented. The CBFM project was formulated for better management of fisheries for the poor who depend on fisheries for their livelihoods. PAPD was conducted with all the stakeholder groups (including non-poor) and with their consensus the CBO was formed. In case of non-PAPD sites the partner NGOs prepared a list of fishers and DoF verified it (added/subtracted people). They then picked up people for formation of the CBOs. The local influentials were also consulted. In most of the cases in the name of fishers some local leaders, politicians, etc. become involved in the CBO. Although it was said that the fishers are poor, some are better off, but in general traditional poor fishers have very little space in decision making in some of these CBOs. The inclusiveness of the PAPD seems to legitimize forming CBOs with more poor people in them rather than opening the door for better off people to dominate the CBOs.

Poor fishers reportedly comprise two thirds of the CBO members in PAPD sites, whereas in Non-PAPD sites poor represent only one third (Table 4.11b). Thus there are more poor people in the CBOs in PAPD sites, although whether they are better represented in decisions also depends on the type of people in the executive posts.

Table 4.11a Model for percentage of poor in CBO.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8413.00(a)	1	8413.00	19.50	0.000
Intercept	92766.48	1	92766.48	214.99	0.000
PAPD	8413.00	1	8413.00	19.50	0.000
Error	14670.73	34	431.49		
Total	115850.21	36			
Corrected Total	23083.74	35			

a R Squared = 364 (Adjusted R Squared = .346)

Table 4.11b: Mean percentage of poor in CBO by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	35.48	5.86	23.11	47.84
PAPD	66.05	3.68	58.28	73.82

4.4 Changes in Social Capital

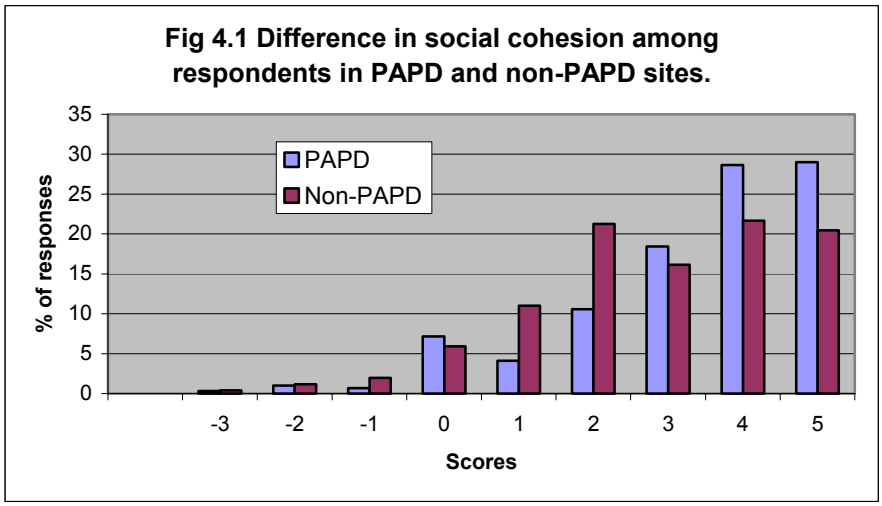
It was expected that PAPD as a consensus building method involving different types of stakeholder would result in higher levels of social capital, in terms of trust, harmony, cooperation and collective action compared with sites where CBFM was introduced without PAPD. As indicators for this self-assessments by the respondents in the participatory assessments were used.

4.4.1 Measure of the degree of change in social cohesion in community

The degree of changes in social capital was assessed by the respondents on a -5 to +5 scale. Each respondent expressed their opinion on the changes in social cohesion. In more than 50% of waterbodies with a PAPD respondents scored changes as high – scores of 4 or 5, compared with about 40% in non-PAPD sites (Fig. 4.1). Only a few respondents in any sites reported a negative change in social cohesion. The reason is implementation of fishery rules in the area, such as closed season, ban on fishing during breeding season and ban on using harmful gears. In a few waterbodies where only professional fishers have access and do not let others fish in the waterbody, the relationship between fishers and others has worsened. In some waterbodies where beneficiaries have to pay lease value for access rights, the participants who pay the lease often do not allow others to fish[1].

For example, in Chitra River (non-PAPD site), the management committee established a fish sanctuary in a place where usually fishers were fishing. The fishers also claimed that the management committee members and their families fish during the ban period but they are not allowed to fish there. The management committee admitted the claim and said that those people are “recreational fishers”. However, the fishers do not know what is allowed and what is not allowed. On the other hand, in Kathuria Beel (PAPD site), beneficiaries drive outsiders (from outside the villages around the beel which were covered by the PAPD) away and resisted a group who claimed ownership of the adjacent khals and wanted to culture fish (exotic species). The management committee considers this as an example of the high social cohesion. Both of these sites have the same facilitating NGO (Banchte Sheka).

[1] Particularly if the beneficiaries stock fish, then they do not allow others to fish in the waterbodies, but these CBFM-2 sites were excluded from the study.



With respect to social cohesion, there was a significant effect by type of waterbody (p=0.022, Table 4.12a and b). The more diverse river plus beel and floodplain sites had higher scores on average, and these sites tended to have fewer issues of leasing or conflicts over access. There was also strong evidence in support of the hypothesis that PAPD results in greater social cohesion (p<0.01). This is largely because PAPD brought different stakeholders from different villages to know each other, to exchange ideas and to come in consensus among themselves. This relationship was further nurtured through working together for common interests after the PAPD. There appears to be a limited effect of PAPD in river sites where the access is open and fishers or community representatives have no strong ability to bring diverse users together.

In analysing the degree of social cohesion a large number of confounding factors were expected to have an effect, i.e. type of waterbody, number of other development activities and other uses of the waterbody, the number of days to form CBO from the date of PAPD, proportion of professional fishers, proportion of males in CBO membership and proportion of better-off people in the committee (CBO); these were all included in the modelling procedure. However, all these factors except type of waterbody, number of categories of development activities and proportion of better-offs were dropped from the model because they were non-significant, resulting in the model in Table 4.12a.

Table 4.12a Model for change in social cohesion

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	22.389(a)	6	3.731	2.898	.024
Intercept	127.944	1	127.944	99.353	.000
Type of waterbody	14.440	3	4.813	3.738	.022
PAPD	12.278	1	12.278	9.534	.004
Other development	8.258	1	8.258	6.413	.017
Percent better off in CBO	7.535	1	7.535	5.851	.022
Error	37.346	29	1.288		
Total	401.599	36			
Corrected Total	59.735	35			

a R Squared = .375 (Adjusted R Squared = .245)

Table 4.12b Mean score for change in social cohesion by waterbody type

Waterbody type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Open beel	2.558(a)	.328	1.887	3.229
Flood plain beel	3.934(a)	.425	3.064	4.804
River	2.246(a)	.423	1.382	3.110
River+ open beel	4.886(a)	.866	3.115	6.658

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.2706.

Table 4.12c Mean score for change in social cohesion by whether PAPD site or not

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	4.403(a)	.411	3.563	5.244
Non-PAPD	2.409(a)	.423	1.543	3.274

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.2706.

Table 4.12d Mean score for change in social cohesion by number of other development activities

no. of other development activities	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
0	4.123(a)	.405	3.295	4.951
1	2.689(a)	.368	1.936	3.442

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.2706.

Interestingly where there is another development activity this seems to reduce social cohesion, possibly by setting up competing interests in the use of the natural resources such as wetlands in the area. It is possible that those other activities might have already increased social cohesion. Since the assessments made by the respondent groups were of changes that would be recorded as a smaller change, but the developments referred to tended to be physical infrastructure rather than institution development.

4.4.2 Measure of degrees of change in social cohesion by stakeholder

Overall average scores were used in the analysis above, but the two categories of stakeholder, management committee members (mainly executive/office bearers) and poor fishers could have very different views of social cohesion, so a separate analysis was carried out for each of these types of respondent.

a) Management committee

The members of the management committees (BMC/RMC) in the participatory assessments reported significant changes in social cohesion in the PAPD sites. In all the sites, whether PAPD or not, executive committee members tried to score social cohesion very high but when asked from different angles to know the relationship between different stakeholders they could not defend their initial claims and then re-scored this indicator.

The degrees of change in social cohesion were modelled, allowing for the PAPD effect and confounding factors: type of waterbody, number of other development activities in the area and other uses of the waterbody, the number of days to form CBO from the date of PAPD, proportion of professional fishers, and proportion of better-offs in the community. Except for type of waterbody, number of other development activities in the area, and proportion of better-offs all other confounders were non-significant and were dropped from the model. There was a significant effect due to PAPD ($p<0.05$, Table 4.13a and b). This supports the hypothesis that PAPD results in greater social cohesion among management committee and

with general beneficiaries in order to show improvement in fishery management. The mean score is higher by 1 unit for PAPD sites compared to non-PAPD sites. The confounding factors: type of waterbody, other development activities, and proportion of better-off in the CBO also have a considerable effect on social cohesion as assessed by the committee members. If other development activities prevail in the area, social cohesion decreases due to involvement in own interest (Table 4.13d). If involvement of better-offs increases in the management committee, social cohesion decreases due to lack of empowerment and participation.

Table 4.13a Model for change in social cohesion reported by BMC/RMC.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15.528(a)	6	2.588	2.396	.054
Intercept	161.473	1	161.473	149.490	.000
PAPD	7.850	1	7.850	7.268	.012
Type of waterbody	11.444	3	3.815	3.532	.027
Other development activities	5.507	1	5.507	5.098	.032
Proportion of better-offs	8.089	1	8.089	7.489	.011
Error	30.244	28	1.080		
Total	495.660	35			
Corrected Total	45.772	34			

a R Squared = .339 (Adjusted R Squared = .198)

Table 4.13b Mean score for change in social cohesion reported by BMC/RMC by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	4.686(a)	.372	3.923	5.449
Non-PAPD	3.091(a)	.392	2.288	3.893

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.8783.

Table 4.13c Mean score for change in social cohesion reported by BMC/RMC by waterbody type.

Waterbody type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Open beel	2.996(a)	.306	2.369	3.623
Flood plain beel	4.390(a)	.387	3.598	5.183
River	2.995(a)	.389	2.199	3.792
River+ open beel	5.173(a)	.792	3.550	6.796

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.8783.

Table 4.13d Mean score for change in social cohesion reported by BMC/RMC by number of other development activities.

Number of other development activities	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
0	4.475(a)	.370	3.717	5.232
1	3.303(a)	.339	2.608	3.997

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.8783.

b) Poor fishers

In the case of the poor fishers who gave their scorings in the participatory assessments, the evidence is stronger in support of changes of social cohesion due to PAPD: the poor fishers of PAPD sites reported significantly greater increases in social cohesion than in non-PAPD sites ($p<0.01$, Table 4.14). The same confounding factors have similar effects on social cohesion reported by the poor fishers as reported by BMC/RMC members.

Table 4.14a Model for change in social cohesion reported by poor fishers.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	28.42 (a)	6	4.74	2.89	0.025
Intercept	83.91	1	83.91	51.22	0.000
PAPD	13.62	1	13.62	8.31	0.007
Type of waterbody	19.61	3	6.54	3.99	0.017
Other development activities	10.40	1	10.40	6.35	0.017
Proportion of better-offs	8.51	1	8.51	5.20	0.030
Error	47.51	29	1.64		
Total	350.48	36			
Corrected Total	75.93	35			

a R Squared = .374 (Adjusted R Squared = .245)

Table 4.14b Mean score for change in social cohesion reported by poor fishers by whether PAPD site or not.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	4.122(a)	.464	3.174	5.070
Non-PAPD	2.022(a)	.477	1.045	2.998

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.2706.

Table 4.14c Mean score for change in social cohesion reported by poor fishers by waterbody type.

Waterbody type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Open beel	2.331(a)	.370	1.574	3.087
Flood plain beel	3.657(a)	.480	2.676	4.638
River	1.575(a)	.477	.600	2.550
River+ open beel	4.725(a)	.977	2.726	6.723

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.2706.

Table 4.14d Mean score for change in social cohesion reported by poor fishers by number of other development activities.

Number of other development activities	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
0	3.877(a)	.457	2.942	4.811
1	2.267(a)	.415	1.418	3.117

a Covariates appearing in the model are evaluated at the following values: Proportion of better-offs in community = 21.2706.

4.5 Sustainability of the Fishery

The fifth hypothesis, "PAPD results in greater community awareness and concern for collective sustainability and security actions", was tested through analysis of three main variables listed in Table 3.1. In the participatory assessments, two groups of beneficiaries - Management Committee members and general fishers who are not involved in the committee separately discussed and assessed three types of benefit: their own benefit and short and long term (future sustainable) community benefits received. For each type of benefit they estimated the number of types of benefit that they had/would receive, and they also rated the importance of those benefits (on a scale of 1-10); this resulted in six tests – two for each type of benefit.

4.5.1 Number of types of own benefits received

The frequency of reporting types of own benefit are shown in Table 4.15, which indicates that almost all PAPD sites had increases in fish and most saw income and knowledge gains,

whereas almost 75% of non-PAPD sites had fish increases but income and knowledge gains were less common. The diversity of own benefits also appears higher in PAPD sites.

Table 4.15 Types of own benefit received or expected in the future identified through participatory assessment (percentage of respondent focus groups reporting).

Types of own benefits	PAPD		Non-PAPD		Maximum no. of responses per category
	MC	Poor fisher	MC	Poor fisher	
Fish increased	94.4	94.4	72.2	72.2	18
Income increased	72.2	61.1	38.9	55.6	18
Knowledge increased	61.1	55.6	33.3	38.9	18
Protein consumption increased	5.6	5.6	0.0	0.0	18
Irrigation	22.2	16.7	16.7	11.1	18
IGA introduced	33.3	11.1	11.1	0.0	18
Fish price decreased	5.6	5.6	16.7	5.6	18
Ensured economic uplift	11.1	16.7	0.0	5.6	18
Participation	22.2	5.6	11.1	0.0	18
Ownership/right over waterbody	0.0	11.1	5.6	0.0	18
Recognition by Government/NGO	5.6	5.6	5.6	0.0	18

IGA = income generating activity, MC = management committee (BMC or RMC) member.

The number of types of benefit identified by each focus group as gained by themselves or their families was subjected to analysis of variance procedures, allowing for type of waterbody, the number of fishers in the community fishing for an income and the number of other uses of the fishery as confounding factors. The analysis also took account of the stratification of the 72 focus groups into MC members (one group per site) and fishers (again one group per site). Possible interactions between these variables were also explored, but none of the interactions were significant, nor was there evidence that the number of fishers fishing for an income had a significant effect on the number of own benefits perceived by the focus groups.

Table 4.16a gives strong evidence ($p<0.001$) that the number of perceived benefits for respondents and their families differ according to whether of not the respondent group is from a PAPD site or not. Table 4.16b shows that the mean number of benefits perceived is about 3 for PAPD sites but 2 for non-PAPD sites. Thus on average, about one more benefit was achieved for the participants, whether from MC or fishers, in PAPD sites compared to non-PAPD sites.

Table 4.16a Model for number of own benefits.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	69.655(a)	9	7.739	10.878	.000
Intercept	483.657	1	483.657	679.802	.000
PAPD	11.527	1	11.527	16.201	.000
Category (BMC/Fisher)	2.821	1	2.821	3.965	.051
Other uses of fishery	34.676	4	8.669	12.185	.000
Waterbody type	9.327	3	3.109	4.370	.008
Error	42.688	60	.711		
Total	596.000	70			
Corrected Total	112.343	69			

a R Squared = .620 (Adjusted R Squared = .563)

Table 4.16b Mean number of own benefits by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	2.959	.237	2.486	3.433
Non-PAPD	2.031	.263	1.504	2.558

Table 4.16c Mean number of own benefits by category or respondent (whether respondent group is from management committee or general poor fishers).

Respondent category	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
BMC	2.696	.245	2.206	3.187
Poor fisher	2.294	.243	1.808	2.781

The beneficiaries from PAPD sites mentioned income as a main benefit for themselves as a result they can send their children to school, can get better health care and improved family nutrition, especially for children. They now consume more fish which they translate as more energy through more protein intake. Some of the beneficiaries mentioned increased knowledge through PAPD, training, meetings and workshops and through facing visitors. They particularly mentioned the PAPD as the first gathering where they freely raised their own problems and they also proposed solutions (participation) which were taken into consideration. They felt that they were given attention and they were not controlled by anyone. The same types of benefits were reported in non-PAPD sites but fewer were achieved within the period assessed. Also in the discussions respondents from non-PAPD sites said that decisions were taken in a big meeting where powerful people dominated decisions and the poor people were given less attention. Although they reported some benefits from CBFM, such as increased income and increased fish catch, Table 4.17 shows that on average they give a lower importance score to these benefits than in the PAPD sites (scale of 1-10 where 10 is the maximum score). According to the respondents the benefits also depend on the number of fishers in the community - the smaller the number, the bigger the benefit.

Table 4.17a Model for own benefit score.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	145.106(a)	10	14.511	8.107	.000
Intercept	2209.035	1	2209.035	1234.175	.000
Waterbody type	33.781	3	11.260	6.291	.001
PAPD	26.714	1	26.714	14.925	.000
Other uses of fishery	45.706	4	11.426	6.384	.000
PAPD * Type of waterbody	25.975	2	12.987	7.256	.002
Error	105.603	59	1.790		
Total	2459.744	70			
Corrected Total	250.709	69			

a R Squared = .579 (Adjusted R Squared = .507)

Table 4.17b Mean score for own benefits by whether PAPD held.

TYPE	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	6.758	.383	5.991	7.525
Non-PAPD	5.470(a)	.365	4.740	6.200

a Based on modified population marginal mean.

Table 4.17c Mean score for own benefits by type of waterbody by whether PAPD held.

Type of Waterbody	Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval		Number of cases
				Lower Bound	Upper Bound	
Open beel	PAPD	8.114	.587	6.940	9.288	10
	Non-PAPD	5.431	.467	4.497	6.365	24
Flood plain beel	PAPD	6.492	.525	5.443	7.542	12
	Non-PAPD	7.080	.645	5.790	8.370	6
River	PAPD	4.876	.543	3.789	5.963	10
	Non-PAPD	3.899	.614	2.671	5.128	6
River+Open beel	PAPD	7.551	.826	5.899	9.203	4
	Non-PAPD	.(a)	.	.	.	.

a This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

For own benefit score we find a significant interaction between the PAPD effect (variable "type") and waterbody type. However there was no evidence of a difference between responses given by the BMC group compared to those given by the fishers group (hence the variable "category" does not enter the final model).

PAPD appears to have a much stronger effect in the open beels than in other types of waterbody. In the open beels, beneficiaries have to share payment of lease value. In PAPD sites due to consensus among different stakeholder groups responsibilities of the entire community are more equal and they all try to protect and improve the fishery and benefit. In the non-PAPD open beels CBO membership is fisher-only, as the fishers are paying the lease they control the waterbody, so their benefit is significantly higher than the non-CBO members. However, in non-PAPD open beels responsibilities for fishery management also lie only with the fishers. Hence benefits are spread more equally among all beneficiaries in PAPD sites whereas in non-PAPD sites they are very much concentrated among fishers.

In the table of adjusted means (Table 4.17c), the interaction effect indicates that the PAPD effect is strongest in open beel sites, giving an average score which is 2.5 units higher than scores in non-PAPD sites. The corresponding difference in river sites is 1.2 units. However, in floodplain beels the average benefit score is in fact higher for non-PAPD sites compared to PAPD sites.

Floodplain beels are privately owned land with common access for fishing in the monsoon for everybody in the locality, and there is no significant difference in access between PAPD sites and non-PAPD sites. In floodplain beels landowners have ditches (*kuas*) which act as fish trapping devices where fish aggregate as water recedes after the wet season, so they individually benefit just as fishers do, landless people can also fish in these sites as there is general access in all floodplains. The general benefits are quite high in the floodplain sites and tend to benefit most people since access and interventions are similar with or without PAPD.

Similarly in the rivers, everyone has free access to the waterbody since no lease is paid. In PAPD sites the communities are managing the fishery and they reduced the number of brushpiles (*katas*) for which general fish catches increased in those river sites. Individually everyone is benefited in PAPD sites, but in non-PAPD sites influential people are establishing bigger brushpiles in good fishing grounds and the fisher-based RMCs have had less success in reducing this. Despite being organized by the NGOs, the poor fishers still have limited access to the rivers in those non-PAPD sites since they did not reach any consensus with other stakeholders, and so the benefit is lower for them. Hence the respondents in PAPD rivers see on average some more benefits than respondents in non-PAPD rivers.

4.5.2 Short term community benefits

Twenty two focus groups in PAPD sites and 20 groups in non-PAPD sites mentioned some short term community benefits (Table 4.18). Most of the groups did not see so far many short term benefits. The most commonly mentioned short term benefits were: Income Generating Activities (IGAs), social cohesion, increased fish supply in local market, increased aquatic resources, and fish at cheaper price. Some of the CBOs are fairly new and CBFM related activities have been underway for on average about a year, so they perceived very little community benefit so far.

Table 4.18 Percentage of respondents reporting different short term benefits from CBFM.

Types of short term benefits	PAPD		Non-PAPD		Maximum no. of responses per category
	BMC	Poor fisher	BMC	Poor fisher	
Fish conservation devices established	16.7	11.1	0.0	0.0	18
Use of harmful gears and complete dewatering of kuas restricted/cross dams removed	11.1	16.7	11.1	0.0	18
Aquatic resources increased	16.7	11.1	5.6	5.6	18
Fish species restored	5.6	0.0	0.0	0.0	18
Fish supply/varieties increased, price decreased	11.1	5.6	22.2	5.6	18
Protein intake increased	5.6	5.6	11.1	11.1	18
Income from fish catch increased	5.6	11.1	5.6	5.6	18
Awareness about fish conservation increased	11.1	11.1	11.1	0.0	18
Community participation enhanced	16.7	5.6	0.0	0.0	18
Unity	0.0	5.6	5.6	5.6	18
Social cohesion and understanding increased	11.1	16.7	5.6	5.6	18
Habit of compliance developed	0.0	16.7	0.0	5.6	18
Empowerment	5.6	0.0	0.0	0.0	18
Linkages between different organisation increased	5.6	11.1	11.1	5.6	18
Alternate Income Generating Activities and credit facilities	16.7	16.7	16.7	5.6	18
Knowledge increased	0.0	0.0	5.6	0.0	18
Education for the children increased	0.0	0.0	11.1	22.2	18
Training for the community	0.0	5.6	5.6	11.1	18

In terms of the number of short term benefits, there is no evidence that PAPD sites show differences from non-PAPD sites (Table 4.19a, p=0.537). On average respondent groups in both PAPD sites and non-PAPD sites reported about two types of short term benefit. The data also shows no evidence that MC members perceive more or different benefits from fishers. However, the number of short term benefits perceived differs between types of waterbodies (p=0.023). Floodplain beels reported about three short term benefits on average while open beel sites indicate two such benefits on average, and the river sites reported only 1.4 on average.

Table 4.19a. Model for number of short term community benefits.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	17.877(a)	3	5.959	3.294	.030
Intercept	192.581	1	192.581	106.471	.000
PAPD	.701	1	.701	.388	.537
Type of waterbody	15.120	2	7.560	4.180	.023
Error	70.542	39	1.809		
Total	281.000	43			
Corrected Total	88.419	42			

a R Squared = .202 (Adjusted R Squared = .141)

Table 4.19b Mean number of short term community benefits by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	2.188	.293	1.595	2.781
Non-PAPD	1.926	.300	1.319	2.532

Table 4.19c Mean number of short term community benefits by type of waterbody.

Type of waterbody	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Open beel	1.906	.328	1.241	2.570
Flood plain beel	2.890	.354	2.173	3.606
River	1.376	.406	.554	2.197

The second part of the analysis for a PAPD impact on short term community benefits is using the average score (on a 1-10 scale). The PAPD effect was again non-significant (Table 4.20a, p=0.111). The average scores for PAPD sites were about one unit more than for non-PAPD sites (Table 4.20b).

Table 4.20a Model for short term community benefit score.

Source	Type II Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	9.470(a)	1	9.470	2.646	.111
Intercept	1757.442	1	1757.442	491.127	.000
PAPD	9.470	1	9.470	2.646	.111
Error	146.714	41	3.578		
Total	1913.626	43			
Corrected Total	156.183	42			

a R Squared = .061 (Adjusted R Squared = .038)

Table 4.20b Mean short term community benefit score by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	6.852	.403	6.037	7.666
Non-PAPD	5.913	.413	5.079	6.746

4.5.3 Long term community benefits (future sustainability)

All the respondents, whether from PAPD sites or non-PAPD sites, foresee a number of long-term community benefits from CBFM (Table 4.21). The respondent groups could only predict long-term benefits, but this is the key indicator for their concern for collective sustainability and security. Their scores should indicate the level of long term benefit they expect and its importance to them, and as will be seen this indicated greater awareness of sustainability benefits from CBFM in the PAPD sites. However, at this relatively early stage of establishing CBFM it is quite reasonable that no strongly significant difference was found in the number of long term community benefits predicted between PAPD and non-PAPD sites.

Table 4.21 Long term benefits mentioned by the respondents (% of respondent groups).

Types of long-term benefits	PAPD		Non-PAPD		Maximum no. of responses
	BMC	Poor fisher	BMC	Poor fisher	
Community participation in decision making specially poor	55.6	38.9	0.0	0.0	18
Ownership and access ensured	0.0	5.6	22.2	33.3	18
Unity among different stakeholders increased	27.8	27.8	16.7	5.6	18
Confidence among fishers increased	55.6	16.7	11.1	11.1	18
Poor fishers empowered	27.8	27.8	11.1	5.6	18
Linkages to local government and other institutions established	55.6	22.2	11.1	5.6	18
Coordination and cooperation among adjacent WB increased	16.7	22.2	11.1	11.1	18
Knowledge increased	0.0	5.6	5.6	5.6	18
Institutions built	16.7	22.2	5.6	0.0	18
Community confidence on women leadership increased	11.1	0.0	5.6	0.0	18
Credit and training support improved livelihoods of the poor	27.8	16.7	5.6	5.6	18
Community involved in fishery management-sign of sustainability	16.7	5.6	0.0	0.0	18
Lease value decreased due to policy influence	5.6	33.3	16.7	22.2	18
Biodiversity increased	55.6	38.9	50.0	27.8	18
Fish sanctuary as dry season refuse established	33.3	50.0	11.1	33.3	18
Local fishery management rules established-people aware	16.7	0.0	0.0	0.0	18
Environment improved due to tree plantation	33.3	33.3	5.6	11.1	18
Fish habitat restored, rare fish rehabilitated	5.6	11.1	27.8	16.7	18
Fish for future generation	16.7	5.6	0.0	11.1	18
Fishers number limited	38.9	22.2	27.8	27.8	18
Fish population increased	5.6	5.6	5.6	0.0	18
Dewatering of kuas stopped	16.7	16.7	5.6	0.0	18
Use of all harmful gears reduced	11.1	0.0	11.1	16.7	18

For the variable representing the number of long term benefits, some evidence of a PAPD effect was found (Table 4.22a, p=0.040). On average, one more type of long term benefit was expected by the focus groups in PAPD sites compared to non-PAPD sites. Other factors contributing to variability in the number of long term benefits included type of waterbody (p=0.002), number of other uses of the fishery (p=0.008) and the number of fishers in the community fishing for an income (p=0.000).

Table 4.22a Model for number of long term community benefits.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	93.177(a)	9	10.353	6.115	.000
Intercept	152.348	1	152.348	89.979	.000
PAPD	7.457	1	7.457	4.404	.040
Type of waterbody	29.398	3	9.799	5.788	.002
Other uses	25.843	4	6.461	3.816	.008
Number fish for income	29.273	1	29.273	17.289	.000
Error	99.895	59	1.693		
Total	1063.000	69			
Corrected Total	193.072	68			

a R Squared = .483 (Adjusted R Squared = .404)

Table 4.22b Mean number of long term community benefits by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	3.979(a)	.366	3.246	4.711
Non-PAPD	3.211(a)	.410	2.391	4.031

a Covariates appearing in the model are evaluated at the following values: Number of fishers who fish for income = 261.58.

Table 4.22c Mean number of long term community benefits by type of waterbody.

Type of waterbody	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Open beel	3.301(a)	.437	2.426	4.177
Flood plain beel	3.939(a)	.472	2.995	4.884
River	1.994(a)	.397	1.199	2.789
River+ open beel	5.144(a)	.822	3.500	6.788

a Covariates appearing in the model are evaluated at the following values: Number of fishers who fish for income = 261.58.

Confounding factors are very important for perceiving long-term benefits. Different types of waterbodies have different features, for example open beels may be relatively less important for non-fish aquatic resources as these beels are under leasing and to pay lease and get increased benefit the fishers have to concentrate on fishing rather than other resources. In the floodplain beels there is no such pressure and community management is seen as conserving and restoring fisheries and the wetland in general, also the monsoon water in floodplain beels is less disturbed as they have growing rice in the fields and the wider communities are involved in the management. Floodplain beels have more diverse resource use such as aquatic plants and animals of economic value, and the range of long-term benefits may be more apparent, especially as the resources in some sites had been more degraded and CBFM offers the opportunity to re-excavate parts of silted up floodplain beels. Also, the number of fishers who fish for income provides an insight on the level of exploitation of fishery resources. In the floodplain beels there are very few people who depend on fishing as a main income. This pattern is repeated in the river plus open beel sites (where there are also floodplains and a diversity of habitats and different stakeholders are involved in management). But in the river sites few long-term benefits were predicted as there has been less change in access and participants fear that open access means in future the resource could be captured by powerful people.

With respect to the average importance (score) given by respondents for long term community benefits, a clear difference was found between PAPD sites and non-PAPD sites (Table 4.23a, p=0.000). There was also a strong interaction between the PAPD effect and type of waterbody. This necessitates the interpretation of the interaction means shown in Table 4.23d. These means show that the PAPD effect is strong in open beel sites with a difference in average score of about 3 units, but in floodplain beels and in river sites the differences are minute.

Table 4.23a Model for long term community benefit score.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	84.719(a)	6	14.120	7.726	.000
Intercept	3527.827	1	3527.827	1930.409	.000
Type of waterbody	4.746	3	1.582	.866	.464
PAPD	33.432	1	33.432	18.294	.000
PAPD * Type of waterbody	29.189	2	14.594	7.986	.001
Error	113.305	62	1.828		
Total	3725.851	69			
Corrected Total	198.024	68			

a R Squared = .428 (Adjusted R Squared = .372)

Table 4.23b Long term community benefit score by whether PAPD held.

type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
PAPD	8.107	.247	7.614	8.600
Non-PAPD	6.761(a)	.278	6.205	7.317

a Based on modified population marginal mean.

Table 4.23c Long term community benefit score by waterbody type

Type of waterbody	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Open beel	7.152	.260	6.633	7.671
Flood plain beel	7.281	.338	6.606	7.957
River	7.555	.349	6.857	8.253
River+ open beel	8.733(a)	.676	7.382	10.084

a Based on modified population marginal mean.

Table 4.23d Long term community benefit score by whether PAPD held and waterbody type.

Type of waterbody	Type	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Open beel	PAPD	8.657	.427	7.802	9.511
	Non-PAPD	5.647	.295	5.057	6.237
Flood plain beel	PAPD	7.553	.390	6.773	8.333
	Non-PAPD	7.010	.552	5.907	8.113
River	PAPD	7.485	.427	6.630	8.340
	Non-PAPD	7.625	.552	6.522	8.728
River+open beel	PAPD	8.733	.676	7.382	10.084
	Non-PAPD	.(a)	.	.	.

a This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

In floodplain beels benefits go to all community members equally and in open access rivers benefits are limited but on average widespread among the community. In non-PAPD open beel sites, benefits only go to the fishers rather than to the entire community, and the whole community has only a vague expectation of long-term benefits. But the PAPDs in similar open beel sites involved the wider community and this was expected to give greater assurance of improved management continuing in future and a broader spread of benefits. The other key factor is the leasing system: the only waterbody type that is leased by the users in this study is the open beels. Open beels have a risk that in future powerful people may once again take them on lease and exclude poor fishers, but in the PAPD sites there was a consensus on new management among the wider community (including with local leaders and elected representatives) so this could mean that the participants in PAPD open beels see less risk of losing their access and benefits in the long term.

4.6 Faster Uptake of Collective Action

Collective action refers both to the process by which voluntary/community institutions are created and maintained and to the groups that decide to act together. Experience has shown that institutions of collective action and property rights play an important role in how people use natural resources, which in turn shapes the outcomes of production systems. The design of PAPD was expected to result in improvements in collective action compared with other less holistic, inclusive and structured ways of initiating CBFM.

The sixth hypothesis, “PAPD results in faster uptake of community actions for natural resources management”, was tested using monitoring information of CBFM-2 collected from NGOs and cross checked with the Management Committees. If this hypothesis was correct it might be confirmed by two indicators or sub-hypotheses: the number of days between first recruitment of field staff to a site and the action taken by the management committee was less for PAPD sites than non-PAPD sites; and/or the number of days between CBO formation and collective fishery management actions is less for PAPD than for non-PAPD sites.

There was strong evidence in support of the hypothesis that PAPD results in faster resource management action since the time of staff recruitment (Table 4.24a, p=0.000). Collective resource management action started approximately 170 days sooner, i.e. over five months sooner after NGO staff field posting in PAPD than non-PAPD sites (Table 4.24b).

Table 4.24a Model for days from staff recruitment to first collective action.

Source	Type II Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	254713.766(a)	1	254713.766	23.156	.000
Intercept	5302611.903	1	5302611.903	482.061	.000
PAPD	254713.766	1	254713.766	23.156	.000
Error	351996.359	32	10999.886		
Total	5909322.028	34			
Corrected Total	606710.125	33			

a R Squared = .420 (Adjusted R Squared = .402)

Table 4.24b Days from staff recruitment to first collective action by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	481.471	25.437	429.657	533.285
PAPD	308.363	25.437	256.549	360.177

In the CBFM-2 sites, whether PAPD or non-PAPD site, no activity started before the NGOs fielded their staff. After staff recruitment NGO activities such as census, PAPD and group formation started. Type of waterbody was predicted to be the relevant confounding variable, but this factor turned out not to be significant. The nature of the community and how they agreed to implement their planned actions appears to be more important than waterbody type.

However, the PAPD effect was found to vary significantly (Table 4.25a, p=0.008) across the type of waterbody for the number of days between the time of CBO formation and the date of first management action. Table 4.25b shows that this difference is largely because in non-PAPD sites there was a very long gap before taking the first action in river areas, and a fairly long gap in open beel areas, compared with PAPD sites. There appears to be no effect due to PAPD in floodplain beels.

Table 4.25a Model for number of days from CBO formation to first collective action.

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	119984.485(a)	6	19997.414	5.396	.001
Intercept	241353.465	1	241353.465	65.124	.000
PAPD	35838.203	1	35838.203	9.670	.005
Type of waterbody	22517.153	3	7505.718	2.025	.137
PAPD * Type of waterbody	44635.364	2	22317.682	6.022	.008
Error	88944.805	24	3706.034		
Total	705808.970	31			
Corrected Total	208929.290	30			

a R Squared = .574 (Adjusted R Squared = .468)

Table 4.25b Number of days from CBO formation to first collective action by whether PAPD held and waterbody type.

Type of waterbody	Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval		Number of sites
				Lower Bound	Upper Bound	
Open beel	Non-PAPD	159.917	17.574	123.646	196.187	12
	PAPD	131.667	35.147	59.126	204.207	5
Flood plain beel	Non-PAPD	81.333	35.147	8.793	153.874	3
	PAPD	86.683	24.853	35.389	137.977	6
River	Non-PAPD	252.333	35.147	179.793	324.874	3
	PAPD	24.800	43.047	-64.044	113.644	5
River+open beel	Non-PAPD	.(a)	.	.	.	
	PAPD	20.000	43.047	-68.844	108.844	2

a This level combination of factors is not observed, thus the corresponding population marginal mean is not estimable.

Management actions in some sites were implemented very quickly (less than 3 months after CBO formation in floodplains). In some PAPD sites, the community influence and awareness generated from the PAPD was so strong that the actions even started from the last day of the PAPD. For example, in Shuluar Beel, the CBO was formed during the last plenary session of the PAPD proper and the first activity they took up was restriction of use of harmful gears. The action was jointly planned with Department of Fisheries and they implemented this action within a few days of the PAPD. The traditional fishers were using nylon monofilament gill nets to catch fish. However, according to the community it is the most destructive gear and use of this gear needed to be stopped immediately. Although the fishers were worried about their income they welcomed this decision as most of them knew the effect of this gear. In this case the management committee found out alternate work for those fishers and they were happy. In general floodplain beels are private property but during the monsoon the area under water is a common property and anyone can fish in the submerged areas so long as they fish without doing any harm to the broadcast rice. Therefore, everyone was interested to improve management early once a committee representing all stakeholders was formed, even when there was no PAPD.

In the case of rivers there was a very large PAPD-effect on time taken between CBO formation and first management action. Before CBFM, most of the fishers had limited access in rivers because of many brushpiles and cross dams/barriers made by better off people, moreover there is intense fishing effort in rivers since they became open access in 1995. In this case, PAPD resulted in a general consensus on the problems amongst all local stakeholders including support of local influential people to end harmful fishing, and the formation of CBOs that included these different stakeholders. Therefore, they started to remove cross dams and later they imposed ban on harmful gear use and restriction of brushpiles. In the non-PAPD river sites CBOs were formed with fishers only based on small groups developed by the NGOs. CBO action was late as fishers were not been able to establish their rights and government support to recognise their rights and demarcation of the river sections was late. It took a long time to come to consensus over plans and how those could be implemented because the genuine fishers had (and still have at the beginning of 2004) limited access to the good fishing grounds and they are the poorest and socially weakest members of the community. Therefore, without PAPD a long process of awareness building among the community members was needed after the fisher based CBOs were formed.

4.7 Number of Collective Actions

Hypothesis seven: “PAPD results in more community/collective actions for natural resources management” was tested using data on two indicators: number of actions planned and not done, and data on number of actions implemented, both derived from the quarterly

monitoring format. Each site has its own unique combination of features, and the nature of the CBO and its members' interests are also location specific. Therefore, the plans for fishery management were also different for each site. The monitoring format allowed all possible actions to be listed and progress reported against the CBO's plans each quarter. The typical actions that can be found in the plans are shown in Table 4.26.

Table 4.26 Possible resource management and related components of local CBFM plans.

Sl no.	Possible components	Sl no.	Possible components
1	Closed season	11	Cage culture
2	Gear restriction	12	Re-establish rare fish
3	Fish aggregating device (kata/kua) restriction	13	Land purchase by committee
4	Fish sanctuary	14	Tree planting
5	Excavate link canal	15	Integrated pest management
6	Excavate dry season sanctuary	16	Irrigation restriction
7	Bund	17	Marketing
8	Nursery pond	18	Fish processing
9	Stocking open area	19	Community centre
10	Pen culture	20	Registration of committee

The hypothesis was tested considering two sub-hypotheses: that there would be fewer actions planned but not done in PAPD sites, and that there would be more actions implemented so far in PAPD sites.

First, the number of actions planned but not done was modelled, allowing for the PAPD effect and confounding factors: type of waterbody, total number of conflicts, number of other development activities in the area, and other uses of the waterbody. Except for waterbody type, all other confounders were significant. There was a significant effect due to PAPD (Table 4.27a, p=0.000). This indicates that the mean number of actions planned and not done was on average two more for non-PAPD sites compared to PAPD sites (Table 4.27b).

Table 4.27a Model for number of actions planned and not done.

Source	Type II Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	69.16 (a)	4	17.29	17.04	0.000
Intercept	158.20	1	158.20	155.92	0.000
PAPD	24.43	1	24.43	24.07	0.000
Total number of conflicts	11.52	1	11.52	11.35	0.002
Other development activities	3.90	1	3.90	3.85	0.059
Other uses	8.60	1	8.60	8.48	0.007
Error	31.45	31	1.01		
Total	258.82	36			
Corrected Total	100.61	35			

a R Squared = .687 (Adjusted R Squared = .647)

Table 4.27b Mean number of actions planned and not done by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	3.20 [a]	0.28	2.63	3.77
PAPD	0.99 [a]	0.28	0.42	1.57

[a]. Covariates appearing in the model are evaluated at the following values: Total number of conflicts = 4.43, Number of other uses of fishery = .90, Number of other development activities in area = .44.

Second, the number of actions implemented by the end of December 2003 was modelled. The same set of potential confounders were considered, but here none were found to be significant. On average three more actions (more than double) were undertaken within this period at PAPD sites compared to non-PAPD sites (Table 4.28a, p=0.000). Non-PAPD sites

averaged less than two resource management actions implemented during approximately two years on average of field CBFM activities.

Table 4.28a Model for number of actions planned and done.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	77.93 (a)	1	77.93	62.40	0.000
Intercept	367.15	1	367.15	293.96	0.000
PAPD	77.93	1	77.93	62.40	0.000
Error	42.46	34	1.25		
Total	487.54	36			
Corrected Total	120.39	35			

a R Squared = .647 (Adjusted R Squared = .637)

Table 4.28b Mean number of actions planned and done by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	1.72	0.26	1.19	2.26
PAPD	4.66	0.26	4.13	5.20

Hence overall the management committees in the PAPD and non-PAPD sites planned a similar number (over five) management actions, but the communities in the PAPD sites were able to implement more of their planned actions. This is not so surprising, the PAPD process generates plans with activities in them, whereas non-PAPD sites lacked such a clear plan development and so identification of planned activities was not systematic or so widely supported. Also conflicts and other users and development activities were significant factors which result in more planned actions not being undertaken.

4.8 Compliance

In each waterbody the management committee set some fishery rules in order to maintain a healthy fishery. In PAPD sites those rules were discussed elaborately and the different participant stakeholders agreed on some rules that seemed to be effective for fisheries management. However, the negative impacts of each rule were also discussed and based on a mitigation agreement they established the rules. In the non-PAPD sites, however, decisions on rules were taken by the fishers, NGO workers and DoF staff, a wider community consensus on rules was not considered.

Therefore, hypothesis eight was that “PAPD results in community actions with greater compliance”. To assess this hypothesis four indicators were used: number of rules in place in the last year, number of rule breaking incidents in the last year, percentage of the community who know the rules, and number of conflicts in the last year.

4.8.1 Number of rules in place

Compliance with a management plan and fishing rules depends on a set of rules being in place. In general a few simple rules are more likely to be complied with than many complex rules. Therefore it was first tested if there was a difference in the number of rules between PAPD and non-PAPD sites. Very few sites have no fishing rules in place (Table 4.29), but most have one or two main rules (for example a closed season or a ban on a particular gear type(s)). There were no significant differences in the number of rules in place between PAPD and non-PAPD sites or by type of waterbody (Table 4.30). Therefore, number of rules should not affect any differences in compliance.

Table 4.29 Number of fishing rules in force last year.

Number of rules	Non-PAPD		PAPD	
	Number of sites	%	Number of sites	%
No rules in place	3	16.7%	2	11.1%
1 or 2 rules in place	12	66.7%	13	72.2%
More than 2 rules	3	16.7%	3	16.7%

Table 4.30 Number of fishing rules in force last year by whether a PAPD was held and waterbody type.

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Non-PAPD	18	1.94	1.47	0.35	1.21	2.68
PAPD	18	1.77	0.81	0.19	1.36	2.17
Open beel	17	2.09	1.37	0.33	1.38	2.79
Flood plain beel	9	1.90	1.17	0.39	0.99	2.80
River	8	1.53	0.74	0.26	0.91	2.15
River+open beel	2	1.00	0.47	0.33	-3.24	5.24
Total	36	1.86	1.18	0.20	1.46	2.25

4.8.2 Number of rule breaking incidences

During the institutional survey, the BMC/RMC members were asked to provide information on the number of rule breaking incidences by participants, in case of PAPD sites it was the community members who participated in the PAPD and in case of non-PAPD sites it was the community members other than fishers who did not participate in the process of planning.

There was strong evidence in support of the hypothesis that PAPD results in greater compliance (Table 4.31a, p=0.000). The mean number of rule breaking incidences as shown in Table 4.31b demonstrates that the number of incidents in PAPD sites was almost 6 times less than in non-PAPD sites. There are significant differences between categories of waterbodies (p=0.006), and an interaction between PAPD and waterbody effects.

Table 4.31a Model for total rule breaking incidences in last year.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	517.92 (a)	7	73.99	11.88	0.000
Intercept	321.60	1	321.60	51.65	0.000
PAPD	120.37	1	120.37	19.33	0.000
Type of waterbody	94.02	3	31.34	5.03	0.006
Waterbody area	35.61	1	35.61	5.72	0.024
PAPD * Type of waterbody	68.48	2	34.24	5.50	0.010
Error	174.33	28	6.23		
Total	1013.86	36			
Corrected Total	692.25	35			

a R Squared = .748 (Adjusted R Squared = .685)

Table 4.31b Total rule breaking incidences in last year by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower bound	Upper bound
Non-PAPD	5.53	0.75	-4.00	7.06
PAPD	0.96	0.66	-0.38	2.31

Table 4.31c Total rule breaking incidences in last year by waterbody type.

Type of waterbody	Mean	Std. Error	95% Confidence Interval	
			Lower bound	Upper bound
Open beel	3.02	0.67	1.65	4.40
Flood plain beel	0.23	0.89	-1.58	2.05
River	6.13	0.95	4.19	8.07
River+open beel	1.66	1.80	-2.02	5.35

Table 4.31d Total rule breaking incidences in last year by whether PAPD held by waterbody type

Whether PAPD site or not	Type of waterbody	Mean	Std. Error	95% Confidence Interval	
				Lower bound	Upper bound
Non-PAPD	Open beel	4.84	0.72	3.35	6.32
	Flood plain beel	0.44	1.45	-2.54	3.41
	River	11.31	1.67	7.88	14.73
PAPD	Open beel	1.21	1.13	-1.10	3.51
	Flood plain beel	0.03	1.07	-2.16	2.22
	River	0.95	1.17	-1.44	3.34
	River+open beel	1.66	1.80	-2.02	5.35

Although the PAPD sites had on average more rules in place, there were fewer rule breaking incidents. It may be mentioned here that the definition of beneficiaries varies in PAPD sites they include different stakeholder groups represented in PAPD but only fishers in non-PAPD sites (except floodplain beels). This explains the tendency of others to break rules due non-compliance to the rules developed by only a certain group in non-PAPD open beels and rivers. In case of differences in rule breaking incidences in different types of waterbodies, very few cases were reported in floodplain beels where there was a broader participation even in non-PAPD sites, whereas the highest incidences were recorded in non-PAPD river sites. Open access to rivers made rule implementation difficult and these sites had more conflicts.

4.8.3 Knowledge of fishing rules

The percentages of group members who reportedly know the fishing rules in their site does not differ between PAPD and non-PAPD sites (Table 4.32). Modelling for PAPD effect, and allowing for number of other development activities in the area, other uses of the waterbody and percentages of fishers in the CBO also showed that none of the confounders were significant. There was no effect due to PAPD on the participant's knowledge ($p>0.05$). Awareness campaign within the project sites in general was high and information on the rules was quickly spread to people whether it is a PAPD site or not.

Table 4.32 Mean percent of group members who know the rules by whether PAPD held.

Whether PAPD site or not	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean	
					Lower Bound	Upper Bound
Non-PAPD	18	86.61	16.10	3.79	78.61	94.62
PAPD	18	83.66	23.65	5.57	71.90	95.42
Total	36	85.14	19.99	3.33	78.37	91.90

4.8.4 Conflicts

Lastly to test the hypothesis about compliance, any PAPD effect on the number of conflicts was tested through two indicators: total conflict incidents and internal conflicts (among people within the community related to fishery management). The main confounding factors such as waterbody type and size, number of different uses of the waterbody and number of development works within the waterbody area were also included in modelling.

a) Total conflicts

The model showed a significant difference (Table 4.33, p<0.01) between PAPD and non-PAPD for total number of conflicts, confounders were not included. Although PAPD itself does not resolve conflict, the study shows that it reduces the incidence of conflict due to consensus on issues of common interest. However, it is difficult to stop external conflict if outsiders were habituated to make certain uses of an area that are no longer allowed by the local community.

Table 4.33a Model for total conflicts in last year.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	531.69 (a)	1	531.69	7.88	0.008
Intercept	708.00	1	708.00	10.50	0.003
PAPD	531.69	1	531.69	7.88	0.008
Error	2293.28	34	67.45		
Total	3532.97	36			
Corrected Total	2824.97	35			

a R Squared = .188 (Adjusted R Squared = .164)

Table 4.33b Mean number of all conflicts in last year by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	8.28	2.73	2.51	14.04
PAPD	0.59	0.18	0.22	0.97

b) Internal conflicts

PAPD was not designed as a conflict resolution method. In all CBFM sites it was expected that participants would have agreement on their management activities, institutions and organizations, and that they could reduce internal conflict which is under the control of the project participants. However, there is evidence that PAPD can reduce internal conflict (Table 4.34, p=0.000). The PAPD increased confidence among the committee and they can negotiate or bargain with the others within or outside the local community. In some of the closely linked adjacent waterbodies there are cluster committees which take care of any problem within the cluster area (and more PAPD than non-PAPD sites are in such cluster locations). Moreover, PAPD has raised social cohesion (Section 4.4). In most of the cases the internal conflict is not so severe and it was resolved with help of the local government representative. But once again the improved linkages of the Management Committees with the local government achieved through the PAPD process have facilitated better conflict resolution in PAPD sites.

Table 4.34a Model for number of internal conflicts in last year.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	71.121(a)	1	71.121	17.570	.000
Intercept	91.521	1	91.521	22.609	.000
PAPD	71.121	1	71.121	17.570	.000
Error	137.629	34	4.048		
Total	300.271	36			
Corrected Total	208.750	35			

a R Squared = .341 (Adjusted R Squared = .321)

Table 4.34b Number of internal conflicts in last year by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Non-PAPD	3.00	.47	2.04	3.96
PAPD	.19	.47	-.78	1.15

4.9 Livelihood Outcomes of PAPD

4.9.1 Number of stakeholder categories benefited

Hypothesis nine was that the benefits from CBFM should be more widespread in terms of types of stakeholder in sites with PAPD because of its holistic nature. During the participatory assessment two types of respondent group - BMC members and poor fishers - listed the beneficiaries who directly or indirectly received benefits from the fishery management and project related activities. A number of different categories of beneficiaries reportedly received benefits from the project activities. Most of the respondents mentioned fishers as the most benefited group. For other groups the benefits vary between PAPD and non-PAPD sites. In case of PAPD sites both BMC and poor fishers mentioned that farmers, poor households, rich people and fish traders were benefited groups. Farmers benefit from more fish from their own land and restoration of water for fisheries which provides more moisture for the crops. Rich households can buy more fish at a cheaper rate from the locality and also can get different varieties of fish when scarce species are restored. Poor households can fish for food and to sell during the slack period for work. Fish traders get fish locally at a cheaper rate, and they can still sell locally, which minimizes their carrying cost. In PAPD sites, one third of the BMC respondents mentioned women as beneficiaries because in most PAPD sites women are included in the BMCs. It is evident from Table 4.35 that although the same types of beneficiary stakeholders were recognized in some non-PAPD sites, in more PAPD sites different stakeholders were perceived as receiving benefits.

Table 4.35 Number of participatory assessment groups that mentioned different stakeholders as beneficiaries of CBFM.

Type of stakeholder	PAPD		Non-PAPD	
	No.	%	No.	%
Fishers	36	100	36	100
Farmers	30	83	11	31
Poor households	32	89	21	58
Rich households	28	78	15	42
Kua owners	15	42	16	44
Leaseholders	1	3	3	8
Fish traders	27	75	14	39
Labourers	14	39	5	14
Net owners	3	8	5	14
Fry traders	1	3	7	19
Other aquatic resource users	12	33	3	8
NGOs	10	28	5	14
Women	8	22	1	3

There is a strong evidence that PAPD results in community actions where there is a wider coverage of perceived benefits across the communities ($p<0.01$). The number of stakeholder groups perceived to have benefited was more in the PAPD sites than in the non-PAPD sites (Table 4.36). However, there is no difference in extent of cumulative benefits from PAPD for all types of beneficiaries except fishers who were targeted by the project.

Table 4.36a Model for number of beneficiary stakeholder types per waterbody.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	72.25 (a)	1	72.25	11.88	0.002
Intercept	1284.03	1	1284.03	211.19	0.000
PAPD	72.25	1	72.25	11.88	0.002
Error	206.72	34	6.08		
Total	1563.00	36			
Corrected Total	278.97	35			

a R Squared = .259 (Adjusted R Squared = .237)

Table 4.36b Mean number of beneficiary stakeholder types by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
PAPD	7.39	0.58
Non-PAPD	4.56	0.58

4.9.2 Extent of benefits across stakeholder categories

The extent of benefit for different stakeholder groups was different. The groups of respondents were asked to score the extent of benefit for each stakeholder category that they said had benefited on a scale of 1 to 10. For the next model these scores were averaged across the stakeholder categories reported in each participatory assessment, and then averaged across the management committee members and poor fishers from each site. This gave a measure of the overall extent of benefits reported for the site. The respondents perceived a significant difference in the overall level of benefits across benefited stakeholder categories according to whether a PAPD was held ($p<0.01$, Table 4.37). In PAPD sites the score for extent of benefits was higher than in the Non-PAPD sites.

Table 4.37a Model for extent of benefits from PAPD (Average score of benefits across stakeholder categories).

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	12.12 (a)	1	12.12	8.00	0.008
Intercept	896.64	1	896.64	592.12	0.000
PAPD	12.12	1	12.12	8.00	0.008
Error	51.49	34	1.51		
Total	960.25	36			
Corrected Total	63.61	35			

a R Squared = .191 (Adjusted R Squared = .167)

Table 4.37b Mean score for extent of benefits by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
PAPD	5.57	0.29
Non-PAPD	4.41	0.29

4.9.3 Extent of benefits for fishers

The same perceived benefit scorings were also analysed just for the fishers (who were reported to benefit in all sites). It was reported that benefits for the fishers were higher in PAPD sites ($p<0.05$, Table 4.38). Although PAPD has an effect on broadening CBO composition, it seems that still fishers benefits were scored higher in PAPD sites.

Table 4.38a Model for score for extent of benefits from PAPD for fishers.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	15.90 (a)	1	15.90	5.86	0.021
Intercept	957.44	1	957.44	353.00	0.000
PAPD	15.90	1	15.90	5.86	0.021
Error	92.22	34	2.71		
Total	1065.56	36			
Corrected Total	108.1143	35			

a R Squared = .147 (Adjusted R Squared = .122)

Table 4.38b Mean score for extent of benefits for fishers by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
PAPD	5.82	0.39
Non-PAPD	4.49	0.39

4.10 Effect of PAPD on Linkages with Local Government

4.10.1 Types and number of government support incidents

Co-management was expected to provide greater benefits to the community from the fishery and PAPD was supposed to create and enhance that opportunity. In the PAPD process all concerned secondary stakeholders, such as government and non-government organisations in the area were involved and they became aware of the problems, solutions and the action plans and implementation plans that the stakeholders proposed. The linkages between the community members and these secondary stakeholders were supposed to be strengthened through PAPD, and for plan implementation responsibilities of each stakeholder category present in the PAPD were agreed during the PAPD.

The respondent groups reported better relations with different government officials specially Department of Fisheries (Table 4.39). The government is a stakeholder of the project and their involvement was direct. Local government is associated with all the activities and in some committees local government representatives are formally involved as advisors. In the smaller leased waterbodies the upazila administration is involved since it administers leasing. There is no significant difference between PAPD and non-PAPD sites for the extent of overall linkages. Local government representatives (union parishad – local councils) were more involved in PAPD sites as they have made commitments in the PAPDs and accordingly they try to attend meetings and to resolve minor misunderstandings within the fishery management team.

Table 4.39 Number of respondent groups (sites) that reported support from different government departments.

Government agency	PAPD		Non-PAPD	
	Frequency	Percent	Frequency	Percent
DoF	17	94.44	18	100
DAE	1	5.56		
Upazila administration	7	38.89	8	44.44
Union Parishad	14	77.78	6	33.33
Police/Magistrate	8	44.44	5	27.78
Local MP	2	11.11	1	5.56
Other	2	11.11		

The respondent groups were asked to score on a scale of 1 to 10 the extent of support received from different government departments. Although all groups mentioned linkages with the local government and upazila officials, the extent of support from them was scored higher by the groups in PAPD sites than by the groups in the non PAPD sites. The differences were not great and as very few groups scored all the departments, statistical

analysis for significance was not possible. In some non-PAPD waterbodies the local influentials who are involved in CBOs have linkages with the local public representatives (Members of Parliament). However, the support was not evident but desired by the general people.

Table 4.40 Mean scores for support to CBO from government.

Government agency	PAPD	Non-PAPD
DoF	7.24	4.5
DAE	5.00	
Upazila administration	6.43	4
Union Parishad	7.71	5
Police/Magistrate	4.13	4.4
Local MP	5.00	8
Other	3.50	

Although the score for support was not significantly different according to whether it was a PAPD site, there is strong evidence that PAPD has enhanced the frequency of support received by the CBOs from government agencies ($p<0.01$, Table 4.41). This support was provided mainly in terms of technical or advisory services including conflict resolution, with very few cases of physical works (Table 4.42).

Table 4.41a Model for number of times received government agency support.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	80.60 (a)	1	80.60	6.17	0.019
Intercept	1169.35	1	1169.35	89.58	0.000
PAPD	80.60	1	80.60	6.17	0.019
Error	391.62	30	13.05		
Total	1685.00	32			
Corrected Total	472.22	31			

a R Squared = .171 (Adjusted R Squared = .143)

Table 4.41b Mean number of times community received support by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
PAPD	7.65	0.88
Non-PAPD	4.47	0.93

Table 4.42 Group responses on types of support received (number of respondent groups reporting).

Type of support	PAPD	Non-PAPD
Administration/training/project activities	33	22
Technical assistance for fisheries management	29	15
Lease	2	
Problem/conflict resolution	22	11
Process papers for registration	2	
Canal digging	1	
Improved crop variety selection	1	
Protection of fisheries/project implementation	8	9
Technical support for awareness raising	4	8
Implementation of local rules	12	
Financial help	2	
Legal support	6	13
Physical infrastructure building	2	2
Groups/BMC/RMC organisation and coordination	6	17

4.10.2: Attitude of the UP and Upazila officials towards the community based approach

The attitude of the local government representatives and officials - whether Union Parishad (council) members or Upazila officials - to CBFM has changed since the inception of the project. Both types of government officials thought the approach is a new one and the acceptance as well as sustainability was a question to all. Initially they had doubts about community involvement, rule setting and conflicts of interest. Even at the start they thought negatively about the future benefits. Some of them told the beneficiaries that the waterbody may be transferred to the NGO or the project, and that the poor and fishers would have no access to the waterbodies. However, later their attitudes changed to a great extent. The focus groups were asked to score the attitudes of these officials to the project activities (CBFM) on a scale of -3 to +3, and Table 4.43 shows the reported change in attitudes seen by the participants. This scoring supports the qualitative information and gives evidence of the change in local government representatives' attitudes towards the project and project impacts. The change in scores between the start of the project and now was calculated and used to test for a PAPD effect. Their attitudinal change differed significantly between PAPD and non-PAPD sites both for elected Union Parishad members and for Upazila officials posted in the area using scores from both of the types of group respondent (p=000, Tables 4.44 and 4.45).

Table 4.43 Mean scores for attitudes of the local government officials towards CBFM.

Time	Type of official	PAPD	Non-PAPD
Now (early 2004)	Union Parishad	3	1
	Upazilla officials	3	2
At start of project	Union Parishad	-1	0
	Upazilla officials	0	0

Table 4.44a Model for changes in attitude of the Union Parishad officials towards CBFM.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	36.66 (a)	1	36.66	44.20	0.000
Intercept	141.66	1	141.66	170.80	0.000
PAPD	36.66	1	36.66	44.20	0.000
Error	38.15	46	0.83		
Total	279.00	48			
Corrected Total	74.81	47			

R Squared = .490 (Adjusted R Squared = .479)

Table 4.44b Mean change in score for attitude of the Union Parishad officials towards CBFM by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
PAPD	2.71	0.16
Non-PAPD	0.88	0.22

Table 4.45a Model for changes in attitude of the Upazila officials towards CBFM.

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	21.12 (a)	1	21.12	21.52	0.00
Intercept	286.91	1	286.91	292.31	0.00
PAPD	21.12	1	21.12	21.52	0.00
Error	54.97	56	0.98		
Total	363.00	58			
Corrected Total	76.09	57			

a R Squared = .278 (Adjusted R Squared = .265)

Table 4.45b Mean change in score for attitude of the Upazila officials towards CBFM by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
PAPD	2.83	0.18
Non-PAPD	1.62	0.18

4.10.3 Links with local government organisations and others

Linkages in terms of meetings at local or Upazila levels were not significantly different for PAPD or non-PAPD sites. Some of the meetings were routine meetings as a requirement of the project memorandum, some were for specific incidents and events, and some were for conflict resolution. In the case of rivers the number of meetings was high for PAPD sites, but for non-PAPD sites there was no linkage with the government organisations. As rivers are open access waterbodies, the government officials care less for those waterbodies and in non-PAPD sites their interaction with the CBOs is non-existent (Table 4.46). In PAPD sites, however, groups mentioned that they met government officials for local fishery rule implementation. For example, to remove cross dams and to reduce brushpiles in the river, the River Management Committee sought help from the local upazila administration even from their Member of Parliament. According to the groups in non-PAPD sites more meetings were held to get help from local government to address problems (Table 4.47). The reason is mostly for conflict resolution and court cases. For example, in one of the non-PAPD sites there were as many as 20 meetings since the inception of the project (between September 2001 and December 2003). Thus this did not appear from the qualitative information to be an appropriate indicator, since linkages had such diverse reasons.

Table 4.46 Mean number of meetings with local government by type of waterbody and whether PAPD held.

Whether PAPD site or not	Type of waterbody	Meetings
PAPD	Open Beel	2.83
	Floodplain Beel	3.50
	River	5.67
	River+Open beel/Small beel	2.00
Non-PAPD	Open Beel	3.00
	Floodplain Beel	11.6

In Non-PAPD river sites no groups reported meetings with local government.

Table 4.47 Mean number of times meetings with local government were held by whether PAPD held.

	Mean	Std. Deviation	N
PAPD	3.65	2.346	20
Non-PAPD	6.91	7.503	11
Total	4.81	4.976	31

4.11 Transaction Costs

Hypothesis eleven: “PAPD actions require greater time input from participant communities” differs from all the other hypotheses as it indicates a possible disadvantage of PAPD – active participation of all stakeholders and better planning could be at the cost of stakeholders spending more time on this at the cost of their short term livelihoods, which could be important for poor fishers dependent each day’s fishing for their survival. Moreover, literature on co-management also predicts that in the long term overall transaction costs may fall when compliance levels are high and management systems become norms, but in the process of establishing CBFM more time may be spent by participants.

A short supplementary survey recorded by various categories of tasks the time spent by representatives of the respondent groups in the last year for CBFM. This was modelled considering PAPD effect and whether the participants were management committee members or general fishers, with the number of CBO members and waterbody type as confounders (which were not significant).

The evidence rejects the hypothesis that PAPD requires participants to spend more time on CBFM, instead the model shows that people in PAPD sites spent less time for community action in the last year while management committee members spent more time than poor fishers (Table 4.48a). That management committee members spend more time on CBFM was expected, and they average more than double the time (equivalent to about 40 working days, although much of this includes time spread through the year for example observing that rules are not broken (such as sanctuaries and gear restrictions) which can be done while they are fishing, other time is taken up by meetings. The reduced time spent on CBFM in PAPD sites suggests that already after about two years those management actions that are in place are being observed voluntarily because of the general consensus, the other factor is that poor fishers do not have the same involvement in NGO groups in these sites that they do in the non-PAPD sites, and these groups take up time in addition to that related with resource management. Also conflicts and lack of consensus in the non-PAPD sites means that more time is taken up in resolving these including related to legal cases in some of the sites.

Table 4.48a Model for number of hours per person in last year involved in CBFM activities.

Source	Type II Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1587610 (a)	2	793805.2	7.206	0.002
Intercept	5315119	1	5315119	48.247	0.000
PAPD	670563	1	670563	6.087	0.017
Respondent type	879369	1	879369	7.982	0.006
Error	6389540	58	110164		
Total	13292269	61			
Corrected Total	7977150	60			

a R Squared = .199 (Adjusted R Squared = .171)

Table 4.48b Number of hours per person in last year involved in CBFM activities by whether PAPD held.

Whether PAPD site or not	Mean	Std. Error
Non-PAPD	391.49	56.12
PAPD	179.41	65.18

Table 4.48c Number of hours per person in last year involved in CBFM activities by respondent type.

Respondent type	Mean	Std. Error
BMC/RMC	405.70	62.08
other participants	165.21	58.92

These figures for investment of time in a year should also be compared with the time spent on participatory planning meetings and workshops, including the PAPDs. From the same survey on average people in PAPD sites spent 24 hours in such meetings (32 for BMC/RMC members and 16 for other participants), whereas the average was just under 4 hours in total for people in non-PAPD sites (about 5 hours for BMC/RMC members and under 3 hours for other participants). While there was a much larger investment in time on the planning process in PAPD sites (and committee members were more likely to have been involved in the PAPD and therefore spent the equivalent of about four working days in the meetings, this

is only a fraction of the time spent on CBFM activities in subsequent years. The total time spent even allowing for the PAPD was therefore much less in the PAPD sites.

4.12 Overview and Assessment of Findings

Overall there is evidence to accept nine hypotheses. It was not clear if PAPD results in more active CBOs although PAPD sites appeared to have more non-routine activities. PAPD was not associated with perceiving more short term benefits, and this is consistent with it changing attitudes towards longer term community benefits and sustainability. Hence the evidence shows there are advantages to using PAPD when initiating community based resource management, compared with NGO approaches that lack a structured inclusive participatory planning process. It also produces evidence that in the PAPD sites poor were well represented in the executive committees and they took part in community decision making. Community decisions were implemented in shorter time in PAPD sites whereas in non-PAPD sites, decisions were influenced by the NGOs and the government representatives.

PAPD resulted in higher social cohesion. This is a great achievement towards sustainability. Although PAPD was not designed for conflict resolution, it was evident in this study that this unintended result as well as conflict minimisation has been achieved, especially for internal conflict resolution. Conflicts in the non-PAPD sites have resulted in higher interaction with the government. This was the reverse evidence from the expected better linkages and more interaction with government in PAPD sites. It was evident from this study that the communities in PAPD sites seek less support from the government but when they did get support it was more effective.

Although surprising, it is not illogical that transaction cost for CBO activities for fishery development in PAPD sites was less than non-PAPD sites. PAPD did not result in a need for more time spent on CBFM activities, so the rejection of that hypothesis is an additional point in favour of PAPD since this was hypothesised to be the one potential disadvantage. The explanation supports the hypothesis that PAPD results in less conflict within the community, but the time to convince the neighbouring community to follow local rules was not enough. However, if sustainable fishery co-management can be achieved by the local community, local CBO can influence future policy towards sustainable fishery management.

PAPD does take up time from community members at the outset, but the improvements in performance and savings on NGO staff time, and even participant time after the PAPD, would appear to strongly outweigh the initial input.

Some confounding factors are important, in particular waterbody type which is associated with the types of users, access rights and leasing issues, and some management options.

It is recognised that the findings emerging from this chapter depend heavily on the statistical analysis, and in turn on the data that were used to generate the analysis. While every effort was made to carry out data quality checks throughout the process of data collection, computerisation and analysis, a substantial part of the data came from secondary sources (data from CBFM-2 project). The analysis assumed these data were free of errors in their collection and computerisation stages. There is no evidence to doubt the accuracy of these data, but the assumptions made regarding data quality must be recognised.

It is also important to note limitations associated with statistical modelling. First, consideration was given to possible factors that may mask or enhance the PAPD effect. These were listed in the hypotheses matrix, i.e. Table 2.1. All these potential confounders listed in Table 2.1 were examined (although all possible interactions could not be included in

the analysis. Only measurable factors were included here. They were each assessed and those contributing significantly to explaining variability in the indicator being analysed were retained in the model, and confounders that did not contribute significantly to the model were removed. Secondly, a general linear model was used in the analysis. Here, the model represents a simple additive equation, and it is assumed that this is suitable to describe the data being modelled. Model assumptions were checked by an analysis of residuals[2], and appropriate action taken where there was doubt on the assumption being considered. The statistical modelling does not show causality, but was used to determine whether the PAPD effect (and other factors) can explain a significant component of the variability in the indicators under consideration. It may be noted that the significance or otherwise of the intercept is immaterial. In general, the intercept is important only where the model equation is to be used to make predictions.

It is also well to note that significance testing in general has its own limitations. For example, significance with a probability level $p < 0.05$ (but $p > 0.01$) indicates that there is a 1-5% chance that the finding was a chance result and not a real effect. The indication of a significant result (say for the PAPD effect) must also be matched by a clear difference between the corresponding mean values. In general, the results were well matched and hence greater confidence can be placed on the findings.

During the planning stages of the analysis, due consideration was given to the dominance of CNRS in evaluating the PAPD effect. The question of concern is whether the PAPD effect, where it was evident, was mainly a reflection of the implementing organisation. This is a very relevant question, but the number of sites available to explore this effect was very low. The unit for analysis is the site and there were only 11 sites where both PAPD and non-PAPD were implemented by the same NGOs, namely those sites under Banchte Sheka, Caritas and ERA. The sample size here is too small to enable statistical tests of significance to be conducted to assess the PAPD effect. Nevertheless, the mean values for a few of the hypotheses indicators were examined for cases where a PAPD effect was found.

The results are summarised in Table 4.49 and show the benefits of the PAPD methodology for this restricted set of sites. The benefits of PAPD are reflected in these summary figures. This allows some confidence that the results seen in this chapter are not merely due to the large number of CNRS sites undertaking PAPD.

Table 4.49 Mean values for some indicators restricted to Banchte Sheka, Caritas and ERA sites.

Indicator being compared	PAPD	non-PAPD
Days to CBO formation	233	409
No. of awareness raising activities	24	6
Percent of poor fishers in CBO	65	22
Mean change in social cohesion (-5 to +5 scale)	4.2	2.2
Score for own and family benefits	7.3	4.6
Score for long term benefits	9.0	6.7

Lastly it could be asked if the project investment in CBFM in terms of people and resources was different between PAPD and non-PAPD sites, which might be a reason for the apparent effectiveness of PAPD. The information base is different and not so reliable, but estimates of costs by site were attempted based on the reports of the partner NGOs up to 30 September 2003 (the end of the second year of the CBFM-2 project). However, they did not include any

[2] Residual analyses undertaken in this study involved a study of residual plots to check for validity of model assumptions, and possible outliers. In a couple of instances where an outlier occurred with no plausible explanation for why it should be so, the case was omitted from the analysis and re-run.

expenditures by DOF or by WorldFish Center. Some NGOs had data on all costs by site, but for most NGOs their common costs and those not allocated by site were apportioned evenly across all sites. Some NGOs including CNRS reported expenditures by working area, these were divided by the number of waterbodies and then multiplied by the number of waterbodies within a study unit (PAPD) where this was more than one. In addition expenditures for CNRS were only available up to June 2003, so expenditures for July-September 2003 were estimated based on the expenditure rate in the first 9 months of that project year. For ERA actual expenditures were only available for the NGO as a whole and for one year, to this the planned budget for the next 4 months up to 30 September 2003 was added, and the total divided equally across its three working sites to get an average cost per waterbody.

Accepting these limitations, the total expenditure per PAPD site at about Tk 770,000 was higher than in the non-PAPD sites at Tk 463,000, but not significantly so, moreover the total number of households in the villages covered by PAPDs was about 1,800 per site compared with about 1,100 in non-PAPD sites, so the expenditure per household was very similar. In addition, all NGOs posted similarly experienced staff to the field, although Caritas and BRAC tended to use more existing staff who may therefore have had more practical experience, while the other NGOs recruited more new staff for the project. However, CNRS did post more experienced coordinators for each of their working areas which may have improved their level of facilitation somewhat.

CHAPTER 5

CONTRIBUTION OF OUTPUTS

5.1 Issues Related to Participatory Planning

Although participatory processes are claimed to be holistic approaches creating and building partnerships, capacity building of local institutions, and creating synergies across sectors to achieve effective targeting by fostering local ownership, developing local partners and facilitating the creation of enabling environments that provide transparent and accountable mechanisms for the delivery of goods, services and resources at the community level, some debate arose in the last decade.

Many researchers argued that the success of the terms “participation” and “participatory” as prefixes for development policies is due to the ambivalent connotations of the terms. Some argued that these two terms point in two apparently different directions: one refers to people simply taking part in decision making processes, another is a vision of society as “community” and, at times, of evangelical promises of salvation. Nelson and Wright (1995) describe community as a concept often used by state and other organisations, rather than the people themselves, and it carries connotations of consensus and needs determined within parameters set by outsiders.

Some differences between PAPD methods and non-PAPD methods (PRA) were discussed in Chapter 1. The PAPD process considers opinions of each stakeholder group separately and then presents each stakeholder group’s plans to all stakeholder groups in a plenary session to see what others need and then common and uncommon issues are considered for final planning. In PAPD methods, with careful well informed facilitation, there is no scope for the powerful people to dominate poor people’s decisions. To villagers in Bangladesh, community (*samaj*) is an informal institution which people depend on for cooperation and social justice. Usually the knowledgeable elder person of the community (often a para – neighbourhood – or village) whom everybody respects and trusts is the head (*matbar*) of the samaj. Villagers prefer to work within the samaj culture, thus the concept of community is far more important than a particular group in a village although everyone does not have equal rights and opportunities. In this study the evidence shows that the broader based community-led fisheries (CBFM) associated with PAPD were far more effective than narrower CBFM based on fisher-led management associated with many of the non-PAPD sites.

Another debate is that, “projects clearly influence the way in which people construct their needs” through participatory methods. This was not the case in these examples where all types of needs were raised by different stakeholder groups during PAPD, for example as shown in Table 5.1. The project was limited to addressing fishery management needs, but some of the other needs expressed in the PAPDs were also addressed through the NGO’s own initiatives or through linking the community to other possible sources of support. An example is where the NGO involved in facilitating CBFM through its own initiative provided tubewells for drinking water, provided sanitary latrines, and helped people plant trees which were not included in the project agenda. This helped for example to address women’s problems and needs which tended to be mainly not related to natural resources.

Table 5.1 Example of main problems identified by different stakeholder groups in Kathuria beel during PAPD.

Problems	Fisher	Landless Women	Land-less Men	Small Farmer	Medium-large Farmer	Kua owner
Natural resources related						
1. Faulty sluice gate	Y		Y		Y	Y
2. Canal of Kathuria beel has silted up.	Y		Y	Y	Y	Y
3. Brood fish declining	Y	Y	Y	Y	Y	Y
4. Lack of unity		Y	Y			Y
5. Single crop production in the low-lying lands				Y		
6. Scarcity of fishing instruments (boats and nets).	Y					
7. Force fishing by the outsiders(conflict)	Y			Y		
8. Ditches in the beel silted up.						Y
9. Fish disease		Y	Y	Y	Y	
10. Scarcity of fish seed/fry	Y				Y	Y
11. Cattle population declining				Y		
12. Use of monofilament net			Y			
13. Lack of fish conservation efforts						Y
Other development related						
1. Communication problem.	Y	Y	Y	Y	Y	Y
2. Scarcity of safe drinking water.		Y		Y		
3. Poverty		Y	Y			
4. No electricity supplies.				Y	Y	Y
5. Lack of facilities for education	Y	Y		Y	Y	
6. Scarcity of nutrition.		Y				
7. Lack of sanitary latrine.		Y		Y		
8. Poor health facility.		Y			Y	
9. High price of agricultural inputs					Y	
10. Unemployment problem.		Y				

The danger from a policy point of view is that the actions based on consensus may in fact further empower the powerful vested interests that manipulated the actions in the first place (Mohan, 2002). From the above table it is evident that the PAPD has revealed and taken into consideration all types of stakeholder groups' problems. In PAPD sites most (95%) of CBOs were formed with representatives of different types of stakeholder, but in non-PAPD sites most (78%) CBOs were formed just of fishers (also a way of avoiding vested interests). In PAPD sites where fishers formed CBOs they have advisory committees composed of other influential stakeholders. This has minimised the scope of manipulation of actions by local powerful vested interest groups. In non-PAPD sites, where the focus has been on organizing poor fishers to form their own CBO, the number of conflicts and court cases has been high. However, this is complicated by more of the non-PAPD sites being jalmohals where revenue is collected, since this is the usual focus of fisheries related court cases. Moreover, these conclusions apply to the situations covered by this study. There is evidence from the Fourth Fisheries Project that CBOs developed without PAPD but including a wide range of local stakeholders tend to be dominated by elites and powerful people where there are more valuable resources and funds to be handled by the CBO, for example jalmohals and sites with stocking (Aeron-Thomas 2003, Begum 2004).

5.2 Summary of Testing of Hypotheses about PAPD

Table 5.2 gives a summary of the hypotheses tested and the findings for all 11 hypotheses and the 34 sub-hypotheses assessed. Overall there is evidence to accept nine hypotheses as discussed in detail in the previous chapter.

Table 5.2 Outcomes of testing the research hypotheses.

Research hypothesis	Sub-hypotheses tested	PAPD effect	Mean values	Other significant confounding factors	Overall model
Community Based Organisation (CBO) development					
i. PAPD results in faster setting up of CBOs	No. of days taken to form CBO	**Accept**	PAPD=263 Non=370	None	F=9.3; df 1, 34; p<0.01; R^2 = 0.22
ii. PAPD results in more active CBOs	Overall	**Unclear**		No difference or non-PAPD more active in routine operations of CBO, but in PAPD sites CBO more active in relations with others	
	Average no. of CBO meetings per month	Reject	PAPD=0.60 Non=1.26	None	NS
	% attendance at CBO meetings	Reject	PAPD=73 Non=80	None	F=4.6; df 1, 34; p<0.05; R^2 = 0.12
	No. of awareness raising activities with organisations outside the CBO	Accept	PAPD=15.8 Non=4.4	None	F=11.2; df 1,34; p<0.01; R^2 = 0.25
	% of conflicts resolved by CBO	Reject	PAPD=23 Non=32	None	NS
iii. PAPD results in the formation of CBOs that are more holistic, and where poor are better represented	Overall	**Accept**		Diversity difference not large, but stronger PAPD impact on representation of poor	
	No. of categories of stakeholders in the CBO	Accept	PAPD=3.6 Non=4.2	Waterbody type	F=2.9; df 4,31; p<0.05; R^2 = 0.28
	% of CBO comprises poor fishers and landless	Accept	PAPD=66 Non=35	None	F=19.5; df 1,34; p<0.001; R^2 = 0.36
Social capital					
iv. PAPD results in greater social cohesion	Overall	**Accept**		Several factors important, but allowing for these PAPD effect seen by those taking decisions and by poor fishers	
	Score for change in social cohesion in community	Accept	PAPD=4.4 Non=2.4	Waterbody type; other development activities; % better off in CBO	F=2.9; df 6,29; p<0.05; R^2 = 0.37
	Score for change in social cohesion - BMC/RMC	Accept	PAPD=4.7 Non=3.1	Waterbody type; other development activities; % better off in CBO	F=2.4; df 6,28; p=0.05; R^2 = 0.34
	Score for change in social cohesion - fishers	Accept	PAPD=4.1 Non=2.0	Waterbody type; other development activities; % better off in CBO	F=2.9; df 6,29; p<0.05; R^2 = 0.37
Sustainability of fishery					
v. PAPD results in greater community awareness and concern for collective sustainability and security actions.	Overall	**Accept**		Waterbody type important – use rights and range of non-fish resources	
	Number of own benefits	Accept	PAPD=3.0 Non=2.0	Waterbody type; number of non-fisher users; if respondent is in MC	F=10.9; df 9,60; p<0.001, R^2 = 0.62
	Own benefit importance (score)	Accept	PAPD=6.8 Non=5.5	Waterbody type; waterbody-PAPD interaction; number of non-fisher users	F=8.8; df 9, 60; p<0.001; R^2 -= 0.57
	No. of short term community benefits	Reject	PAPD=2.2 Non=1.9	Waterbody type	NS
	Short term benefit importance (score)	Reject	PAPD=6.9 Non=5.9	None	NS
	No. of long term community benefits	Marginal accept	PAPD=4.0 Non=3.2	Waterbody type, no. of other uses of the fishery, no. of people fish for an income	F= 6.1; df 9,59; p<0.05; R^2 = 0.48
	Long term benefit importance (score)	Accept	PAPD=8.1 Non=6.8	PAPD-waterbody interaction	F= 7.7; df 6,62; p<0.001; R^2 = 0.43
Collective action					
vi. PAPD results	Overall	**Accept**		Some waterbody types have a PAPD effect	

Research hypothesis	Sub-hypotheses tested	PAPD effect	Mean values	Other significant confounding factors	Overall model
in faster uptake of community actions for NR management.	No. of days from fielding NGO staff to first action	Accept	PAPD=308 Non=481	None	F= 23.2; df 1,34; p<0.001; R^2 = 0.42
	No. of days from CBO formation to first action	Accept, but	PAPD=66 Non=165	PAPD-waterbody interaction	F= 5.4; df 6,24; p<0.01; R^2 = 0.57
vii. PAPD results in more community/ collective actions for NR management	Overall	**Accept**		Conflicts etc. also limit plan implementation	
	No. of actions planned and not implemented	Accept	PAPD=1.0 Non=3.2	No. of conflicts, no. of other development activities, other uses of waterbody	F= 17.0; df 4,31; p<0.001; R^2 = 0.69
	No. of actions implemented	Accept	PAPD=4.7 Non=1.7	None	F= 62.4; df 1,34; p<0.001; R^2 = 0.65
viii. PAPD results in community actions with greater compliance.	Overall	**Accept**		Same number of rules and awareness, waterbody and access also an effect	
	No. of rules in place	Reject	PAPD=1.9 Non=1.8	None	NS
	No. of rule breaking incidents	Accept	PAPD=1.0 Non=5.5	Type of waterbody, waterbody area, PAPD-waterbody interaction	F= 11.9, df 7,28; p<0.001, R^2 = 0.75
	% of community know rules	Reject	PAPD=84 Non=86	none	NS
	Total no. of conflicts	Accept	PAPD=0.6 Non=8.3	none	F= 7.9, df 1,34; p<0.01; R^2 = 0.19
	No. of internal conflicts	Accept	PAPD=0.2 Non=3.0	None	F= 17.6; df 1,34; p<0.001; R^2 = 0.34
Livelihood outcomes and linkages					
ix. PAPD results in community actions involving wider coverage of communities that perceive benefits	Overall	**Accept**		More types of beneficiary benefited more, and fishers also benefit more	
	Number of stakeholder categories benefited	Accept	PAPD=7.4 Non=4.6	None	F= 11.9; df 1,34; p<0.01; R^2 = 0.26
	Extent of benefits for all stakeholders	Accept	PAPD=5.6 Non=4.4	None	F= 8.0; df 1,34; p<0.01; R^2 = 0.19
	Extent of benefits for fishers	Accept	PAPD=5.8 Non=4.5	None	F= 5.9; df 1,34; p<0.05; R^2 = 0.15
x. PAPD results in better links with local government	Overall	**Accept**		The number of government bodies with links and frequency of meetings do not differ, but other supports and attitude changes do differ	
	No of government bodies giving support and their scores	Reject	Not calculable / no difference	Not applicable	Not applicable
	No. of times received govt. support	Accept	PAPD=7.7 Non=4.5	None	F= 6.2; df 1,30; p<0.05; R^2 = 0.17
	Change in attitude score to CBFM in Union Parishad	Accept	PAPD=2.7 Non=0.9	None	F= 44.2; df 1,46; p<0.001; R^2 = 0.49
	Change in attitude score to CBFM in Upazila	Accept	PAPD=2.8 Non=1.6	None	F= 21.5; df 1,56; p<0.001; R^2 = 0.28
	No. of meetings fishers have with local govt.	Reject		Indicator/sub-hypothesis probably not useful	
Time /transaction costs					
xi. PAPD actions require greater time input from participant communities	No. of hours per person involved in CBFM activities last year	**Reject**	PAPD=179 Non=391	If MC member or general fisher	F= 7.2; df 2,58; p<0.001; R^2 = 0.2

So in answer to the question are there differences in CBFM-2's effect on community action and on livelihood outcomes and impacts that can be attributed to NGO (modified to whether PAPD was used)? PAPD sites had significantly better progress in establishing CBFM in terms of less time taken to form CBOs, more community issues addressed, more poor participants, larger reported increases in social cohesion, greater benefits both personal and long term expectations, more natural resource management actions taken up sooner, better compliance with rules, and apparently greater cooperation from local government. Yet the participants overall spent less time in PAPD sites on resource management. Can these differences be attributed to PAPD?

Was there an NGO or facilitation effect behind the difference associated with use of PAPD? One NGO (CNRS) worked in most of the PAPD sites and only introduced CBFM through PAPD, but the overall differences reported were also found when just the three NGOs that had both PAPD and non-PAPD sites were considered. Project investment costs could only be estimated very approximately by site, but did not differ significantly between PAPD and non-PAPD, although expenditure per site was higher in PAPD sites which tended to be larger. This might mean more interventions in the PAPD sites, but larger communities would also on average make community organisation and institution building more difficult implying a slower process. It was also not obvious that there was a difference in the quality of field staff between NGOs. In addition individual DOF staff had an impact but this was not associated with NGO or PAPD, and depends on the positive or negative interest towards the approach of the NGO and project.

Was the assessment method appropriate? The assessments used group discussions to generate data that was combined in analysis with other sources of quantitative information. Group discussions may tend to generalize or idealise the participant's views, or may be influenced by dominant people or local influentials. These risks cannot be eliminated but were minimized by discussing separately with the committee members and general fishers, and by avoiding large public meetings. While these are the most important stakeholder categories in the fisheries, the views of farmers, landless men and women from different types of households were not obtained. This would have been helpful if the study had enough time and resources, especially as these stakeholders were represented in the PAPDs, but they are less dependent on the fishery resources than the respondents.

5.3 Fisheries Co-management and Participatory Planning

The CBFM-2 project is essentially a co-management project involving government and communities with NGOs as facilitators, but more emphasis is placed on partnership arrangements between NGOs and government. The PAPD method was used in half of the studied sites for planning and CBOs were formed for resource management in all the sites. Government officials were invited during the PAPD to be a part of the process and to endorse the outcomes in the final plenary, but without influencing the planning process. In the other half of the sites studied, resource management institutions were formed through simple discussion and facilitation by government and NGO staff organizing groups of fishers. However, the communities involved in CBFM are different in different sites. In PAPD sites although NGOs prepared participant lists during PAPD it was endorsed by the participants. In non-PAPD sites participant lists were prepared by the NGO and the list was endorsed by the Department of Fisheries. The evidence of this study shows that PAPD has accelerated CBO formation. This section draws on thematic examples from the four case studies made as part of the study to address the second research question and look for causal linkages between the consensus building methods and the CBFM outcomes and effects. The case studies were in Shuluar Beel and Fatki River (PAPD) and in Shakla Beel and Chitra River (non-PAPD).

In the sites which are leased jalmohals (which more often had no PAPD), the project partnership negatively impacted CBO development compared with non-jalmohal sites. For example, when senior DOF staff involved with the CBFM project provoked landowners to do what they wanted to do in their own land without supporting fishery rules for use of Jalmahal during monsoon. The DOF officials always mention that the former leaseholders made a profit. However, former lease holders never did any conservation management and they concentrated on maximising fish catch. As leaseholders were/are locally influential, they were not obstructed by the landowners, and having use rights over fisheries were supported by DoF officials. Now the poor fishers cannot obstruct those landowners from retaining some influence and rights in the floodplain and even the jalmohal as they are more powerful than these poor fishers. As DoF is responsible for remitting the lease value to the Ministry of Land, they have no option but to force fishers to collect money to pay the lease no matter how they can do it, otherwise the fishing rights would be returned to the land administration to auction out to the highest bidder.

Box 5.1

Shakla Beel is a leased waterbody (Jalmahal). The CBFM CBO was formed in Shakla Beel in a village meeting through hand count selection method. As the issue for forming the CBO was to manage the fishery, they selected fishers and every fisher in the community agreed to pay the lease value. However, the rich ditch owners who were not involved built bunds around their ditches and placed cross fences in their land to catch all the fish within that area. As a result fishers did not get enough fish to pay the lease. The concerned NGO paid two consecutive years' lease, but the fishers did not pay this back. The fishers as a target interest group here did not receive any benefit.

Boxes 5.1 to 5.3 and Table 5.3 illustrate some of these issues comparing some key issues in the development of CBFM in an example of a beel with PAPD and one without PAPD.

Table 5.3 Example of differences between co-management progress in PAPD and Non PAPD sites

Indicator	Shakla Beel (Non-PAPD)	Suluar Beel (PAPD)
Days between CBO formation and first management action	520	179
Number of times CBO executive body changed	3	0
Partnership with DoF	Decisions controlled by DFO/UFO	DFO/UFO helps participants/villagers wherever and whenever they ask for
Attitude of DoF towards community based fishery management	Not satisfactory	Highly satisfactory

Source: Group interview, Quarterly Progress Reports and Institutional Monitoring Form

Participation is a pre-requisite for co-management. However, participation in certain situations can force the participants to agree with the majority. In non-PAPD sites the participants fail to communicate their actual desire because they do not want to antagonise elders or neighbours who have the power to visit adverse consequences on them if they go against their elders' wishes. In this case the group members lead one another into misperceiving the collective reality. On the basis of this misperception actions are taken by the group that are actually contrary to what everyone would prefer and benefit most from doing. This leads to anxiety, frustration, anger, and the search for someone to blame.

Box 5.2

In **Shakla Beel**, the general body of the CBO, which has a Beel Management Committee as its decision making body, was formed with 88 members from four villages after discussion with representatives from these villages. They agreed to observe a closed fishing season from August to October, and to ban using harmful gears. Out of these 88 members 13 split off from the others after one season and started to catch fish forcibly with other associates with harmful gears and in the closed season. They argued that they were not in agreement with the others from the beginning. They refused to pay their share of the lease value and agitated others to stop paying. There were three different incidences of conflict where court cases were lodged. People from two villages now blame the committee and want to withdraw from the CBO and want their share of money from the last two catches.

Increase in social capital is a sign of good co-management. In the earlier consensus building project (R7562) before the PAPD, all the participants were interviewed to know their rating/opinion on various indicators of social capital (trust, harmony, empowerment, co-operation, empathy, unity, conflict management, reciprocity and co-operation). After the PAPD workshop sessions, all participants were asked to discuss with their neighbours what they did during the PAPD sessions and what they have planned. After the PAPD another survey was done to assess any change in social capital with the same participants and also with the non-participants. It was observed that the there were changes in opinion and indicators of social capital increased but there was insufficient time to tell if this was lasting. In this study, the model showed that indicators of social capital had increased significantly in PAPD sites and this gain was 9 times more than that in non-PAPD sites where CBFM was also established.

In PAPD sites, resource management institutions involved all types of stakeholders in the community as everyone within the area is a wetland user in one way or the other. In most of the non-PAPD sites (except floodplain beels), fishers formed resource management institutions and other stakeholders have very little involvement. This created confusion, lack of ownership feeling and exploiting attitude within the community.

In the PAPD sites studied the CBO is responsible for all types of activities including earth work. For example, in Fatki River the community of different villages reached agreement in the PAPDs (four for different sets of sections of the river) that re-excavation of silted up parts of the river was needed, they discussed this among themselves, and about the design with the Upazila Engineer and DoF engineer, and then organised the labour team to do the job. All types of stakeholders were involved in the process and there was no opposition. Although the average number of resource management activities planed was about the same for both PAPD (5.63) and non-PAPD (4.94) sites, the number implemented was 2.7 times more in PAPD sites. It can be argued that group discussion and strength leads to groups taking more innovative and risky decisions than they would have taken as individuals. Actual sharing of responsibility means that individual accountability for a given decision is blurred. However, in the non-PAPD sites due to lack of individual commitment during planning sessions, some of the planned issues have not been implemented because they need funds, everyone's commitment and participation. For example, at Dubail Beel (non-PAPD site) the participants have taken decisions on registration, excavation, land purchase, etc., but did not consider the risks that this could not be achieved without funds and consensus; conflicts arose and they have not been able to implement their plans.

Co-management is expected to minimise incidences of conflict and rule breaking and increase cooperation and voluntary compliance among community members. Due to greater social cohesion, higher awareness and better coordination with different agencies, internal conflict among the participants in CBFM sites where there was a PAPD is less and rule breaking incidences by the participants were few (Box 5.3). In Shuluar Beel, during PAPD, the ditch owners committed not to dewater all the ditches to catch fish after the monsoon. There are also some ditch owners representing their group in the BMC. Here all ditch owners were previously trapping fishes in their ditches during monsoon and were catching all the fishes after monsoon when water recedes by de-watering 3-4 times to catch all the fish. By following their commitment they observed an increase in fish population of 3 to 4 times in the next monsoon season after they left some water and fish in the ditches in the previous year. However, where

Box 5.3

In Shuluar Beel there was no conflict between the community members after a PAPD was held, although in the previous eight months the NGO made little progress in raising issues and bringing together the community to manage this floodplain beel. After the PAPD, the major problem was apparently between the inhabitants of this beel area and those of two adjacent beels (also under CBFM-2 but with a different NGO partner, and where there was also a PAPD), this was minimized through formation of a cluster committee with representatives of the three BMCs. Now due to following a common strategy in all three beels, there is no discontent.

CBFM has only worked with part of the community their collective action may break down when those participants see other people breaking rules and norms. For example people using the beel connected to Chitra River enjoy catching fish during the early monsoon when fish move from the river to the beel for breeding and again when fish go back to the river after the breeding period. Now after seeing this people from the riverside villages who had agreed to follow the management committee rules are following the same path as the people from the beel and also break the rules. Thus the planned management system is mostly inactive.

At the start of CBFM-2 project to ensure delays were minimized, before signing contracts all the NGOs and DoF were asked to recruit staff provisionally, but very few of them did so. Some of them used their existing staff to start with, most NGOs did not have staff in place in the field until early 2002 (the project started in September 2001) but DoF took almost a year and a half to recruit staff. The number of days between staff recruitment and CBO formation depended on the capacity and skill of the staff and the approach adopted. Most of the NGOs recruited fresh graduates who did not have any previous experiences of forming groups. The number of days between staff recruitment and CBO formation was less in PAPD sites than in non-PAPD sites. In PAPD sites the community itself pushed the staff to provide necessary supports, when they started to implement their planned actions. In the case of non-PAPD sites staff spent a great deal of time to coordinate with the community for organising people for CBO formation. As there was no specific direction for starting fishery management action the staff were confused. Moreover, the community itself was not so sure about what activity they wanted and the expected outcomes. Several months after CBO formation, members were not sure about the objectives of the project, what support they might get, and the funding system was not transparent. In the case of PAPD sites, the participants were made aware of the project and they had an opportunity to ask any question to the implementing NGO, wider community and local representatives, government organisations and agencies concerned before they decided what they wanted to do and whether they at all wanted the project.

Due to co-management, the initial transaction costs for management were expected to be high because PAPD and the following actions were predicted to take more time from participants (for workshops etc) than in non-PAPD sites. However, in the PAPD sites there are fewer conflicts and fewer rule breaking incidences were observed and the committees face limited resistance from insiders and outsiders. When there was confusion among the community in the case study sites of Shuluar Beel and Fatki River, the management committee along with the DoF staff and local government representatives could resolve the issue before it became a conflict. This study showed that transaction costs were less in the PAPD sites than in the non-PAPD sites. In most of the non-PAPD sites conflicts among different stakeholders (e.g. in Dubail Beel) caused transaction costs to be high; the need to collect funds to pay government revenue were also a factor directly and indirectly.

5.4 Contribution of Project Outcomes to Development Impacts

This study has generated evidence and understanding on the impacts of PAPD on community management of common pool resources (fisheries). The contribution is summarised here in terms of lessons and conclusions about the uses, limitations and benefits of PAPD based on this evidence (both statistical and case studies).

PAPD is good in bringing in all stakeholder groups to a consensus without any pressure. To design project activities in a site, all stakeholders' opinions on the feasibility of the project, pros and cons of the project, and assessment of the benefits and disbenefits to each stakeholder need to be judged. PAPD provides those opportunities. For community participation in the implementation phase, sometimes it is difficult to know who will be the

best contacts to take responsibilities. PAPD identifies those people and also shows linkages of the villagers with the power structure, individuals and agencies. Finally, an action plan is prepared in a participatory way keeping in mind all stakeholders' interests and allowing for including mitigation measures for the people who may be disbenefited.

The analysis of this study shows that for project design, consideration of confounding factors such as type and size of waterbody, CBO composition, other development works, other uses of the waterbody, and number of poor households (fishers and non-fishers) in the CBO is essential. These confounding factors were significant in different parts of modelling the PAPD evidences. Their impact on social cohesion, collective action and conflicts reveals that before considering any such CBFM or similar NR projects, these factors should be considered.

No evidence of better access of poor people to waterbody (jalmohal) or ensuring use right for the poor people was observed. In the open access waterbodies and floodplain beels, there is no restriction on access to or use of the resources. Although in the PAPD all types of stakeholders in the community participated and increased social cohesion was reported by the participants, there was no change in general use rights reported except for introduction of restrictions on catching fish near the ditches. In the small waterbodies and leased beels (e.g. Charan Beel where a PAPD was held) access of the fishers was ensured through a fishers-led BMC.

To make development plans, PAPD is very effective. There is strong evidence that plans prepared through the PAPD processes were mostly implemented. The plans were prepared on the basis of consensus of all types of stakeholder groups and it took less time to implement actions after the planning process and also after CBO formation. Therefore, PAPD results in more appropriate planning and saves time and costs in facilitating participatory management of natural resources. Moreover, PAPD can ensure community cooperation and increased responsibilities.

Although PAPD was used for planning purposes, it raises awareness about the project and its objectives. Everyday different stakeholder groups were coming to the PAPD meetings and the curious neighbours asked them about the objectives of the PAPD and the project and what they did for the whole day. Moreover, it is an exciting experience for the participants as for most of them this is something very new to them. PAPD is a good start for awareness raising on natural resource issues and scope to improve their management.

Participation of poor people (fishers and non-fishers) in the PAPD in homogenous groups did let them express their own views without fear and anxiety. They feel honoured and confident in this situation. When asked about interaction with other stakeholders in the community and the government officers/agencies and to give their opinion on their day-to-day relationships with the officials and rating them against the services they provide, they expressed their grievances and satisfactions. This information can help projects and government improve services and service providers in a given environment. For example, in all the beels in the Narail Sadar Upazila the PAPD participants expressed their satisfaction over the Assistant Fisheries Officer and Block Supervisor (Department of Agricultural Extension field worker) but were annoyed with the Bangladesh Water Development Board. Similarly in Shuluar Beel PAPD participants were very happy with their Union Parishad Chairman. They kept him as an advisor in the committee and said that they can tap resources from him. Moreover, through interaction with different people and exposure to outsiders as part of the PAPD plenary process they now became more confident and demanding.

Linkages with government were established during the PAPD plenary session where concerned government officers and NGO staff were present. Government officials also were happy to see local knowledge, skills, analysis, and proposals presented. Government

officials also made commitments in the plenary and after PAPD. Based on these initial links the management committees were more confident when they had to meet different people in connection with their resource management activities. In some clusters of connected waterbodies they have formed cluster committees representing the different CBOs, and they also have taken an active part in initial networking among CBOs in fisheries management.

From this study it was evident that PAPD enhances the development project implementation process. Moreover, active participation of the different types of stakeholders has reduced the load on the implementing agency and increased the responsibilities of different stakeholder groups. It was also evident that the variances in transaction cost of BMC between PAPD and non-PAPD sites were significantly different. This also suggests reduced staff time for NGOs. Participants said that due to PAPD their knowledge was also increased. PAPD has helped to see that existing fisheries laws are observed, where government officials helped. Participants mentioned that the habit of compliance with rules is a gain for them. The implementation of the local fishery management rules has reportedly increased fish resources, fish species diversity and overall supply. Fish traders can buy fish locally and that reduces transportation cost.

The beneficiaries from PAPD sites mentioned income as a main benefit for themselves from project related activities. As a result they can send their children to school, can get better health care and improved family nutrition, especially for children. They now consume more fish which they translate as more energy through more protein intake. Some of the beneficiaries mentioned increased knowledge through PAPD, training, meetings and workshops and through facing visitors. They particularly mentioned the PAPD as the first gathering where they freely raised their own problems and they also proposed solutions (participation) which were taken into consideration. They felt that they were given attention and they were not controlled by anyone. The same types of benefits were reported in non-PAPD sites but fewer were achieved within the period assessed.

The study assessed changes over only about two years. The time is too short to conclude on the sustainability of CBFM including the institutions developed from PAPD or from NGO support without PAPD. However, some of the indicators that were assessed, such as comparing own, short term and long term benefits that the participants mentioned showed that long term community benefits are reported to be significantly higher in the PAPD sites than in the non-PAPD sites. This translates into sustainability. Moreover, registration of the CBOs, which so far has advanced more rapidly in the PAPD sites, is a sign of likely sustainability for the CBOs. At this moment, CBOs in PAPD sites are trying to build some fund for the CBO operating costs and future collective activities, through harvesting some fish on behalf of the CBO for their own fund or by accessing local resources such as leasing in ponds or canals for fish culture.

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