

Method of Consensus Building: Community Based Aquatic Habitat and Floodplain Fisheries Management in the Mekong Delta



Can Tho University, Vietnam
ICLARM-The World Fish Center
Penang, Malaysia
June 2002

SH
207
M5M47
2002



SH
207
MS
MA7
2022



#1930

CONTENTS

List of Figures	iii
List of Tables	iii
Abstract	2
1. INTRODUCTION	2
<i>Structural social capital</i>	3
<i>Cognitive social capital</i>	3
2. METHODOLOGY	4
3. PAPD or CB Process	6
3.1 Scoping phase	6
3.1.1 <i>Stage 1. Situational</i>	6
3.1.2 <i>Stage 2. Stakeholder Analysis</i>	6
3.2 Participatory planning phase	7
4. APPLICATION OF THE METHODOLOGY	9
4.1 Situational Analysis	9
4.2 Census and participant selection	9
4.3 Outputs of PAPD	10
~ <i>Problem Census</i>	10
~ <i>Cause and Effect Analysis</i>	11
~ <i>Social Impact Matrix</i>	12
<i>Problem 1: Natural fish declining</i>	12
<i>Problem 2: Canal re-excavation</i>	12
<i>Problem 3: Water pollution</i>	13
~ <i>Seasonal Calendar</i>	13
~ <i>Trend Analysis/Timeline</i>	13
~ <i>Force Field Analysis</i>	14
~ <i>Stakeholder Social Impact Matrix for Solution</i>	
<i>of the Problems</i>	15

5.	RULES SET BY THE PARTICIPANTS	16
	<i>Rules</i>	16
	~ <i>Main rules agreed on in PAPD</i>	16
	~ <i>Rules specific to the Nga Ngay canal</i>	16
	<i>Punishment set for rule violators</i>	16
	~ <i>For the people within the community</i>	16
	~ <i>For the people within the administration</i>	16
6.	PARTICIPATORY MONITORING	17
7.	CONFLICT RESOLUTION	17
8.	CHANGE IN SOCIAL CAPITAL	18
9.	CONCLUSION	19
10.	REFERENCES	20
11.	ANNEX	
	Part A: First stakeholder group sessions – problem census	21
	<i>Group 1: Landless (no rice field or garden)</i>	23
	<i>Group 2: Owner of rice field and garden</i>	21
	<i>Group 3: Owners of rice field, garden and fish culture</i>	25
	<i>Group 4: Women</i>	27
	Part B: Additional points raised during the first plenary session	28
	Part C: Second stakeholder group work: Solution analysis	29
	<i>Group 1-4: Solution analysis</i>	29
	Part D: Stakeholder Force Field Assessment	32
	<i>Group 1-4: Stakeholder force field assessment</i>	32
	Part E: Social Impact Analysis	33
	<i>Group 1-4: Social impact analysis</i>	33
	Part F: Rules Set by the Community and Punishment for Violating Rules	35

List of Figures

Figure 1	Change in social capital	18
----------	--------------------------	----

List of Tables

Table 1	The three phases of community-based resource management projects	5
Table 2	The six activities in the participatory planning phase	7
Table 3	An Binh village, Vietnam	9

Abstract

ICLARM's experience in community based resource management in Bangladesh has showed that consensus building among all stakeholder groups in a community who use and benefit from the resources are an essential element of any collective action program. The Methods of consensus building initially developed in Bangladesh are now being applied in both Bangladesh and Mekong delta. This paper describes the process and outcome of a consensus building workshop conducted in a Vietnamese village in the Mekong delta as part of the community-based aquatic habitat management project. The objectives of the consensus building were to (i) strengthen the capacity of the research partners of Can Tho University (CTU), Vietnam in participatory natural resources management; (ii) assist the local community to understand and manage their own resources; and (iii) translate group discussion and learning initiatives into a built-in action plan. The outputs of the workshop provided a clearer analysis of problems, and their causes and solutions. It also identified the collective actions that are needed to reach these solutions, and determined impacts on different stakeholders and their responsibilities toward the action plan implementation, including monitoring and evaluation. These outputs of village level consensus were validated with the local, district and provincial government authorities through a subsequent workshop. The plan is currently being implemented by the community itself and the local people's organization, with research support, technical inputs and training from CTU and ICLARM, the process and implementation are funded by Oxfam America Mekong Learning Initiative (MLI).

1. Introduction

The main objective of the consensus building (CB) workshop 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. The methodology development depended on the levels of consensus of different types of stakeholders. Part of the activities of the consensus building was to hold local workshops where different stakeholders using wetland resources attended to make a problem census, participate in plenary exercises, and to prepare an action plan for natural resources management. The problem census with the local resource users/stakeholders tried to obtain an insight of the important problems villagers face in managing the land and water resources upon which their livelihood is largely dependent. The key features of the method were to work with each category of stakeholders separately to identify their problems, and for all stakeholder groups jointly to agree on the priority problems. Then each stakeholder group analysed possible solutions before meeting in plenary to share their analysis and form a consensus on solutions and actions

As part of the process of common property resource (CPR) management, consensus among stakeholders is a prerequisite. A method is also needed to assess the changes in the level of consensus. In Bangladesh a method was developed and tested in three sites for building consensus among different stakeholders on the problem analysis and solutions. However, the method did not allow detailed planning and revalidation of the plans with the stakeholders whose livelihoods and assets were assumed to be directly affected by the plan. This raised questions of which process would be appropriate to achieve full consensus among different interest groups and also to find out ways to resolve conflicts.

The first question in designing the study was how many participants in the CB process have learnt about each other's livelihoods, and about each other's use of aquatic CPRs, how

much has their awareness of the issues in management of aquatic CPRs and the possible solutions to improve the management been raised and what number of agreements have been reached over management of CPRs, and how many actions taken? Eventually, what measurable improvements have there been in biodiversity, fish populations and production.

Many types of outcome could be indicators of the process. The process indicators for increased consensus could be from the following approaches:

- assessment of changes in level of cognitive social capital
- economic investment games to assess trust and reciprocity
- assessment of criteria about process [qualitative]
- level of inclusivity/representation
- common issues/goal
- follows principles of civil discourse (openness; all can speak)
- adapts and incorporates high quality information (aware of the science)
- encourages challenging assumptions
- maintains interest of participants
- consensus sought only after full exploration of the issues
- decline in reported conflict (e.g. steeling/poisoning fishes?)– this makes the assumption that conflict is the antithesis of consensus, which is not clearly established.
- methods from Alternative Dispute Resolution (ADR) - these are more conflict focused, and more focused on outcomes.

One of the approaches for assessment of attitude changes of the participants utilises tools recently developed by the World Bank for measuring Social Capital (SC) as a part of the Sustainable Livelihoods (SL) framework. Krishna and Shrader (1999) use a conceptual framework that separates micro and macro levels of SC. The macro-level relates to the institutional context in which organisations operate. The micro-level is relevant to this study. Two types of micro-level SC are identified:

Structural social capital

Includes the composition and practices of formal and informal local institutions that serve as instruments of community development. "Structural SC is built through horizontal organisations and networks that have collective and transparent decision making processes, accountable leaders, and practices of collective action and mutual responsibility".

Cognitive social capital

Refers to values, beliefs, attitudes, and social norms. 'Values' includes co-operation and "the trust, solidarity and reciprocity that are shared amongst members of a community and that can create conditions under which communities can work together for a common good".

Structural social capital facilitates people/communities to take collective actions through established roles and social networks, supplemented by rules, procedures and precedents (Krishna & Uphoff, 1999).

Cognitive social capital predisposes people/communities towards collective action on the basis of shared norms, values, attitudes and beliefs.

Krishna and Uphoff (1999) state that cognitive and structural SC are interactive and mutually reinforcing, but they distinguish between them as follows:

Structural SC is relatively objective; it includes things that are visible or tangible, and can be devised through group deliberation. It is external as it can be observed and directly modified.

"Cognitive SC is essentially subjective, being a matter of how people feel and think." It is internal, residing within peoples' heads. Krishna and Uphoff (1999) say that it is not easily changed.

Assessing structural SC is closer to monitoring quantitative outcomes of consensus building efforts. Therefore this study attempted to assess levels of cognitive SC recognising that this is difficult to change.

The original design of Problem Census-Village Workshop 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 design also 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. Such action research is deliberative, inclusive, and participatory. It is also recognised that there are other ('secondary') stakeholders who have an interest in floodplain natural resource use and its potential impacts (for example on wildlife and the environment), and that these interests also need to be taken into account in the process.

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; these raise collective awareness of the problems and thence collective that these problems may be shared and that joint action can tackle them most effectively.

2. Methodology

As originally conceived (Barr and Dixon 2001), Participatory Action Plan Development methodology (PAPD) was seen as a two stage process:

- problem census
- stakeholder and plenary workshops in the village (village workshop/planning workshop)

Although there were preliminary, intermediate and post-workshop activities, these were not seen as central to the process. Following some use of the PAPD process, the process

evolved to become a four stage process. The above two stages were preceded by Stakeholder Analysis, and followed by an 'Action' or implementation stage. Process development and internal review in the course of this project has evolved it into a seven stage process.

1. Situation analysis (*including local knowledge on organisations and institutions*)
2. Reconnaissance social survey and Stakeholder analysis (RSS)
3. Problem census
4. Cluster problems (this step is needed only if the intervention is already agreed?)
5. Planning workshop
6. Development of institutions to implement action plan
7. Implement action plan

There continue to be a core of activities (Activities 3. – 5.) that involve participatory workshops with both stakeholder groups and plenary sessions, in which perspectives on NRM are expressed and shared. It has been these three stages on which the present project has focused, as it is here that the substantive consensus is built.

Besides the above 7 stages, in Vietnam the stakeholders prepared the detailed implementation design, they explained each stakeholders' roles and responsibilities in guarding, participatory research and keeping water clean. They also set some rules for fish conservation, environmental management and punishment for violators. However, another stage in PAPD was identified. After planning phase, it was reviewed by the individual interest group and they came up with different problems of the group. They then started to disagree with the plan. Individual sessions were organized with each individual interest group and the hamlet leaders (government and non-government). Through one-to one problem identification and alternate solution analysis at individual basis a common consensus was build and an ownership process was started to built-in.

The whole Participatory Action Plan Development process may thus be viewed as four phases:

- | | |
|---|---------------------------|
| 1. Scoping phase | <i>Activities 1 and 2</i> |
| 2. Participatory planning phase | <i>Activities 3 to 5</i> |
| 3. Individual stakeholder problem solving phase | <i>Activities 6 and 7</i> |
| 4. Implementation phase/management phase | |

These phases are explained below. A similar phased approach to community-based resource management projects has been developed in other programmes, for example Pomeroy (1998) with three phases of community-based fisheries co-management projects (Table 1) and Allen *et al* (2001) with four steps in two phases for integrated systems of knowledge management in projects for animal pest control.

Table 1. The three phases of community-based resource management projects

	PAPD	Community-based co-management (Pomeroy, 1998)
1.	Scoping phase	Pre-implementation
2.	Participatory planning phase	Implementation
3.	Implementation / management phase	Phase-out / post-implementation

These frameworks or phase models work equally well in relation to research and participatory development. They all involve a finding out phase, an information sharing and mutual learning phase and an action phase. The steps in the Allen *et al* (2001) framework are particularly structured so as to create an effective learning environment.

Participatory processes are often mistakenly considered in only terms of their products – the resource maps, calendar charts and matrix tables that are created, but it is essential part of the process in order to know the situation better and the timing of different livelihoods activities. This also gives insight of the historical background of the natural resources depletion and management. The fact is that if participatory processes, such as PAPD, are to result in agreements for sustainable collective action by a range of diverse stakeholders, then the participants need to learn about each other and their different understandings of the environment. It is the phase in which this mutual learning occurs. In PAPD, this mutual learning occurs in Phase Two.

In the following sections, the PAPD process is considered in relation to its three phases.

3. PAPD or CB Process

3.1 Scoping phase

3.1.1 Stage 1. Situational Analysis

In some cases, PAPD has been, and will in the future, be carried out in locations where the facilitating organisation has already been working. This makes the scoping phase easier as the organisation should have a good understanding of the bio-physical, socio-economic and cultural environment of the area. This was the case in this project, as ICLARM/CTU already worked at their sites during the first phase of the Mekong Learning Initiative (MLI)/Community Based Fisheries Management (CBFM) project.

Where the facilitating organisation does not have prior experience of the area, there is a need to find out about the communities in the location, obtain an appreciation of the natural resource systems and sub-systems, and understand the level of interaction between communities and resource systems. This activity might be called "situational analysis", but obtaining this preliminary understanding of the system does not need to be a formal PRA exercise, though PRA tools such as participatory resource mapping are useful. It utilises what would be considered good practice in any scoping or rural appraisal exercise: speaking to a number of local functionaries and key informants and triangulating what they say, walking around the area and observing systems of NRM. This provides some insights for the facilitators, which they will call upon during the PAPD workshops, when they try to draw out NRM constraints and possible solutions.

3.1.2 Stage 2. Stakeholder Analysis

PAPD is fundamentally a stakeholder-based process. The scoping phase undertook an analysis of principle stakeholders in the management of natural resources in the location.

Initially, key informant discussions are used to identify the locally relevant stakeholder groups. This can occur as part of the situational analysis. Given the largely agrarian nature of the rural population and the NRM focus of the PAPD, these stakeholders groups tend to

relate to the main resource use activities. However, socio-economic status and gender are also considered in constituting these groups. Gender is particularly included to ensure coverage of the livelihood problems of some of the most disadvantaged groups on the floodplain – women from landless households.

The RSSs have been designed to incorporate locally relevant indicators of socio-economic status, such as ownership of a garden and rice fields. The RSS is administered to all households in the location, and households are classified into locally appropriate stakeholder groups, but they also have a shadow classification on national indicators, which can be used for further analyses¹.

The scoping phase also serves to familiarise the facilitating team with the geography of the location, so that participants can easily be located and invited to the workshops. It also builds rapport with communities in the area and builds awareness of the process at an early stage.

In an heterogeneous community with a range of interest and influence groups, it is clearly important to get representation and participation from this diverse set of stakeholders. This is unlikely to occur through a passive approach, such as announcement of a village meeting or posting notices. An active, or even aggressive, approach to meeting design and recruitment of stakeholders is necessary to ensure that traditionally marginalized groups are represented (McCool and Guthrie, 2001).

3.2 Participatory planning phase

The participatory planning phase involves six separate activities in three stages (Table 2). These are the spaces in which stakeholders formulate and develop a common understanding of the perceived issue (Allen et al, 2000).

Table 2. The six activities in the participatory planning phase.

Stage	Purpose	Format
3.	Problem census	Individual groups
4.	Cluster and review group findings	Facilitators only
5.1	Group introduction and Problem census synthesis	Plenary
5.2	System appraisal & feasibility analysis	Individual groups
5.3	Compile group findings into summary charts	Facilitators only
5.4	Developing a shared framework of understanding and taking steps to an action plan	Plenary

It is in these stages where participants are meant to express the constraints they experience in their (natural resources-dependent) livelihoods and share their views on how they may be overcome, especially through better resource management.

However there is a paradox in participation due to the inverse relationship between people's willingness to express their views frankly and the number and diversity of people participating

This is a paradox, between the frank exchange that occurs between individuals and what people are willing to express in public, which is found in many participatory activities. It is

¹ It should be noted that the level of information collected in the stakeholder analysis process, particularly in the RSS, is appropriate to a research project. For development purposes, it can be undertaken with the collection of a lesser amount of quantitative information.

compounded by the fact that participatory planning, though it tends to occur in public fora, is meant to be democratic since it is put forward as yielding a true representation of peoples' views. Mosse (1994) observes that "*public and collective events...tend to emphasise the general over the particular (individual, event, situation), tend towards the normative ('what ought to be' rather than 'what is'), and towards a unitary view of interests which underplays difference...These 'rhetorical expressions of integrity of the community' are not to be mistaken for the absence of distinct and perhaps conflicting interests*".

People may not contribute ideas to a public discussion for several reasons. These include:

- because they do not consider their ideas valuable
- because they do not want to upset the status quo
- because they are worried about the consequences of what they say (i.e. that it might offend someone at the meeting)
- because in many cultures certain types of person traditionally do not speak at public meetings (e.g. women and young people), while others do (e.g. male elders).

Anthropologists have long known that to go deeper than the superficial and to obtain information of the real workings of society requires a prolonged exchange with a few key individuals, usually alone, when they will divulge what they might not say in public. These 'truths' can over time be validated by triangulation with what other individuals say, but it is a slow process, with no explicit public consultation. In participatory planning and thence consensus building, there thus remains the paradox of 'democratic' outcomes that can be founded not on private truths, but rather on public generalities which are within the public comfort zone.

Opening up decision-making means listening to those who are usually silent and this usually involves challenging existing gender and age relations of power. People can be encouraged to express their ideas in a less judgemental forum in which they feel comfortable. This is often a closed group of friends and/or peers, wherein they can express their real concerns rather than the perceived interests that these marginalized groups are usually accorded. The drawback is that in a closed forum the diversity of views is not aired in public and does not contribute to a shared framework of understanding and mutual learning, and there is no change in the *status quo*. Thus the problem is to balance the comfort of a closed forum where the real problems and issues are discussed and everyone contributes, with an open forum that may be dominated by a few vocal people and may only provide a platform for airing the same old issues.

Kaner (1996) calls this latter situation "Business as Usual", but recognises that this approach can work much of the time. It is with difficult and more complex problems - such as stakeholder options in floodplain management - where it does not. Kaner recognises that to reach new and collectively agreed solutions, participants must pass through three stages. Firstly divergent ideas must be expressed, secondly stakeholders must participate in the process of trying to appreciate one another's perspectives - achieving a shared framework of understanding, and finally converging towards a closure zone or decision point. Using Kaner's framework, the Problem Census (PAPD Activity 3) is 'business as usual' since each of the stakeholder groups work in a closed forum.

The objective of PAPD is to encourage the frank expression of a full diversity of views on NRM, whilst achieving a high level of representation of *demos* ('the public' voice) in the target communities. No single activity will be able to achieve this. Thus PAPD has approached this paradox of public and private voices through a series of separation and aggregation steps. The separation steps are exercises undertaken by stakeholder groups separately. The aggregation steps are facilitated plenary sessions where all groups are

represented. Thus the participatory planning phase uses a series of linked individual and plenary activities to achieve a balance of frank exchange and representation².

4. Application of the methodology

4.1 Situational Analysis

Loi Du-B hamlet of An Binh Village of Can Tho Province is one of the most densely populated areas in the Mekong Delta and majority of the population rely on aquatic resources for economic subsistence. The hamlet has a population of 2984. Between 1997 and 1998, the population growth rate was 1.3%, mainly from migration. There was more female residents in the hamlet (54%), but males account for 80% of the 30% of the total population that comprises labour force. There are 629 hhs of which 2% are poor and landless.

This hamlet is situated along the Rau Ram Channel, which is connected to the Mekong by the Can Tho river. Because of the hamlet's proximity to the river system, its economic activities are interspersed with and highly dependent on the dynamics in the Mekong River. The river system provides access to very diverse aquatic resources that support the livelihood of the community but problems in the Mekong River also negatively impact their wellbeing.

Loi Du-B hamlet has a land area of 162 hectares, 97% of which is devoted to agriculture. The main economic activity in the hamlet is farming, although households depend on the fishing for daily subsistence and home consumption. The agricultural area is characterised as semi-deep water regime and 93% are predominantly planted to irrigated rice, allowing at least two rice crops a year and one cash crop such as corn. Perennial crops such as banana and citrus are found in the orchards that occupy some 64 hectares of land. Farmers produce about 1000 tons of rice each year and about 5 tons of other crops.

4.2 Census and participant selection

The total population of the village and sample of participants by stakeholder categories are shown in Table 3.

Table 3 An Binh village, Vietnam

Groups	Total Pop	No participated
Landless		15
Rice+Orchard+ Fish		32
Rice+Orchard		30
Women		29
Total	2471	

² Ravnborg and Westermann (2000), working in the Andean foothills of Colombia, approached this paradox of receiving only a polished version of reality in public meetings yet needing to be 'participatory' in a fashion similar to that of PAPD. They combined public meetings with individual interviews that revealed the breadth of divergent perceptions on NRM, which then enabled inclusion of these different interests in the participatory forum, where they could be included in the public negotiation of improved NRM.

4.3 Outputs of PAPD

The following tables show the main outputs of the PAPD workshop.

Problem Census

Ranking of priority natural resource related problems and other developmental problem

Rank	Natural resources related problems	Other development related problems
1	Fish declining	Lack of capital
2	Siltation of canal	Bad road communication
3	Water pollution	Electricity
4	Rice production declining	Low price of agricultural product
5	Flood	Local Security
6	Unavailability of modern rice variety	Irrigation/Drainage
7	River bank erosion	Unemployment
8	Use of harmful gear	Unstable rice price

Cause and effect analysis

Problem	Causes	Effects	Solution	Affected people
Fish declining	<ul style="list-style-type: none"> • Low water level, shallow canal • High amount of pesticide use • Rice production throughout the year changed fish habitat • Use of electric gear • Use of duck to catch fish • Overfishing • Catching undersized fish 	<ul style="list-style-type: none"> • Less fish for consumption and sale 	<ul style="list-style-type: none"> • Fish conservation in the sanctuary • Fish culture • Strict regulation in using harmful gear and net size 	<ul style="list-style-type: none"> • Community
Siltation of canal	<ul style="list-style-type: none"> • Daily wave activity • Canal was excavated in 1998 • Bank erosion due to many engine boat • Wave action brings more silt 	<ul style="list-style-type: none"> • Reduced fish • Water transport become difficult during dry season 	<ul style="list-style-type: none"> • Canal re-excavation 	<ul style="list-style-type: none"> • Community
Water pollution	<ul style="list-style-type: none"> • Inadequate water flow in the canal • Pig and poultry raising • Waste from noodle industry • Limited awareness about environment • Use of pesticide • Dam on the canal 	<ul style="list-style-type: none"> • Less fish • Health problem • Lack of safe drinking water 	<ul style="list-style-type: none"> • Dip tubewell • Excavation of canal • Strict rule for waste water management/ disposal • Use of filter • Bigger diameter pipe for drainage • Limited use of pesticide 	<ul style="list-style-type: none"> • Community

Social Impact Matrix

Problem : Natural Fish declining

Solutions/ Actions	Purpose	Alternative	Political/ social impact	Technical/ Economic aspects	Environmental Impacts	Sustainability
Conserve fish (fish sanctuary)	-To increase the number of fish -to bring ecological balance -To increase fish diversity	None	Community will be benefited, some households will be affected	-Need technical support from the experts	Positive impact	Long term
Canal re-excavation	-To make easy flow of water -To get more water available for community use - To ensure more fish for food and for sale	None	-Some household will be disturbed	-Need technical support from the experts	Positive impact	No idea
Decreasing use of pesticide	-To decrease water pollution and health hazard	IPM	None	-IPM training arranged by CanTho University and Government department	Positive impact	Depend on level of awareness building and farmers reception
Changing agricultural practices (from 3 paddy crops a year to 2 paddy crop and a vegetable)	-To increase income -To improve soil fertility	None	-More labour use will employment more local people	-Need demonstration	Positive impact due to less use of pesticide	-Depend on market demand

Problem 2: Canal re-excavation

Solutions/ Actions	Purpose	Alternative	Political/ social impact	Technical/Eco nomic aspects	Environmental Impacts	Sustainability
Canal re-excavation	-To make easy flow of water -To get more water available for community use - To ensure more fish for food and for sale	None	-Some household will be disturbed	-Need technical support from the experts	Positive impact	No idea

Problem 3: Water Pollution

Solutions/ Actions	Purpose	Alternative	Political/ social impact	Technical/Eco nomic aspects	Environmental Impacts	Sustainability
Dipping tubewell	-To get safe water for domestic purposes and irrigation	- Rainwater harvest - Storing water in reservoir	None	-Support from technical experts	Less pollution	No idea
Using Biogas	-To use household waste for biogas production	- Use waste for composting	None	-Support from technical experts	No idea	No idea

Seasonal Calender

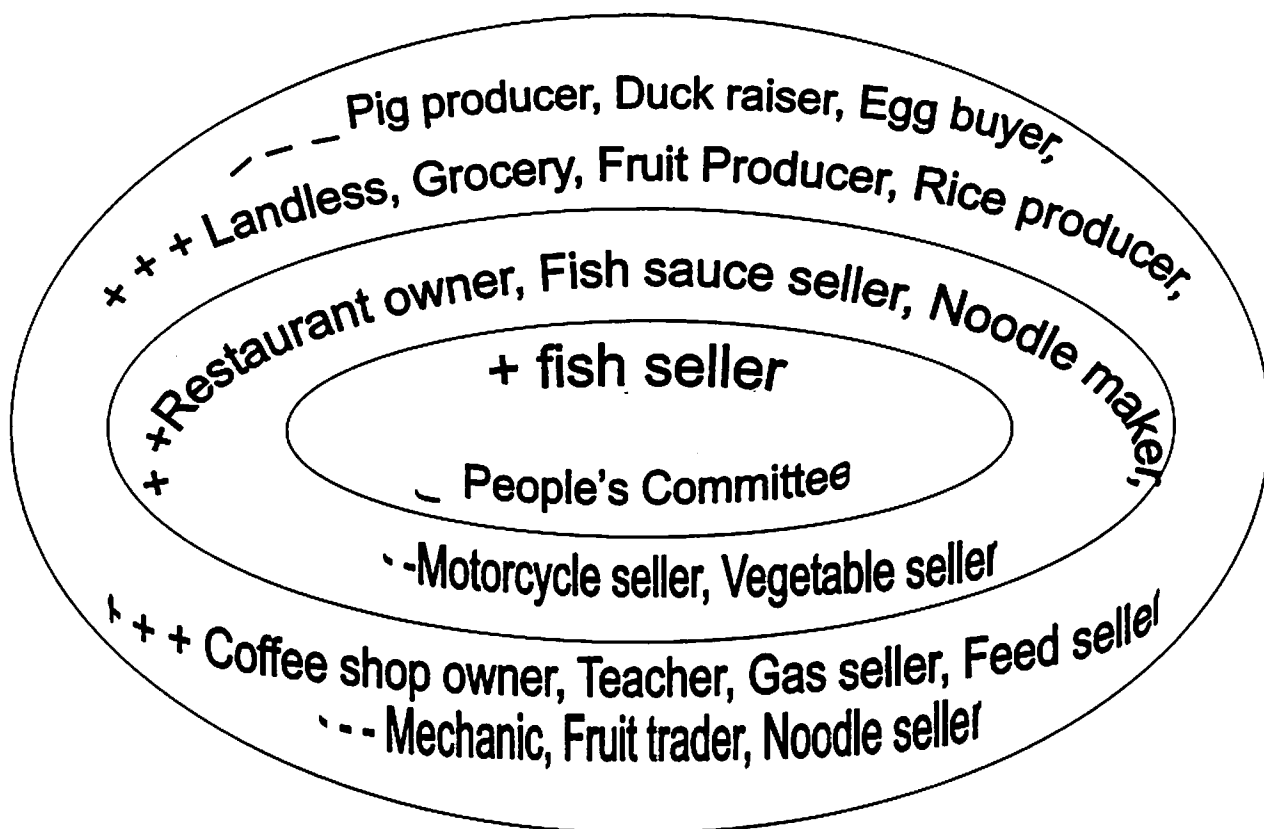
Months	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Paddy cultivation												
Fish raising												
Small trade												
Labouring												
Fishing												
Noodle production												
Gardening												
Tailoring												

Shading: activity important in these months
No Shading: not important

Trend Analysis/ Timeline

- 1975: Fish declined
- 1976: Fish disease
- 1978: Cooperative movement, start to grow 2 crops a year, Flood, HYV variety, Fish declined due to more water for irrigation
- 1979: Low yield of rice due to rice disease
- 1979: Deep flooding
- 1983-84: Introduced 3 crops/yr
- 1992: First electricity in the village
- 1994-95: Out break of brown hopper (rice pest)
- 1996: First elementary school in the village
- 1997: Deep flooding (5' ft)
- 1998: Re-excavation of Nga ngay canal and bridge over Ram Rau canal
Road constructed along the Nga ngay canal
- 2001: Foot and mouth disease o pig (pig disease outbreak)

Force Field Analysis



Stakeholder Social Impact Matrix for solutions of the problems

Stakeholders	Problem 1: Fish declining				Problem 3: Water Pollution	
	Conserve fish	Re-excavation of canal	Applying IPM	Change in agricultural practices	Dipping well	Using household waste as biogas
Traditional doctor	0	0	0	0	+	0
Fish trader	+	+	+	+	0	0
Vegetable trader	+	+	+	+	0	0
Mushroom trader	0	+	+	-	+	0
Police	+	+	+	+	+	+
Meat trader	-	+	0	0	+	+
Customer	0	+	+	+	0	0
Coffee shop owner	+	+	+	+	+	+
Grocery store owner	+	+	+	+	+	+
Fertilizer/pesticide dealer	+	+	+	+	+	+
Gasoline vender	-	+	0	+	0	0
Drugstore owner	0	0	0	0	0	0
Wine seller	+	+	+	+	+	+
Noodle trader	0	+	+	0	+	0
Motorcycle driver	+	+	0	0	+	+
Hairdresser	+	+	0	+	+	+
Motorcycle passenger	+	+	+	=	+	+
Fruit buyer	+	+	-	+	+	+
Fish sauce buyer	+	+	+	+	+	+
Local government	+	+	+	+	+	+

In this village in Vietnam unlike the method earlier developed in Bangladesh, in the second round of stakeholder workshops the participants discussed:

- Actions needed to achieve the priority solutions
- Possible conflicts and their mitigation
- Composition of the management committee
- Rules to be followed and punishments
- Monitoring to assess impacts
- Timetable for implementation

They also agreed to disseminate the workshop experience and findings to their neighbours

5. Rules set by the participants

Rules

Main rules agreed on in PAPD:

- Post signboards and red flags to mark sanctuary
- No fishing at any time in the sanctuary.
- No boats of any kind in the sanctuary canal
- After 3 years half of the sanctuary will be fished with income distributed equally among all people living along the sanctuary and Nga Ngay canal.

Rules specific to the Nga Ngay canal:

- no fishing using battery/electricity or dynamite
- no use of chemicals to attract fish
- net mesh size to be 2.5-3 cm
- no fishing using ducks
- fish under 3 cm in length not to be caught
- no big boats or tourist or engine boats
- ducks should not be raised in either sanctuary or Nga Ngay canals

Punishment set for rule violators

For the people within the community

1st time: Hamlet head will arrange the violator to meet with the community and arrange awareness training

2nd time: Payment of 10 times more price of the caught fish

3rd time: Handing the violator to law enforcing authority

For the people within the administration

1st time: Hamlet head will arrange the violator to meet with the community and arrange awareness training

2nd time: Payment of 20 times more price of the caught fish

3rd time: Handing the violator to law enforcing authority

This will have Project Management Committee:

9 members comprising:
5 members from People's Organisation
1 member from each of 4 stakeholder categories

6. Participatory Monitoring

The participants wanted to see the following outputs impacts from their plan and they proposed the types of monitoring needed to see the expected outputs.

Indicator/output	Monitoring
Fish catch increase	catch monitoring
Fish diversity increase	catch monitoring
Fish consumption increase	consumption monitoring
Increase in fish marketed	market monitoring
Increased income from VAC	demonstration plots/uptake
Reduced use of pesticide	PM training & adoption
More safe domestic water	water quality monitoring
Better habitat for fish	water quality monitoring
More sustainable agriculture	demonstration plots/uptake

Participatory Monitoring Team

- 5 persons agreed to participate in fish catch monitoring
- 30 households agreed to monitor their own fish catch and consumption

7. Conflict Resolution

Specific stakeholders who thought they would be adversely affected by the plan agreed on by the community raised some problems:

8 duck raisers
2 canal side tree owners
7 landowners having land on the side of the sanctuary canal

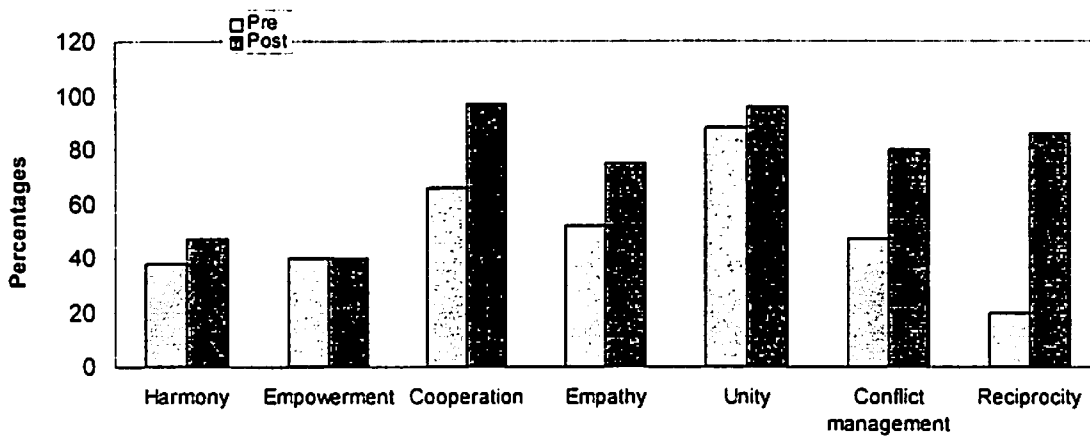
The process of reconciliation and negotiation that was successful involved:

- One to one interaction
- Solution with the community
- Solutions from the People's Committee
- Consensus on the problem
- Agreement on the solution

8. Change in Social Capital

A series of questions designed to represent different dimensions of social capital were presented to the participants in the PAPD workshop in a survey before the workshop. They were asked to give answers on a scale ranging from 1 to 7 or with a 7-point scale ranging from maximum disagreement (1) to maximum agreement (7). The survey was repeated with the same respondents in Loi Du A and Loi Du B hamlets after the PAPD and implementation of the planned activities. The percentage giving high scores of 6 or 7 in the two surveys is shown in Fig. 1. All changes in indicators between the surveys were positive. There was apparently a marked increase in levels of cooperation, conflict management and reciprocity among the participants after the successful implementation of the plan developed through PAPD. Reflecting the cooperation needed in agreeing on the plan and its implementation, the resolution and management of problems over the implementation plan and resolution of conflicts over this, and an increase in feelings that if community members help someone they can expect help in return.

Fig 1: Change in social capital



However, although the participants indicated a high level of unity and cooperation in the community, it would appear that the PAPD had little impact on empowerment and harmony. There are still underlying tensions between members of the community and local government which will take longer to resolve and this will depend on the extent that resource management is actually devolved following the PAPD and its implementation from local government to local community members through an effective local management committee.

9. Conclusion

The PAPD method which was developed in Bangladesh was successfully adapted and followed in planning improved management of aquatic resources in An Binh village. A new step was added to resolve issues in finalizing implementation details and minimize any adverse impacts related to physical works. The community plan was advanced by the People's Committee and which then implemented it, involving excavation of a canal and creation of a fish sanctuary in early 2002. A local committee composed of Peoples' Organisation representatives and local stakeholders representatives is overseeing various rules related to water and fish use agreed by the community. So far compliance is reported to be high. The community decided on how it wanted to monitor and assess impacts, and participatory monitoring is now underway.

10. References

- Allen, W., O. Bosch, M. Kilvington, J. Oliver and M. Gilbert. 2001. Benefits of Collaborative Learning for Environmental Management: Applying Integrated Systems for Knowledge Management Approach to Support Animal Pest Control. *Environmental Management*, 27 (2), 215-223.
- Barr, J.J.F. and P-J. Dixon. 2001. *Methods for consensus building for management of common property resources*. Final Technical Report of R7562. Centre for Land Use and Water Resources Research, Newcastle University, UK.
- Kaner, S. 1996. *Facilitator's Guide to Participatory Decision Making*. New Society Publishers, British Columbia with Community at Work, San Fransisco.
- Krishna, A. and Shrader, E. 1999. *Social Capital Assessment Tool*. Paper for the Conference on Social Capital and Poverty Reduction. 22-24 June, 1999. World Bank, Washington, D.C.
- Krishna, A. and N. Uphoff. 1999. *Mapping and Measuring Social Capital: A conceptual and empirical study of collective action for conserving watersheds in Rajasthan, India*. Social Capital Initiative, Working Paper No. 13. Environmentally and Socially Sustainable Development Network, World Bank, Washington, D.C.
- McCool, S.F. and K. Guthrie. 2001. Mapping the dimensions of successful public participation in messy natural resources management situations. *Society and Natural Resources*, 14, 309-323.
- Mosse, D. 1994. Authority, gender and knowledge: theoretical reflections on the practice of Participatory Rural Appraisal. *Development and Change* 25(3): 497-526.
- Pomeroy, R.S. 1998. A Process for Community-based Fisheries Co-management. *NAGA the ICLARM Quarterly*, Jan-Mar, 71-75.
- Ravnborg, H.M. and O. Westermann. 2000. *Understanding Interdependencies: A precondition to collective natural resource management*. Paper presented at the Eighth Conference on the International Association for the Study of Common Property at Bloomington, Indiana; 31 May – 4 June 2000.

ANNEX

Part A: first stakeholder group sessions – problem census

Group-1: Landless (no rice field or garden)

Problems	Causes	Effects	Solution	Affects group
1. Siltation of canal	<ul style="list-style-type: none"> • Daily wave activity • Canal was excavated in 1998 	<ul style="list-style-type: none"> • Water very communication different in dry season • Filter decrease 	<ul style="list-style-type: none"> • Canal re-excavation 	<ul style="list-style-type: none"> • Community
2. Water pollution	<ul style="list-style-type: none"> • Use of insecticide/fertilizer/pesticide • Waste from noodle preparation in commercial basis • Raising ducks and pigs • Dam on the canal 	<ul style="list-style-type: none"> • Effect • Health problem • Lack of safe drinking water 	<ul style="list-style-type: none"> • Manage waste water and garbage • Manage waste disposal • Avoid too much insecticide/pesticide • Bigger pipe for waste disposal • In house waste management 	<ul style="list-style-type: none"> • Community • Producers
3. Fish declining	<ul style="list-style-type: none"> • Low water level for fish to migrate • Use of electric gear • Use of insecticide • Use duck to catch fish (duck chase snakehead and farmers catch them and the fries then die) • Over population • No. of crop grows increased 	<ul style="list-style-type: none"> • Lack of fish for food • Decreased income from fish catch 	<ul style="list-style-type: none"> • Limit use of electric gear • Stop using duck • Avoid use of unlimited pesticide 	<ul style="list-style-type: none"> • Community
4. Low price of agricultural products	<ul style="list-style-type: none"> • Limited market • Less export • Low quality • Less capital for production 	<ul style="list-style-type: none"> • Made life difficult 	<ul style="list-style-type: none"> • Improved seed • Subsidize output • Improve technology 	<ul style="list-style-type: none"> • Farmers
5. Lack of capital	<ul style="list-style-type: none"> • Over population • Lack of plan • Low income 	<ul style="list-style-type: none"> • Low quality of life • Production low 	<ul style="list-style-type: none"> • Credit 	<ul style="list-style-type: none"> • Poor landless

Seasonal calendar

1.	Paddy cultivation	Whole year
2.	Raise pigs/chicken/ducks	Whole year
3.	Raise fish	January-August
4.	Snail trade	January-May, October-December
5.	Hired labour	Whole year
6.	Catch fish	September-November
7.	Noodle production	Whole year
8.	Garden	Whole year
9.	Tailors	Whole year

Events trend:

1974	Tornado
1975	War
1978	Famine
1983	Pig disease
1985	Drought
1986	Started to use HYV
1990	Fish disease, fish decline
1990-93	Rice disease (Brown hopper attack)
1993	Got electricity
1998	Road from Nga-Ngay bridge to Ram Rau bridge
1999	Excavation of causes
2001	Foot and mouth disease of pigs

Other problems:

1. Bad road, communication (15)
2. Lack of electricity (10)
3. Lack of credit (10)

Group-2: Owner of rice field + garden

Problems	Causes	Effects	Solution	Affects group
1. Bad road communication (25)	<ul style="list-style-type: none"> • Weather • Silt from re-excavation dumped on the road side 	<ul style="list-style-type: none"> • Community (to school & field) 	<ul style="list-style-type: none"> • Re-build the road • Put sand on the top 	<ul style="list-style-type: none"> • Community • students
2. Lack of capital (24)	<ul style="list-style-type: none"> • Agricultural product price dropped • Input cost • Unemployment 	<ul style="list-style-type: none"> • Income 	<ul style="list-style-type: none"> • Give loan 	<ul style="list-style-type: none"> • Community
3. Silted canal shallow (21)	<ul style="list-style-type: none"> • Erosion along the canal • Many engine boat creates wave and brings more silt in the canal 	<ul style="list-style-type: none"> • Transportation • Fish declining 	<ul style="list-style-type: none"> • Dig canal • Grow more trees • Bamboo piles or porcupines 	<ul style="list-style-type: none"> • Community
4. Fish declining (17)	<ul style="list-style-type: none"> • Use of pesticide • Battery gear • Too many crops a year • Ducks • Shallow canal • High population 	<ul style="list-style-type: none"> • Fish for consumption and sale 	<ul style="list-style-type: none"> • Protect fish from insecticide • Fish sanctuary • Fish conservation 	<ul style="list-style-type: none"> • Community
5. Local security	<ul style="list-style-type: none"> • Unemployment 	<ul style="list-style-type: none"> • Not so serious 	<ul style="list-style-type: none"> • Govt. will solve • Agreement among community members 	<ul style="list-style-type: none"> • Community

Seasonal calendar

1. Rice cultivation Whole year
2. Fruit tree Whole year
3. Raise chicken Whole year
4. Hired labour February-May, September-December
5. Factory labour Whole year
6. Noodles production Whole year
7. Tailors Whole year
8. Agriculture Whole year

Events trend:

1975	Fish declined
1976	Fish disease
1978	Cooperative, begin to grow 2 crops/year, HYV variety, Fish declined due to more water taken for irrigation
1983-84	3 crops/year
1992	Electricity
1994-95	Rice disease (brown hopper)
1996	School (elementary)
1998	Re-excavation of Nga-Ngay canal
1999	Built bridge from Ram Ran to Nga-Ngay
2001	Pig disease (foot and mouth disease)

Other problems

1. Rice production (11)
2. Unemployment (8)
3. Water pollution (2)
4. Electricity (4)

Group-3: Owners of Rice field+Garden+Fish culture

Problems	Causes	Effects	Solution	Affects group
1. Fish production declining (32)	<ul style="list-style-type: none"> • Many crops in a year • Use a lot of pesticide • HYV change habitats of fish • High human population • Different ways to catch fish • Wave action • Duck raising • Shallow canal (erosion and other activities) 	<ul style="list-style-type: none"> • Not enough fish for consumption of sale 	<ul style="list-style-type: none"> • Fish raising • Fish sanctuary • Regulation for size of the net (gear) • Ways of fishing 	<ul style="list-style-type: none"> • Community
2. Water pollution (29)	<ul style="list-style-type: none"> • Limited awareness about environmental protection (animal husbandry, pesticide use, duck rearing) • Pollutants from small industry (noodles) 	<ul style="list-style-type: none"> • Health problem (diarrhoea, skin disease): 20% hh has tubewell; >50% hh depend on Nga ngay canal. 	<ul style="list-style-type: none"> • Making well for better aquafer • Excavation of canal • Filter use • Social adherence (group formation, motivation, awareness) • Resettleme nt plan 	<ul style="list-style-type: none"> • Community
3. Flood (12)	<ul style="list-style-type: none"> • Small dyke • Shallow creek • Limited drainage • Lack of sluice gate management 	<ul style="list-style-type: none"> • Fruit tree gardens • Fish raising • Animal husbandry • Travel and communicatio ns 	<ul style="list-style-type: none"> • Excavation • Dyke building 	<ul style="list-style-type: none"> • Community

Seasonal calendar

- | | |
|---------------------|---------------------------------|
| 1. Rice cultivation | Whole year |
| 2. Garden | Whole year |
| 3. Raise animal | Whole year |
| 4. Hired labour | January-March, October-December |

Timeline/ trend:

- | | |
|------|------------------------|
| 1978 | Flood |
| 1979 | Low yield of rice |
| 1997 | Flood (deep) 5ft' |
| 1998 | Road construction |
| 2001 | Foot and Mouth disease |

Other problems:

1. Capital (29)
2. Security (6)
3. Electricity (15)
4. Population (4)
5. Irrigation (5)
6. Erosion (1)
7. Road bad (10)
8. Crop variety (15)

Group-4: Women

Problems	Causes	Effects	Solution	Affects group
1. Capital (29)	<ul style="list-style-type: none"> • Less land • Price of rice low • Fertilizer cost 	<ul style="list-style-type: none"> • Cannot produce • Cannot maintain livelihood 	<ul style="list-style-type: none"> • Investment from donors 	<ul style="list-style-type: none"> • Community
2. Polluted water (20)	<ul style="list-style-type: none"> • Inadequate water flow • Poultry and pig • Small industry (noodles) 	<ul style="list-style-type: none"> • Health problem 	<ul style="list-style-type: none"> • Digging well (hand pump) - cost VND 1.5 million per well (100m deep) 11 existing, needs 8 more • Fish culture 	<ul style="list-style-type: none"> • Community
3. Fish declining (16)	<ul style="list-style-type: none"> • Use of pesticide • Small size fish caught • Use of electric gear • High population 	<ul style="list-style-type: none"> • No fish for consumption or for sale 	<ul style="list-style-type: none"> • Fish culture 	<ul style="list-style-type: none"> • Community

Seasonal calendar

Rice cultivation	Whole year
Fruit	Whole year
Raising/pig	Whole year
Hired labour	Whole year
Training	Whole year
Tailoring	Whole year
Hair dresser	Whole year

Events trend:

1990	School, 2 crops
1991	Electricity
1992	Curling disease of paddy
1995	Electricity (Nga-Ngay canal)
1995-98	3 crops/year
1998	Orange disease (viral)
2001	Foot and mouth disease

Other problems:

1. Price of handicraft low (8)
2. Agriculture products price low (12)
3. Erosion (8)
4. Electricity (10)
5. Security (9)
6. Flood (3)
7. Road (9)

Part B

Additional points raised during the first plenary session:

Fish decline	<ul style="list-style-type: none">• 2 crops-1 vegetable in Loi Du A• Punishment• Excavation• Put some tree branches in the deepest part
Siltation	<ul style="list-style-type: none">• 2/3 boat trips for tourist in Nga-Ngay canal• Running big boats
Water pollution (duck raising)	<ul style="list-style-type: none">• Following IPM

Part C: Second stakeholder group work: Solution analysis

Group 1: Solution analysis

Solution/ action	Purpose	Alternative	Political/ social impacts	Technical/ economic impacts	Environmental impacts	Sustainability
Problem: Fish declining						
Conserve fish	<ul style="list-style-type: none"> • Increase fish population • Balanced ecosystem • Increased fish diversity 	None	Some households will be affected	Need technical supports from the government	None	Long term
Excavation:	<ul style="list-style-type: none"> • Better water flow • Increased water level in the sanctuary for fish conservation 	None	Some households will be affected	Need support from the government	None	No idea
Decreasing amount of insecticide	<ul style="list-style-type: none"> • Protect their health • Decrease water pollution 	Apply IPM	Pesticide dealer	Need support from Cantho University and government	Good for the environment	Depends on the natural conditions
Changing from 3 paddy crops/year to 2 paddy crops/year and 1 vegetable crop or anything else depending on the natural condition	<ul style="list-style-type: none"> • Increase income • Increase soil fertility 	No idea	Using more labourers	Need some demonstrations	<ul style="list-style-type: none"> • better for the environment • increase income • decrease the use of insecticide 	Depends on the market (need)
Problem: Water pollution						
Drilling wells	<ul style="list-style-type: none"> • Having pure water for daily activities and production 	<ul style="list-style-type: none"> • Storing water from the rain and taking the water when the water level is high 		Need supports from the government	Less polluted	No idea
Problem: Pig raising						
Using bio-gas for cooking	<ul style="list-style-type: none"> • Make the environment pure • Using waste as manure and food for the fish 		No adjustment	Need technical assistance from Can Tho University	No idea	No idea

Group-2 Solution analysis

Problem: Fish declining						
Solution/ action	Purpose	Alternative	Political/social impacts	Technical/economic impacts	Environmental impacts	Sustainability
Fish conservation (sanctuary)	<ul style="list-style-type: none"> • Increase fish population • Ecosystem management • Increase income 	• None	• None	• Support from expert	• None	• Depends on people's perception
Canal re-excavation	<ul style="list-style-type: none"> • To raise fish preserve habitat • Transportation • To control inundation • Water can come to their private canal 	• None	• None	• Support from expert	• None	• After 3 years if the present situation remains static
Problem: Water Pollution						
Drilling well	<ul style="list-style-type: none"> • For safe water for daily activity 	<ul style="list-style-type: none"> • Store rain water • Make canal clean 		<ul style="list-style-type: none"> • Themselves • Govt. expert 	• None	• Don't know
IPM	<ul style="list-style-type: none"> • Reduce cost • Increase quantity of rice • Reduce effect on fish • Reduce health hazard 			<ul style="list-style-type: none"> • Themselves • Govt. expert 	• Positive	• Depend on resource

Group-3 Solution Analysis

Problem: Fish declining						
Solution/ action	Purpose	Alternative	Political/social impacts	Technical/economic impacts	Environmental impacts	Sustainability
1. Re-excavation of canal	<ul style="list-style-type: none"> • To increase fish population • To increase income • Increased Irrigation • Improved transportation 	• None	• None	<ul style="list-style-type: none"> • Assuring them the fund is available • Experts • Contractors (labour) 	• Positive	• 3 years
2. Sanctuary	<ul style="list-style-type: none"> • increase 	• None	• None	• Assuring		

	<ul style="list-style-type: none"> income improve livelihood increase natural fish 		(some people will be affected but it could be managed)	<ul style="list-style-type: none"> them the fund is available Experts Contractors (labour) 		
Problem: Water Pollution						
Solution/action	Purpose	Alternative	Political/social impacts	Technical/economic impacts	Environmental impacts	Sustainability
1. IPM	<ul style="list-style-type: none"> Conserve fish Health hazard Cost of production 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Extension station (Plant protection by the Agriculture Department) CTU for improved seed New variety introduction Natural energy use 	<ul style="list-style-type: none"> Positive impact 	<ul style="list-style-type: none"> Long term
Rule for duck raising	<ul style="list-style-type: none"> Reduce water pollution Protect paddy field Increased aquaculture 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Negative impact on duck rearer Committee should settle the issue with duck rearer 	<ul style="list-style-type: none"> Committee will implement 		<ul style="list-style-type: none"> Long term

Group-4: Solution Analysis

Problem: Fish declining						
Solutions/actions	Purpose	Alternatives	Political/social impacts	Technical/economic impacts	Environmental impacts	Sustainability
Fish conservation	<ul style="list-style-type: none"> Consumption Sale 	<ul style="list-style-type: none"> No alternatives 	<ul style="list-style-type: none"> No adverse impact 	<ul style="list-style-type: none"> Don't know 		
Re-excavation of Canal						
Excavation of Canal	<ul style="list-style-type: none"> Road Habitat for fish Transportation 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Some hh may be affected 	<ul style="list-style-type: none"> Govt. 		<ul style="list-style-type: none"> 5 years
Problem: Water pollution						
1. Drilling well	<ul style="list-style-type: none"> For daily activities 	<ul style="list-style-type: none"> Purification of water 		<ul style="list-style-type: none"> Govt./village 		<ul style="list-style-type: none"> Long term
2. Limit use of pesticide	<ul style="list-style-type: none"> To stop water pollution 		<ul style="list-style-type: none"> No restriction 	<ul style="list-style-type: none"> Training 	<ul style="list-style-type: none"> Traditional 	

Part D: Stakeholder Force Field Assessment

Group 1: Stakeholder Force Field Assessment

+++	Vegetable seller, Feed buyer, Coffee seller, Fish seller, Fruit buyer
++	Fruit seller, Grocery seller, wine buyer, coffee seller, Noodle buyer (trader), Cloth seller, Meat seller,
+	Noodle seller, grocery buyer, Rice seller, Noodle seller (for breakfast)
—	Tax collector, Middleman (fruit and paddy)
— —	Gas seller
— —	Fertilizer seller, Middleman (rice), Wine seller
—	

Group 2: Stakeholder Force Field Assessment

+++	Cloth seller, Vegetable seller, coffee seller, Meat seller, Fish seller, Fruit buyer, Feed buyer, Tax payer
++	Fertilizer seller, Middle man, Fruit seller, Grocery seller, wine buyer, coffee seller, Noodle buyer (trader)
+	Noodle seller, grocery buyer, Rice seller, Noodle seller (for breakfast)
—	Gas seller
— —	Middleman (fruit and paddy)
— —	Middleman (rice), Wine seller
—	

Group-3: Stakeholder Force Field Assessment

+++	Friends, Neighbors, Doctors, Fertilizer seller, people of the community
++	Coffee seller, carpenter, relatives, fruit buyer, grocery store seller, fish seller
+	Gas seller, pub owner, meat seller, paddy buyers
-	
--	Tobacco seller

Group 4: Stakeholder Force Field Assessment

+++	Grocery, Fruit seller, Rice seller, Meat seller, Ice Seller, Egg buyer, Coffee shopper, Teacher, Feed seller, Gas seller, Mechanic
++	Restaurant owner, Fish sauce seller, Noodle seller, Motorcycle shop, vegetable seller
+	Fish Seller
-	
--	
---	Vegetable seller

Part E: Social Impact Analysis

Group-1: Social impact analysis

Stakeholders	Conser ving fish	Excavation	Applying IPM	Change 3→2 crops	Drilling well	Using bio-gas
Traditional doctors	0	0	0	0	+	0
Fish seller	+	+	+	+	0	0
Vegetables seller	+	+	+	+	0	0
Mushroom seller	0	+	+	-	+	0
Police	+	+	+	+	+	+
Meat seller	-	+	0	0	+	+
Customers	0	+	+	+	0	0
People who drink coffee	+	+	+	+	+	+
Person who owns grocery store	+	+	+	+	+	+
Person who sells fertilizer and insecticide	+	+	+	+	+	+
Person who sells gasoline	-	+	0	+	0	0
Person who works at the drugstore	0	0	0	0	0	0
Person who sells wine	+	+	+	+	+	+
Person who sells noodle	0	+	+	0	+	0
Motor cycle driver	+	+	0	0	+	+
Hair dressers	+	+	0	+	+	+
People who transports by motorcycle driver	+	+	+	+	+	+
Customers of hair dresser	+	+	-	+	+	+
Person who buys fruits	+	+	+	+	+	+
Person who buys eggs	+	+	+	+	+	+

Group 2: Social impact analysis

Stakeholder	Sanctuary	Re-excavation of canal	Drilling well	Limited use of pesticide
Grocery store keeper	+	+	+	+
Fruit seller	+	+	+	+
Rice Seller (breakfast)				
Meat seller	+	+	0	+
Ice seller				
Egg buyer				
Coffee shop owner	0	0	0	0
Fish seller	+	+	+	+
Teacher				
Food seller (pig, chicken)				
Gas seller	+	+	+	+

Stakeholder	Sanctuary	Re-excavation of canal	Drilling well	Limited use of pesticide
Mechanic				
Restaurant owner				
Fish sauce seller				
Noodle seller				
Motorcycle shop keeper (owner)				
Vegetable seller	+	+	+	+
Rice buyer	+	+	+	+
Noodle buyer	+	+	+	+
Pig buyer				
Duck buyer	-	+	+	0
Labour	+	+	+	+
Cloth seller	0	0	0	0
Brain buyer	0	0	0	0
Coffee customer				
Noodle seller	0	+	+	+
Wine buyer	0	+	+	0
Fertilizer seller	-	-	-	+

Group-3: Social Impact Analysis

Stakeholders	IPM	Re-excavation	Sanctuary	Rule Duck raising
Neighbor (friends)	0	+	+	+
Doctor	0	0	0	0
Paddy buyer	+	0	0	0
Fertilizer seller	-	0	-	0
People committee	+	+	+	+
Coffee seller				
Carpenter	0	+	+	0
Grocery seller	0	+	+	0
Fish seller	0	+	+	0
Gas seller	0	+	0	0
Pub owner	0	+	+	0
Meat seller	0	0	-	0
Tobacco seller	0	+	0	0
Fruit buyer	0	+	0	0

Group 4: Social Impact Analysis

Stakeholder	Sanctuary	Re-excavation of canal	Drilling well	Limited use of pesticide
Grocery store keeper	+	+	+	+
Fruit seller	+	+	+	+
Rice seller	0	0	0	0
Meat seller	+	+	+	+
Ice seller	+	+	+	+
Egg buyer	+	+	+	+
Coffee shop owner	0	+	+	0
Fish seller	+	+	+	+
Teacher	+	+	+	0
Feed seller	+	+	+	+
Gas seller	0	0	0	0

Stakeholder	Sanctuary	Re-excavation of canal	Drilling well	Limited use of pesticide
Mechanic	0	0	0	0
Restaurant owner	—	—	—	—
Fish sauce seller	+	+	+	0
Noodle seller	0	0	0	0
Motorcycle shop keeper	0	0	+	0
Vegetable seller	0	0	0	0
Rice buyer	0	+	+	+
Noodle buyer	0	0	0	0
Pig buyer	+	+	+	0
Fruit buyer	+	+	+	+
Duck buyer	—	+	+	+
Customer of wine seller	0	0	0	0
Middle man				
Commerce				

Part F: Rules Set by the Community and Punishment for Violating Rules

Rules:

- No big boat in the Nga-Ngay canal.
- No boat in the sanctuary canal
- No tourist boats
- No engine boat
- People's Organisation will buy 3 tricycle to carry rice from farmers fields
- Catch fish in half of the sanctuary after 3 years. But if the population of fish increases a lot, the committee will decide if they should fish earlier
- Minimum net mesh size-2.5-3.0 cm
- No battery gear
- No fishing by duck
- Sign board posted, red flag
- No chemical to attract fish
- Stop catching fingerlings
- Raising duck in a specific area

Punishments:

1st time: meeting in the community for awareness, hamlet lead will be responsible

2nd time: 10 times price of fish he caught

3rd time: go to prison

Administrative penalty (outsiders)

1st time: awareness training

2nd time: 20 times prices of fish he caught

3rd time: go to jail

Re-excavation of Nga-Ngay canal within 2 weeks

Implementation Plan (Loi Du A)

- 15/11-23/11 Finalize contract & ask for permission from the province for re-excavation
- 24/11-28/11 Harvesting season
Measurement/engineering aspects
- 29/11-7/12 Cut tree along the canal
- 8/12-31/12 Start re-excavation, wait for 10 days
- 10/1/2002 Road construction