Management of Biological Resources in Tam Giang Lagoon: Issues, Participatory Research Application, and Challenges

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Abstract

The Tam Giang Lagoon, one of the biggest in Asia, is located in Thua Tien Hue province, Vietnam. Natural resource degradation and threats to sustainable livelihoods in this ecosystem result in complex problems in management. The project, established in 1994, was aimed at improving intellectual capacity and interdisciplinary skills for researchers in the Hue region to address the above problems. During the first two-year phase, the research activities were to learn about the systems and management mechanism by using participatory research in an interdisciplinary fashion. First, efforts were made to involve resource users in the research activities and raise their awareness about resource problems and conflicts in management. The project collected data to serve as the basis from which to establish community-based management of biological resources in the lagoon. This paper is to present a new application in approaching participatory research, the most critical issues/problems identified, and challenges for expanding the community-based research for biological resource management.

1. Background

The Tam Giang lagoon, one of the biggest in Asia, is located in Thua Thien Hue province, Vietnam. Its area is about 22,000 ha with a length of 70 km along the coast. About 300,000 inhabitants have settled around the lagoon in a total 236 villages from 31 communes and earn their livelihood by directly or indirectly exploiting natural resources in and around the lagoon.

The project was established in 1994 by a group of Canadian and Vietnamese researchers from Hue University of Science (HUS), Hue University of Agriculture and Forestry (HUAF), Dept. of Fisheries of Thua Thien-Hue Province (DoF), Provincial Department of Science, Technology and Environment, Nha Trang Oceanography Institute, Southeast Asian Research Institute and Hai Phong Institute of Oceanography. The project outline was developed and approved by IDRC and CIDA under the VISED program in 1995. The project started in July 1995 with a PRA training course and exercise in Phu Tan commune. In October, 1995 three interdisciplinary research teams were formed and separated to conduct research in the three research sites selected.

The institutions directly involved in carrying out the project are: HUAF, HUS and DoF. Among a total of 19 researchers (HUAF: 7, HUS: 9 and DoF: 3), there are 4 PhDs, 5 Masters and 11 Bachelors or engineers belonging to the following disciplines: Biology (5), Agronomy (2), Rural development studies (1), Animal production (2), Sociology and Ethnography (3), Fisheries (4), Agricultural Economics (1) and Environmental Chemistry (1). The project is managed by a Management Committee of 6 members. The chairman and the coordinator are both from HUAF. The Management Committee makes final decision on all activities, monitors the budget and holds monthly meetings.

2. Specific Research Objectives

2.1 To identify the structure and social organisation of representative communities whose members are active fishers and farmers, including social and gender role of fisher groups.
2.2 To identify the groups harvesting resources, species harvested, sites and technologies used, and the amount of harvest by gear, season and location.

2.3 To estimate stock and understand crucial ecological parameters of important species in the lagoon, including distribution, migration, spawning, nursery habitats and growth.

2.4 To identify local resources management and production, decision-making at the community level, including fishers' selection of gear and allocation and enforcement of use rights to fishing grounds as well as the role of village leaders, commune People's Committee and formal and informal regulations and policies.

2.5 To identify the share of aquatic production destined for household consumption and use, household-based processing, direct local marketing, export and the significance of aquatic products to people's livelihoods.

2.6 To understand why previous settlement attempts for sampan people have been unsuccessful and to involve these sampan people in determining preferences for livelihood alternatives.

2.7 To improve farms incomes and productivity of poor soils especially for selected villages whose households engage in both farming and fishing.

2.8 To identify the socio-economic and environmental impacts of aquaculture development in the lagoon including an analysis of conflicts between aquaculture and other economic activities (e.g.: agriculture, tourism, fishing, transport, etc.)

2.9 To initiate research to develop methods of sustainable aquaculture production, addressing technological, organisational and regulatory issues.

3. Training Activities

PRA Training was organised at HUAF and Phu Tan commune for 28 participants consisting of 19 project members, 3 members of the Upland resources management project, 4 from Bach Ma National Park and 2 from JIVC. The training course provided the researchers with new methodologies to conduct research and to improve local people's participation into the research activities.

In December 1995, 2 project members attended a 2-week training course on 'Coastal and marine resources management' organised by SEAMEO/BIOTROP at University of Can Tho.

2 project members attended "Festival Workshop on Community-based Coastal Resources Management" (CBCRM) held by the University of Philippines in Dilliman.

1 project member attended a Workshop on "Mangrove Management in Asia" held in Ho Chi Minh City.

Other trainings were organised by the researchers at three research site. These training sessions were on data collection for local research collaborators and the fishers and farmers who participated in the research activities.

4. Process followed in conducting research

PRA was applied at the selected sites at the beginning of the research period. The community groups, facilitated by the research team, identified their problems. However, the level of local participation in planning each research topic varied. Participation was weak for those research topics focussed on basic studies, e.g. aquatic resources assessment, social issues, effects and impact of development strategies.
However, participation was higher for those research topics or activities which were oriented towards interventions, e.g. banning of electric fishing, improving land productivity using appropriate cropping patterns; finding alternative income for women.

Different community groups were involved in the research. Though the groups are not distinct and members can belong to more than one group, the list is as follows:

- Government officials at district, commune and village levels
- Fishers: Fixed gear and mobile gear fishers
- Farmers
- Farmers-fishers
- Women
- Aquaculturists
- Sampan people (who live in boats)

The support of local government officials was enhanced by fitting the research activities to local socio-economic development. Establishing a good rapport with local leaders (by soliciting external support to solve some critical problems and needs of the community) produced advantages to improve participation.

Other groups' participation were enhanced by involving them in appropriate research activities. The farmers were involved in the improvement of agricultural productivity. The fishers participated in research into fishery resources, freshwater macrophytes, aquaculture and aquatic resource protection.

Briefly, the process followed in conducting research is as follows:

4.1 Local people, facilitated by researchers, identified their problems, assessed local potentials regarding natural and human resources, proposed research topics and the groups to be involved.

4.2 Researchers with local participants planned the specific research topics. The local people made decisions on selection of participating households, overall content and implementation procedure to be followed. The researchers facilitated the work by providing various options for the participants, thus building their awareness and in developing their insight into every alternative. In fact, the level of the researchers' influence on local people's decision-making varied from topic to topic and also from site to site.

4.3 Implementation of research activities was mainly done by fishers and farmers. It included the following:

- Training and instruction on research design, data collection and recording, and evaluation were provided to the participants regarding specific activities.
- Materials and tools that were not locally available for data collection and recording were provided to the participants.
- Supervision of data collection was the responsibility of the researchers, field staff and/or local research collaborators.
- Materials and resources necessary for implementing research activities in combination with livelihood activities were made available to the households. In some cases, money and gifts were given for extra time that the households took to collect and record the data.

4.4 Continuous evaluation and improvement in the implementation of research. In most of the research activities, continuous evaluation was done by the researchers. The evaluations identified difficulties encountered and positive results. Proposed improvements and changes to contents and procedures were discussed and agreed to with the participants and then put into effect. A lot of improvements were made in research content, type of data collected, and the process in order to adapt the research to local people's knowledge and skills. To improve the reliability of data, other appropriate participants were involved.
4.5 Final evaluation was done by the local people and the researchers. Level of the participation from local people in results evaluation was different depending on specific research topics. The local people were interested mostly in the results from direct interventions and topics focussing on direct and immediate benefits. The researchers also evaluated using their own skills and experience, based on project objectives and on feedback from the local people.

5. Preliminary Research Findings

Three of the most important findings in the project are (1) the diversity of income sources of all local villagers, (2) conflicts between management strategies and groups, and (3) that villagers were able to involve local government for specific CBNRM activities.

5.1 Diversity of occupations

The diversity of income sources of the local people living around the lagoon is high. Generally, there are two types of communities, farming and fishing. Members of farming communities have access to land allocated as rights of land use. Members of fishing communities, including new settlements and sampan people, only have limited rights to public water areas. However, occupations for all are diverse by season and by household member. At different periods in the year, occupations differ and can be described in a very general and simple way as follows:

After the rainy periods, when soil moisture is high, farmers start seeding and prepare fields for crop growing, fishers fish and aquaculturists raise shrimp and fish.

The main crop growing season (December to April), which overlaps transition of the rainy and dry season, is a slack period for many poor farmers and a time when they are lacking in food. After finishing the crop growing, they go fishing, doing off-farm activities and selling labor.

During the dry season, after the harvest, farmers lack work. They become active in off-farm activities such as fishing, working as hired labour or in construction and collecting firewood and grass. The fishers also farm as an additional job: they grow rice in the submerged fields at the edge of the lagoon as a secondary crop (rights to this land is contracted out by auction). Aquaculture, done by both farmers and fishers, is operated mainly in the dry season.

During the flood season time, from late September to early November, storms, heavy rains and strong winds followed with floods stop people from earning a living. People struggle and suffer with high risks and calamities. It is a slack time for fishers because of the dangers in fishing.

Within households, diversity of occupation results from the following conditions:

Extremely low levels of income makes people find additional sources by diversifying their economic activities. Fishers and sampan people keep pigs. Some fishers win contracts for the rights of land use for growing rice. Some farmers practice fishing by buying fixed gears complete with the rights to fishing grounds. Many farmers use mobile fishing gears seasonally.

The transitional process from farming communities and fishing communities to mixed farming-fishing communities has occurred because of a decrease in natural aquatic resources and changes in management strategies. Originally, Trung Lang village of Quang Thai was a fishing community. It is now becoming a farming-fishing village consisting of a mobile-gear fishing group, a fixed-gear fishing group, and a farming-fishing group, the latter of which occupies half of total households.
Dien Truong village of Phu Tan commune was a farming village but it has become a farming-fishing community since it converted agricultural land into an aquaculture and fishing area. Ha Giang village of Vinh Ha was a new settlement of fishers which became a farming-fishing to make better use of local resources. Some land is used for crop production and pigs are raised by most households using local feed sources such as seagrass and waste fish.

Different types of work are generally the responsibility of different people within the household. Migrating workers are mainly the unemployed youth. They work in construction, trade, and clothes manufacturing, etc., outside community. Men and women are responsible for different activities. In fishing households, the men produce rice as alternative work and in farming households, the men fish as an alternative. Women are responsible for domestic animal production and trade of fishing and farming products.

5.2 Conflicts

Conflicts in natural resource management strategies and among local groups have been identified by the researchers. Very simply they have been described as follows:

**Agriculture vs. Aquaculture**

Conversion of agricultural land into aquaculture area and the construction of ponds in Phu Tan required the destruction of the primary dike for preventing salinity. Though adjacent rice fields were thought to be protected by the highway, acting as a dike, saline intrusion has affected them.

**Agriculture vs. Fishery**

In the northern part of the lagoon, salinity fluctuation is high. This relates closely to the availability of many aquatic species. The villagers claim that before Cua Lat dike was rebuilt to prevent salt water from leaching into the rice fields, salinity in the lagoon area was higher. Fish catches were higher and some exportable species such as greasyback (in big size) were available. At present these species are not caught.

**Aquaculture vs. Fishery**

Privatisation of water area for aquaculture (ponds and net enclosures) has reduced the public area available for fishing. This has caused some serious conflicts including damage of aquaculture structures.

**Mobile fishers vs. Fixed fishers**

In general, water area is considered public access for all fishers. However, fixed gear fishers have rights (though limited) to their own fishing grounds. Mobile gear fishers have very limited rights to fish (limited by time and specific location) in those grounds. Unequal shares to fishing grounds lead to unequal benefits between fishing groups which results in conflicts between fisher groups. Other conflicts occur among fishers because of the use of destructive fishing gear by certain groups.

**Farming groups vs. fishing groups**

Different groups living around the lagoon have access to different natural resources. The farmers want to fish but in return, refuse to share their land with the fishers who want to practice farming. The fishers want to have land holdings and, as well, compete to gain a higher share of fishing grounds.
Settled groups vs. Sampan groups

The sampan people are encouraged to settle on land but they are not provided appropriate land and assistance because farmers and fishers, already settled, do not want to lose land nor increase their crowded population.

Socially, among these groups conflicts occur as a result of a lack of respect among groups because of differences in customs, traditions and life styles.

5.3 Government Involvement

The Commune government's involvement was solicited by the fishers in an activity to manage fishing resources which was originally identified, planned, organised and implemented by the fishers themselves. This support was very much appreciated. The villagers were accustomed to leaving all responsibility for management to the government. In a case study in Quang Thai, the villagers organised themselves and successfully involved the commune government in a community-initiated ban of electric fishing. Commitment and involvement of the commune government in the activity increased. Initially, when the self-management committee of the villagers was established, the commune PC assisted simply by keeping its security force on stand-by in case of serious conflict or emergency. Due to some difficulties as well as opportunities, the commune security force became more and more involved. The commune leadership took over more and more of the activity because it could not ignore the specific requests from the villagers and, of course, enforcement of laws and regulations is its responsibility. Formerly it did not know how to act in the face of violators and was not aware of the extent of destruction made by electric fishing on aquatic resources.

6. CBNRM Research Issues/Processes

CBNRM research was initiated using different approaches in planning and implementation. Therefore, success varied among sites and also among specific research topics. Based on the level and duration of participation and on the extent of changes made to management, a higher level of success is associated with small scale (village rather than commune or district level), with topics that produced direct benefits and with areas more isolated from large city centers and markets.

The project has tried to involve the local government at three levels: the provincial, the district and the commune (in fact, three project members are from a provincial department). For some specific topics, local government officials were also involved. Involvement of commune government has made important contributions to the CBNRM research, especially for the topics providing direct benefits for local people. Conventionally, involvement of local government is solicited by the interveners (outsiders - researchers in this case). In some of the lagoon project activities, local people also joined in soliciting involvement of the local government which increased its support considerably, especially in the case of the banning of electric fishing.

The project cooperated with government agencies and other donor agencies for specific activities and other community needs. For example, the department of aquatic resources protection cooperated in the community-based ban of electric fishing; World Vision (an international NGO) provided loans for electric fishers (using electricity to fish) who were committed to quitting that occupation; the British Council funded the building of a bridge to integrate the fishing village with the neighboring communities. These activities provided direct benefits for local needs and therefore, enhanced local participation and also improved commitment of the local government towards research activities. Cooperation and linkage with other agencies should be well-planned at the beginning CBNRM research. It is most important that the community is provided with the necessary resources to be able to apply the CBNRM research results and improve critical community needs.

One of the most difficult tasks for the research team has been the planning of specific CBNRM research activities. In general the researchers are not skillful at research planning, a result of their education. Moreover,
CBNRM and participatory approaches are new concepts. Poor planning resulted in considerable unexpected problems in implementation.

Making the CBNRM activities sustainable was also one of the most difficult tasks of research team. A CBNRM activity required not only local resources but also external support, such as capital for investment and technical support. However, the research team was not supposed to have access to these resources for the activity.

7. Challenges in Expanding Community-Based Management

The most difficult challenge was to deal with the existing conflicts. It is difficult to plan well and implement the research activities aimed at solving conflict in the system. The researchers are aware of the conflicts; however, they lack the knowledge, skill and experience required to plan and implement activities on building awareness of the conflicts and changing people's attitudes and behaviors. The people may understand the conflicts but they may not implement any changes because these would result in losses to their livelihoods.

The ban on electric fishing was initiated with conditions which made the activity easier to implement. The ban was supported by government law and, especially the provincial government was making efforts to enforce the ban in the province. Therefore the commune government increasingly supported the activity in both dealing with the violators and in protecting the local guards when threats were made against them. As almost all the electric fishers were from outside the fishing community, the ban was mainly against outsiders which meant that all local fishers benefitted equally, or at least few of the local fishers suffered losses as a result of the ban. Therefore it was easier for the villagers to organize themselves and contribute to the activity.

Further expansion of CBNRM activities may encounter the following difficulties:

The local government support will likely decrease if the regulation to be enforced is not a government law but based on local rules. Improvement in a community's responsibility and confidence is crucial.

Future activities may result in losses not only to outsiders but also to some community members. The benefit resulting from the activities may not be equal for all local people; some will gain more and others might lose - at least in direct and immediate benefits. Agreement among villagers and their support might decrease. It is very important to identify the people responsible and capable of running an activity and to select strategies.

In conditions where there is less responsibility assumed by the local government and less support from part of a community, effective solutions to deal with threats made by uncooperative fishers (locals and outsiders) should be identified as a prerequisite to any further expansion of activities.

8. Lessons Learned from the CBNRM Research

CBNRM is complicated and creates many conflicts. Therefore, besides improvements in community support and participation, government at different levels should be involved to ensure the effectiveness and sustainability of this activity. Especially at the first stage of establishing community-based aquatic resource management, involving local government is crucial for the activity.

The establishment of community-based natural resource management can be successful if the initiative is appropriate. A small scale, specific activity which equally benefits all villagers is necessary for good application. The project gained some positive results in small communities (less 100 households). Our experience in CBNRM has been gained through several small separate activities (e.g. ban of electric fishing, use of peanuts and inter-cropping to diversity farm output and tree planting) which were not integrated into one large system but nevertheless used a CBNRM approach.
The socio-economic conditions in Quang Thai, which is relatively poor, isolated and less developed compared to other communes in Vietnam, made it possible for the farming, fishing and farm-fishing communities to organise themselves towards community-based coastal resources management initiatives. Particularly good results have been achieved from the ban of electric fishing and use of peanut and inter-cropping.

Fishers and farmers were able organize themselves to solve their own problems or improve income generation.

The relationship between the fishing community and local government was improved by the fishers' activities

Some community members were involved in building public awareness for aquatic resource protection in their community as well as in neighboring ones.

The local government was involved in the enforcement of aquatic resource protection with the fishers sharing the responsibility and contributing their efforts to the ban. The villagers used to leave all responsibility for management to the government however, the local government itself was not able to enforce the ban sustainably without the involvement of local communities.

Disappointments in the CBNRM research approach were in the level of local participation in research topics focussing on basic data collection. The villagers were interested in problems and issues identified and therefore participation was good initially. However it decreased due to a lack of direct or immediate benefits.

The biggest challenge in doing further research on CBNRM is to train field workers to be capable of dealing with equity issues within a community.

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