

Property rights and collective action in the management of mangrove ecosystems: Implications of the adoption of mangrove-friendly aquaculture

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Abstract

The SEAFDEC/AQD experience in Malalison Island on the Community Fishery Resources Management Project is well used in the Aklan project on community-based mangrove-friendly aquaculture. The territorial use rights in fisheries that was implemented in Malalison has become a model in investigating property rights regime in state-owned mangrove areas in Ibaay, Aklan. The concept of property rights as a management strategy in arresting the further destruction of mangroves and rehabilitating destroyed mangrove forest requires the collective effort of different users and stakeholders. There is a need to balance environmental conservation and food security in the management of mangrove resources.

Introduction

The Philippine waters used to be one of the most productive and diverse in the world. It is home to 2200 species of fish (Sale 1980) and 488 species of coral (Nemenzo 1981). But rapid population growth, industrialization, overfishing, and destructive fishing practices have continuously ravaged marine ecosystems over the past three decades. Coral reef fish production declined steeply, from 429,000 tons in 1966 to 269,000 in 1986 (McAllister 1988). Only 25% of coral reefs are in good condition now, with barely 5% in excellent state (Yap & Gomez 1985). Thick mangrove forests used to cover a large portion of the coastal areas.

Mangrove forests, aside from seagrass beds and coral reefs, form part of the coastal ecosystems that support coastal resources. Consisting of intertidal flora and fauna, mangrove forests thrive in the tropic and subtropical regions of the world. More than a quarter of this important resource is found in Southeast Asia (Spalding *et al.* 1997) and have contributed significantly to the socioeconomic well-being of the coastal communities (Field 1995).

Mangrove ecosystems provide the following ecological and economic benefits: (1) provision of

nursery grounds for fish, crustaceans and molluscs that are recruited into the fishery resources; (2) production of leaf litter and detrital matter which are broken down into bacteria, fungi, and other microorganisms, which in turn provide valuable source of food for marine animals in estuaries and coastal waters; (3) protection of lagoons and estuaries from storm and erosion; (4) reduction of some organic pollution in nearshore waters by trapping or absorption; (5) recreational grounds for bird watching and observation of other wildlife; and, (6) access to a high diversity of mangrove plants and animals, and their adaptations (Saenger *et al.* 1983; Hamilton & Sneider 1984).

Population growth and immense aquaculture development in the region have severely damaged the mangrove area. In Vietnam alone, mangrove forest cover was about 400,000 ha in 1943 but was reduced to 250,000 ha due to cutting primarily for charcoal. The chemical war in 1962-1971 destroyed about 105,000 ha. Specifically, from 1983 to the present, mangrove forests have been converted into agriculture lands and shrimp ponds. The areas of the ponds were too large while there were few sluice gates for tide water exchange resulting in the degradation of pond environment. Many people abandoned their ponds and moved to other areas to destroy other mangrove forests for new shrimp ponds (Hong *et al.* 1995). Mangrove cover in the Philippines, on the other hand, had been reduced from 400,000 ha in the 1960s to barely over 100,000 ha in 1994 due to conversion to fishponds and recreational facilities and indiscriminate cutting of firewood and materials for house construction (Primavera 1993, 1995).

Studies have shown positive correlation between nearshore fish and shrimp yields and mangrove areas in the Philippines (Camacho & Bagarinao, 1986) and in Indonesia (Martosubroto & Naamin 1977). The decline in mangrove areas and production from nearshore fisheries contrasts with the increase in brackishwater pond area and aquaculture production.

The destruction of mangroves and other coastal environments caused by shrimp farming has also led to the deterioration of local livelihoods (Barraclough & Finger-Stich 1996) due to conversion and privatization of mangroves and other lands, salination of soil and water, impoverishment of local populations, and food insecurity. While aquaculture is considered as a key alternative to meet problems on food security, its development, however, in the Southeast Asian region has always been market driven. The export demand for shrimp and other high-value species encouraged governments and investors in the region to convert mangrove forests to shrimp ponds. In the Philippines, for example, large scale aquaculture was facilitated by the government with the issuance of P.D. 704 in 1975 with a fisheries decree accelerating fishpond development, and BFAR A.O. 125 in 1979 converting fishpond permits from 10-year lease agreements to 25 years.

Added to this ecological disturbance was the adoption of intensive culture systems to maximize profit, on the part of investors, and provide Southeast Asian economics with the much needed foreign exchange. The adoption of unsustainable aquaculture technologies and the devastation of mangrove forest became a social problem. The economic benefits realized in terms of private profits for big-time shrimp investors, taxes paid the government by shrimp growers, foreign exchange inflow earnings, and employment of skilled technicians were all negated by the adverse impacts on mangroves and other coastal resources to the detriment of impoverished fishing communities. Moreover, the uncontrolled destruction and exploitation of mangrove resources can be attributed to the lack of property rights regimes and institutional arrangements in managing coastal resources. Mangrove forests are technically government-owned common property where access and use is open to all.

In the Philippines, mangrove forests are state-owned common property that have been "privatized" through the fishpond leasehold agreement (FLAs) under the Fisheries Code of 1975 (P.D. 704) and the new Fisheries Code of 1998 (Republic Act 8550). Aquaculture remains the major cause of decline of mangrove forests -- around half of the 279,000 ha of mangroves lost from 1951 to 1988 were developed into fish ponds. In 1990, the Department of Environment and Natural Resources (DENR) through Administrative Order No. 15 disallowed conversion of vegetated mangrove areas into fishponds. Moreover, the Order instructed the Bureau of Fisheries and Aquatic Resources (BFAR) that all mangrove swamps that were not utilized and had been abandoned for five years be reverted back into the category of forest land.

The advent of aquasilviculture provides options for ensuring food security through the practice of mangrove-friendly aquaculture techniques. Aquasilviculture involves more traditional, non-destructive aquaculture techniques combined with sustainable forestry techniques, including limited harvest of mangroves (Primavera 1993). However, local situations should first be considered before technology interventions are introduced to ensure the sustainability of both the resource and the technology.

SEAFDEC/AQD experience in territorial use rights in fisheries

The Community Fishery Resources Management Project in Malalison Island was a learning experience for SEAFDEC/AQD's interdisciplinary team in the implementation of territorial use rights in fisheries (TURFs). One of the objectives of the project is to provide the organized fisherfolk (Fishermen's Association of Malalison Island) exclusive rights in the management and utilization of the coastal resources surrounding the island. The concept of TURF is to instill a sense of ownership and responsibility for the common property resource such as the coastal resources (Siar *et al.* 1992).

The SEAFDEC team explained to the local government officials the importance of granting TURF to resource users especially the fisherfolk. In recognition of the importance of TURF and in support of the CFRM project of SEAFDEC/AQD, the Culasi Municipal Council passed Ordinance No. 5-90 granting TURF over a one-kilometer area between the island of Malalison and the mainland of Culasi for seafarming and other fishery resource management projects. As an addendum to the ordinance, the Culasi Municipal Council passed another resolution (Ordinance 2-91) allowing the deployment of concrete artificial reefs in the TURF area to serve as a fish sanctuary.

For purposes of granting TURF to other coastal communities, SEAFDEC conducted a study on the traditional and existing marine boundaries and sea tenure practices (Siar 1996). The study revealed that the waters around Malalison Island area is a shared resource. The Malalison fisherfolk had to make arrangements with those from other neighboring fishing villages regarding the setting up of gears and conflict resolution mechanisms.

The Malalison fisherfolk established a Fisheries and Aquatic Resource Management Council whose primary function is to prepare a coastal resource management plan. The first activity of the Council was to propose the establishment of a fish sanctuary in one of the reef areas. The Barangay Council approved the proposal which was subsequently approved by the Culasi Municipal Council. SEAFDEC researchers provided biological resource data to FARMC and the local government legislators to be used as scientific bases for the declaration of fish sanctuaries.

Because of the importance of these aspects in granting TURF and declaration of fish sanctuaries in the CFRM project, SEAFDEC employed the Process Documentation Research methodology (de los Reyes 1988) to fully document all the important events leading to the formulation of policies for the conservation and management of fishery resources.

The learnings from the Malalison experience has become very useful in the community-based project in Aklan especially on matters concerning property rights regimes for the adoption of mangrove-friendly aquaculture.

Property rights regimes

The concept of property rights as a management strategy in arresting further destruction of mangroves and rehabilitating destroyed mangrove forest requires the collective effort of different users and stakeholders. The property rights in mangroves is a grant of authority from the state to users in the form of tenurial rights and stewardship agreements. These rights are guided by rules on what acts are permitted and forbidden in exercising the authority provided by such right. Well-specified property rights provide incentives for either individuals or groups to invest in resources and maintain them over time in order to obtain benefits. Property rights are characterized by: (1) exclusivity or the right to determine who can use or access the resource; (2) transferability or the right to sell, lease or bequeath the rights; and (3) enforcement or the right to apprehend and penalize violators of the rights (Randall 1987).

Community-based coastal resource management or CBCRM and co-management strategies have been successfully implemented in the Philippines (Pomeroy & Carlos 1997; Agbayani & Babol 1997; Primavera & Agbayani 1996). The people-centered approach of CBCRM empowers the fishing community through training, education and skills development in resource management, enterprise development, training on para-legal issues, gender sensitivity, and lobbying, among others. These people-empowering activities have prepared the community to be effective and active co-managers of coastal resources. Community-initiated institutional arrangements on marine sanctuaries and reserves have also been implemented in various fishing communities in the Philippines. The concept of territorial use-rights in fisheries (TURFs) which grants the organized community property rights over coastal resources has been encouraged and legitimized by the government through existing laws, such as the Local Government Code of 1991 and the Fisheries Code of 1998. In mangrove forests, Administrative Order No. 15 (1990) of the DENR or the Department of Environment and Natural Resources sets aside public forest as "communal mangrove forest" for the exclusive use of residents of the municipality from which said residents may cut, collect, remove mangrove forest products, such as firewood and mangrove timber for charcoal production for home consumption in accordance with forest laws and regulations.

Community-based strategies are effective in addressing localized problems through localized solutions especially those pertaining to the exploitation of common property resources. External agents, e.g., NGOs, academic and research institutions, government agencies, have predominantly initiated CBCRM activities. The relationship of these external agents to the community, however, should be temporary until the community has developed a sense of preparedness and self-reliance.

Beyond the community-based initiatives, however, will be the bigger issue of legitimizing locally-accepted institutional arrangements by concerned government agencies. This act of delegating au-

thority to the community to use and manage coastal resources is a co-management arrangement between the government and the local community. The process of co-management involves community participation in decision-making, power sharing, and conflict management.

The focus of co-management is the issue of property rights or rights to access and limit other users from the resource. Co-management addresses the issue on ownership of resource and mechanism to allocate use rights through rules and regulations. However, to date, literature on mangrove utilization in the country has limited, if any, documentation on informal or customary use-rights particularly on the adaptive and evolutionary significance of systems of appropriation of their construction, logic, and historical transformation. There is a need to look into the social circumstances of the actors because as their circumstances change, so does the organizational structure of the community. Failure to recognize this aspect would eventually result in resource-use conflict (Cordell 1992), unsustainable practices and inequitable distribution of benefits (Ruddle 1994), considering the multiple-use characteristic of this resource.

There is a need to examine and evaluate property rights and collective action on mangrove ecosystems to provide reliable scientific information for policy formulation. Considering the vast mangrove resources that have been destroyed, and are presently being converted to different uses, there is a need to rationalize development strategies that will ensure efficiency, equity and sustainability. Poverty and food security are the burning issues confronting developing countries today.

There is a need to balance environmental conservation and food security in the management of mangrove resources. Mangrove-friendly aquaculture technologies are being tested, verified, and transferred for adoption by fishing communities in the Philippines, Vietnam, Indonesia and other South-east Asian countries.

SEAFDEC/AQD proposes to undertake a research project on the assessment and evaluation of the property rights regimes in selected mangrove areas in two Southeast Asian countries to determine which type of regime and institutional framework can be a viable management strategy under varying conditions (political, social, cultural, biophysical and technological). This effort is in relation to the adoption of mangrove-friendly aquaculture technologies. Backed by past learnings, particularly when the government gave private rights to certain individuals in the use of mangroves, this proposal considers the need to focus on local forms of organization, such as informal use-rights. Moreover, the role of the state in legitimizing local strategies in mangrove resource management is essential. Failure to recognize the difference in perspective between the two may result in unlikely consequences (Ostrom 1991). Specifically, maintaining mangrove forests and collective action at the local level might not evolve. Even if there are cases of sound collective action evident in the formation of local cooperatives to reforest degraded mangrove areas, documentation in regard to the process of their creation and present status needs to be done.

Research studies fall into four areas:

- (1) Assessment and documentation of mangrove situations in the project sites (Philippines and Vietnam) particularly current resource-use practice, extent of aquaculture development and plans for development by the government

Gather a profile of mangrove-users (sex, age, education, etc.)

Document prevailing property rights regimes and institutional arrangements in the use and

management of mangroves

(2) External interventions (e.g., technology, organizing, etc.)

Conduct a resource valuation of mangrove sites, specifically their carrying capacity when aquaculture technologies will be introduced

(3) Conduct impact assessments of several aquaculture technologies introduced in mangrove areas, using the following indicators: efficiency, sustainability and social equity

(4) Develop a model of complementation between the state and the local community, specifically in decision-making and developing strategies

With regard to aquasilviculture projects, SEAFDEC/AQD has started collaborating with local government units (LGUs) and peoples' organizations in implementing mangrove-friendly aquaculture technologies. There are several sites in the Philippines where this project is being conducted: Banate (Iloilo), New Buswang, Tangalan and Ibajay (Aklan) and Bgy. Manalo (Palawan).

SEAFDEC/AQD conducted various fora and training programs to familiarize the participants on the concepts, principles, and potentials on mangrove-friendly aquaculture and coastal resource management as well as update them on the fishery laws to enable them to formulate policies related to coastal resource management.

SEAFDEC/AQD has identified and started working on mangrove-friendly aquaculture in Bugtong Bato, Ibajay, Aklan province. A resource and socioeconomic assessment were conducted and a report has been prepared for discussion with the LGUs, both from provincial to village levels. The output aims to have a joint resource management plan to minimize use conflict and establish sanctuaries both in marine and mangrove areas with the participation of the fishing community. It also plans to conduct training courses on mangrove-friendly aquaculture in SEAFDEC member countries.

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