Economic Reforms and Institutional Arrangements for Community-based Mangrove Forest Management in a Village of Central Vietnam

Abstract: Community-based natural resource management is increasingly viewed as the most appropriate arrangement for promoting sustainable development of common-pool resources. It is considered as an alternative to state control or privatization, since it brings about decentralization, meaningful participation, and conservation. Although community-based natural resource management attracts international attention, it has not yet been widely implemented in Vietnam. In Vietnam, the main strategies have been centralized management by state agencies and assignment of management responsibility to individual households. This paper argues that the promotion of nationalization or privatization has not solved the problem of resource degradation and overexploitation. It has deprived many rural households of their livelihoods. This is especially true for mangrove resources in Vietnam where present management strategies have not been successful in reversing the trend of resource degradation. The paper presents findings of a study of mangrove forest use and management in Phuoc Son village in Central Vietnam since the introduction of the economic reforms in 1986. It shows that the local community is highly heterogeneous, as people have reacted to economic reforms through different resource use practices. Access to and control over mangrove resources has differed among households and between men and women, causing conflicts between those who have captured nearly exclusive access, and those who lost, in the recent privatization of coastal aquaculture resources. The paper asks how sustainable mangrove management can emerge in the context of Phuoc Son village and what appropriate combinations of institutional arrangements would encourage this.

1. Introduction

Economic reforms (*doi moi*) introduced in 1986, which included elimination of the cooperative's monopoly on agriculture and forestry, introduction of short-term land use rights (up to 20 years for agriculture), and encouragement of privatization and market liberalization, changed the whole make-up of the rural areas in Vietnam (Reed, 1996: 267 & Ngo, 1993). Rural living conditions improved greatly. It has been argued, however, that these reforms, which have brought positive results, are not yet guaranteed, since private land ownership, which was thought to be the key to further development, may lead in the longer term to land fragmentation and increased social differentiation in rural areas (Ngo, 1993). Others take one step further and argue that rising inequality is associated with non-agricultural activities such as commercial aquaculture in lowland coastal north Vietnam, particularly when the distribution of land is relatively equitable (Adger, 1999 & Lutrell, 2002: 11).

This paper presents the findings of a study of the impacts of economic reforms (*doi moi*) on mangrove forest use and management in Phuoc Son village in Central Vietnam. The paper explores the roles of mangrove forests as ecological and social buffers through different periods of time and the relative role of different institutions, illustrating how rights of access to mangrove resources developed and changed over time. The paper then examines the way the *doi moi* reforms and other factors have affected the economic function of the mangrove forests in the villagers' livelihoods in Phuoc Son village. It examines the rapid changes in local land use systems, resource ownership and patterns of mangrove utilisation and changes in management practices in response to national policy reforms in the village.

This analysis pays explicit attention to a) changes in access to and control over mangrove resources, b) the resultant conflicts between those who have been able to capture nearly exclusive access and those who lost their access as a result of the privatization of coastal

aquaculture resources, and c) the different management practices of men and women. It explores how differing levels of access to and control over mangrove resources have caused inequality in household incomes, despite the fact that agricultural land and shrimp ponds remain equitably distributed among households.

The paper is organized as follows. It begins with a brief discussion of the literature on the evolution of different resource management systems, and related changes in property rights, and the control over, and access to, natural resources. It then explores the concept of community-based resource management as an alternative to either national government centralized management or privatization. Section 3 then presents a case study of access to and control over mangrove resources in Phuoc Son, a village affected by the *Doi Moi* reforms. Section 4 suggests a more new approach for Phuoc Son Village, namely a pragmatic melding of nationalization, privatization and community-based management approaches such that the district would manage the dike system, households would manage individual shrimp ponds, and the overall community would protect the mangrove forests existing adjacent to the shrimp ponds.

2. Managing the Commons

According to Garrett Hardin's model of the "strategy of the commons" (Hardin and Baden 1977), common-property resources are really open-access and they are not owned by anyone. This, in turn, leads to overexploitation and resource depletion. Hardin misused the term, commons, and was really referring to an open access, common pool resource (Ruttan, 1998: 3). He ignored the geographical and historical prevalence of local institutions for communally-managing common property, especially those designed to prevent "free-riding" (Ibid.). He then concluded that natural resources should be either privatized or controlled by central government authority to ensure sustainable use (Berkes, 1989:8). He thought that was the solution to common property problems. In fact, as the case of Phuoc Son village in this study illustrates, the promotion of nationalization and privatization does not solve the problem of resource degradation and overexploitation. Furthermore, it has often deprived a large portion of the population of their livelihood (Pomeroy, 1992:1). This is especially true for the mangrove resources in Vietnam where present management strategies have not been successful in reversing the trend of resource degradation and overexploitation.

According to Baden (1977: 137-39), a common pool resource is a resource "for which there are multiple owners and where one or a set of users can have adverse effects upon the interests of other users". He instructs us that in the situation where no agency has the power to coordinate, action which is individually rational can be collectively disastrous. It is this which results in the "tragedy of the commons," which I argue arises in Vietnam in situations of both free access and government regulation. Though the government may wish to implement state property regimes and officially regulate resource use, it unfortunately lacks the necessary organizational capacity and political will to do so (Scott, 1998:33).

A policy where central governments control most natural resource systems is a strategy of the commons that has been followed extensively, particularly in developing countries (Ostrom, 1990: 9). The centralizing state establishes a whole new, simplified institutional nexus and imposes a novel and (from the center) legible property regime, which has been designed by scientists who are outsiders. As a result, it does not reflect the complexity and variability of the local system. This is far more static and schematic than the actual social phenomena they presume to typify (Scott, 1998: 35). In addition, the state has neither the administrative tools, the accurate information nor is able to change incentives and impose sanctions correctly. It is difficult for a central authority to have sufficient time-and-place information to estimate

accurately both the carrying capacity of a common pool resource and appropriate fines to induce cooperative behavior (Ostrom, 1990). Moreover, it is politically too risky for the state to allow local communities to specify the commons, to work out, for better or worse, ways to deal with overexploitation of and conflict over access to resources (McCay and Acheson, 1987: 31). The state threatens to destroy a great deal of local power and autonomy (Scott, 1998: 49). Thus, local people go ahead and regulate the resources themselves. Where limited-access common-property resources had previously existed and operated in a functional manner, the consequence is that centralized control and regulation of natural resources unintentionally creates an unsustainable open access resources (see Ostrom, 1990). Scott (1988) suggests that we must never assume that local practice conforms with state theory.

2.1.2 Privatization as the “only” way?

Some believe that the only way to avoid the tragedy of the commons in natural resources and wildlife is to end the common-property system by creating a system of private property rights where privatization of the commons internalizes costs and benefits, reduces uncertainty, and thereby increases individual responsibility for the environment and rational use of resources (McCay and Acheson, 1987: 5; Ostrom 1990: 12-14). In contrast, I argue that when individuals become the owners of a resource they will develop the resource potential to maximize their own net return and ignore sustainable practices which could provide long-term benefits.

Ostrom (1990: 12-14) demonstrates that privatization can also mean assigning the exclusive right to harvest from a resource system to a single individual or firm. She argues that the imposition of private property does not stipulate how that bundle of rights is going to be defined, who will pay for the costs of excluding non-owners from access, how conflicts over rights will be adjudicated. In addition, how the residual interests of the right-holders in the resource system itself will be organized is not stated. Thus, privatization is not the solution to a tragedy of the commons. In fact, it makes the situation worse.

2.1.3 Community-based Natural Resource Management

Fortunately, there are alternatives. According to Gibson and Koontz (1998: 621), community-based natural resource management is "increasingly viewed as the most appropriate arrangement for promoting sustainable development of natural resources".

It can be argued that the common-property status of resources is neither a necessary nor a sufficient explanation of resource depletion and economic impoverishment. Problems blamed on common property rights, such as depletion of resources and impoverishment of communities, may be more closely related to capitalism and other manifestation of a colonialized and industrialized world than to common property per se (McCay and Acheson, 1987: 8-10).

The role of community in resource use and conservation has been recently reconsidered by policy makers and scholars in pursuing sustainable resource use. It is unlikely that the national government can accomplish this through its instruments. Neither can local communities accomplish the task on their own either. There is a need for evolution of a "partnership arrangement building from the existing capacities and self-interest of the local community and complemented by the ability of the national government" (Pomeroy, 1992: 2). This partnership, which brings about decentralization, meaningful participation, and conservation is called community-based natural resource management (CBNRM) (Agrawal and Gibson, 1999).

The essence of CBNRM is to replace compulsion with a mixture of facilitative and inducing approach (Bromley, 1999). As an alternative to state control or privatization, CBNRM is based on the premises that local populations have a greater interest in the sustainable use of resources than do the state or distant corporate managers; that local communities are more cognizant of the intricacies of local ecological processes and practices; and that they are more able to effectively manage those resources through local or "traditional" forms of access (Tsing *et al*, 1999:197). CBNRM involves self-management where the community takes responsibility for surveillance and enforcement. A property rights regime and rules of behavior for resource use is established. CBNRM allows each community to develop a management strategy which meets its own particular needs and conditions. Therefore, it allows for a sufficient degree of flexibility and can easily be modified. CBNRM provides for greater participation by the community in resource management. Since the community is involved in the formulation and implementation of management measures, a higher degree of acceptability and compliance can be expected. CBNRM strives to make maximum use of local knowledge and expertise in developing management strategies (Pomeroy, 1992:3).

It has become increasingly clear that, under community-based management, social equity, economic efficiency, and ecological sustainability can be compatible. CBNRM enables villagers including marginalized groups within local communities that might otherwise be excluded from the decision making process, to negotiate with government officials and provide a forum for airing the conflicting needs of those who depend on the natural resources (Ford Foundation, 1998). Research from scholars of common property has shown communities to be successful and sustainable alternatives to state and private management of resources, whose ideas supported conservation that aimed to exclude locals (Agrawal and Gibson, 1999).

The definition of community, however, has not been carefully examined by those who concerned with resource use and management. According to Agrawal and Gibson (1999:633), defining a community as a spatial unit, as a social structure, or as a set of shared norms seems to be not relevant any more and in fact indicates weaknesses[1] (Leach *et al*. 1997: 4-14; Leach *et al*., 1999: 225-47). Some believe that such homogeneity furthers cooperative solutions, reduces hierarchical and conflictual interactions, and promotes better resource management, and therefore outside the community conflicts prevail (Agrawal and Gibson, 1999: 629-49; see Leach *et al*., 1997).

Leach *et al*. (1997:5-7) provide a critical analysis of community, environment and the relationship between them and find that communities are not "bounded, homogeneous entities, but socially differentiated and diverse". Furthermore, they are divided and cross-cut by "gender, caste, wealth, age, origins, and other aspects of social identity". McCay and Acheson (1987: 22-23) point out that community itself involves conflicts between users over rights of access to the resources and over the definition of property rights and law, and competition between different social groups within the community (see also Leach *et al*. 1999: 225-247; Leach *et al*, 1997: 5-13). I argue that the "community" concept can also exclude and marginalize in two ways: (a) by the way community and community membership is defined, thus excluding those defined as "outsiders"; (b) by the way rights of access to resource use are unequally located within communities by gender, class, age, wealth and origins. Most of the time, particular groups of women or poorer people are marginalized. Since this study explores the role of the community in natural resource management, these critical concepts help us to better understand the dynamic way in which power, structure and historical social relations can shape community, common property and collective action.

Agrawal and Gibson (1999: 636) suggest that community must be examined in the context of the multiple interests and actors within communities, how these influence the internal and external factors and shape the decision-making process (see also Leach *et al*. 1999).

The issues of institutional arrangements, resource regimes and property rights are at the core of community-based resource management (Pomeroy, 1992: 1-7; Agrawal and Gibson, 1999). Accepting approaches which are participatory and more decentralized, such as community-based management will involve a major shift in the role of national bureaucracies unaccustomed to sharing power. Smaller organizational units, such as villages, which are "better equipped to manage their own resources than are large authorities" and may be "a more effective basis for rural development and sustainable resource management than institutions imposed from outside", should be recognized by governments (Pomeroy, 1992: 7). This shift may be necessary if natural resources are to be managed in a sustainable manner.

3. Histories of Mangrove Management in Phuoc Son Village

Phuoc Son village is a largely Buddhist community located in Tuy Phuoc district, Binh Dinh province in Central Vietnam. It covers an area of about 2582 ha, of which agricultural land accounts for 1210 ha or 47 percent and commercial shrimp farming 304 ha or 12 percent of the total village area. It supports a population of about 24000. It is an argricultural community, farming rice but also engaged in commercial shrimp farming and animal husbandry. It is bordered to the east by Thi Nai Lagoon, to the west by Phuoc Hiep village, and to the south by Phuoc Thuan village.

On average, the rice production is 6.1 tons/ha/year. Each person has 50kg of rice/month. The village is accessible by roads and waterways. Phuoc Son has 24 kindergartens, three primary, one middle and one secondary schools, one health clinic and one main market which opens every two days.

Phuoc Son village is a community which has a long and rich history. Elderly people in the village have experienced life under two regimes: the French colonial government and the American occupation. The have experienced the struggle to unify the country, the regrouping to the north, the post-1975 period of collectivization and, more recently, the period of *doi moi* reform. The following sections will investigate the ways in which mangrove forests have been managed through different periods of time and the role of different institutions, illustrating how rights of access to mangrove resources were shaped and transformed over time.

The village was established more than 100 years ago. There were many mangrove islands several kilometres from the village. Phuoc Son is thought to have had about 300 ha of mangrove at that time. The trees were 4-6 m tall and the forests were dominated by *Avicennia marina, Rhizophora apiculata,* and *Rhizophora mucronata*. At the beginning, the mangroves were open to all villagers. People went there to collect firewood and marine products, such as carb, fish, shrimp and bivalves for their domestic use. Later these islands were owned and named after those who first claimed them. These names continue today. According to the village elders, there was a profusion of bees, fish, crabs, shrimp, snails, and bivalves in the mangrove forests. In previous times, owners went to their forests to catch birds and collect bird eggs, crabs, fish, shrimp and bee honey to either eat or sell at the local market. They also collected dry branches for firewood and cut mangrove trees for timber and dike construction during the rainy season. They used mangrove trees to make rafts to catch fish, since rafts provided shade and food for fish. The fishing season started in September (according to the Lunar calendar) and ended in July the following year. When the season was over the mangrove trees were used for cooking fuel. Those who did not own any island were not allowed to cut mangrove trees, but could collect crab, fish, and shrimp, and dry branches for

firewood. In addition, there were open water fronts and an open intertidal area for villagers to collect marine products. In this way, the poor were not excluded from the mangrove and marine resources. According to elderly people questioned during the field research, these owners also replanted mangroves at the places where they had harvested. According to these accounts, local practice thus amounted to effective resource management, although there was no law on forest exploitation and management.

During the French and the US occupations the mangroves of Phuoc Son were used little by the villagers. In fact, these resources were essentially protected in these two conflicts. On March 31, 1975 the village was liberated.

After the liberation a 3.7 km long dike was constructed to divide the area into two: one for rice production and the other shrimp farming. Mangrove trees were once more used to build the dike. The north's collectivization model was then applied to the south. In 1977 Phuoc Son's first cooperative was established. Farmers were supposed to pool their land and tools and farm in common. The amount each member worked for one day was measured in points. After each harvest, and after a portion was set aside to pay for the use of members' land, and for production funds, members received share of the crop according to the work points that they had accumulated.

In 1978, the state-owned Thi Nai Lagoon Shrimp Farming Enterprise was established, which was under the provincial Aquatic Product Department. An area of 140 ha which consisted of Trang, Chim and Gia Islands was set aside for the enterprise. The owners of these islands were asked to give their land to the enterprise. It is said that some were forced to give their land, since they were not willing to do so. For the first time in their life, villagers witnessed outsiders who came to cut mangrove trees which used to be theirs down to do commercial farming using extensive shrimp aquaculture in their respective area. The enterprise also set its rules under which villagers were not allowed to log mangrove trees or to catch any marine produce in the enterprise's territory. All that used to be theirs, then became the outsiders' property. According to those interviewed during the field survey, villagers were not allowed to even pass through the enterprise's shrimp farming area. Otherwise, they would be arrested and brought to the Village People's committee. Many were fined for having stolen what they perceived as their own resources. This resulted in resentment between the enterprise's workers and the villagers. They were not passive, however, they found ways to resist the enterprise's policy. Since the enterprise did not have enough personnel to guard the mangroves and no one had real responsibility, everyone tried his or her best to poach in the forests. They hid their big knives and even cut big mangrove trees down for firewood. That is how a " tragedy of the commons" arose.

4. Impacts of Economic Reform (*doi moi*): New Institutions for Shrimp Management

During the 1980s a household-based economy increasingly displaced the cooperative-based economy (Le and Rambo, 1999). The Government of Vietnam shifted responsibility for the management of natural resources away from village cooperatives and into the hands of individual farm households (Nguyen, 1995). Generally speaking, rural living conditions improved greatly (Ngo, 1993). It has been argued that the positive results of reforms are not yet guaranteed, since private land ownership may lead to land fragmentation and increased rural social differentiation.

During the *doi moi* period, countries in Asia, Europe and the United States have become the biggest importers of Vietnam's marine products. Therefore, shrimp and other marine products

fetch much better prices. In response, in 1985 the Village Aquaculture Cooperative was established. All the village's remaining island owners or those who inherited land from their parents or grand-parents were asked to pool their land and join the cooperative. At that time a production quota for each pond was fixed for a period of one year and shrimp had to be repaid to the cooperative. In principle, cooperative members that exceeded their quotas kept one hundred percent of the surplus for home consumption or sold to private traders. Conversely, in cases of natural calamities and other extenuating circumstances they were required to make up for all deficits. This practice did not help improve the cooperative's management. In 1991, households were able to lease shrimp ponds for a period of 20 years. This policy was also applied to the enterprise. Its workers who were outsiders were allocated land to do shrimp farming, a business which according to the village's shrimp farmers generated large profits when compared with rice farming. Due to large profits from shrimp export, shrimp farming has been encouraged by both central and local governments. This is illustrated by National Decree 773-TTg issued by the Prime Minister on December 21, 1994, which stipulates that open coastal areas and water fronts can be used for shrimp and crab farming. Households that cleared the mangroves for shrimp ponds were not supposed to pay any tax to the cooperative for the first five years. During this period of time those who cleared the forests for shrimp pond construction were nominated the heroes of the uncultivated land encroachment movement. This policy encouraged shrimp farmers to clear all the village's remaining mangrove forests for shrimp farming. It also resulted in great demand for aquaculture land in the village. Conflict between villagers who did not have enough aquaculture land and the enterprise's workers who were outsiders and had shrimp ponds to do commerical shrimp farming increased. In 1991 villagers' complaints were addressed to the enterprise' Board of Management. The Provincial Party Committee Secretary was then assigned to come to the village to solve the villagers' problem. In 1992, the enterprise had to give the village back 54 ha which were then allocated to households. In 1993 the village's aquaculture reserve fund of 51 ha was auctioned to individuals for shrimp farming. The proceeds from the bidding process were spent on the village's infrastructure, such as roads, schools and health clinics. Although the bidding process was nominally open to every one, only the rich who had sufficient capital, management skills, and more importantly connections were able to participate in the process.

Between 1996 and 1997 the modified extensive aquaculture was applied to Phuoc Son. For a pond of one ha one earned VND 60 million (roughly 5000 USD), an amount of money that is higher than that from rice farming. Hatcheries were established in the area for the first time. This is partly due to the fact that natural shrimp fry were not available anymore. Shrimp farmers tried to extend the area of their ponds illegally by encroaching the open water fronts where the villagers used to go to collect marine produce. Consequently, the area has shrunk. This process of land claim excluded the poor and female-headed households who did not have capital to invest in lucrative shrimp farming.

In 1999, households that received land were issued "red books", documents which were signed by the head of the household provided households with the right to use the lands that they were allocated. Each household received an allocation of shrimp pond, based on the number of members (1400 m^2 per household member), which was registered to household heads. In other words, men and women, young and old did not receive an individual right to land, but were tied to household heads, the majority of whom were men. It should be noted that a household member is not supposed to receive both agricultural land and shrimp pond. It is very common that in a household one or two members received agricultural land, while others received shrimp pond. In this way, they could avoid risk, because if they are only engaged in shrimp farming and if shrimps die as a result of disease, cold weather, or unusual turbid water caused by typhoons or hurricanes, farmers would lose profits and therefore fall in

debt. When they are engaged in rice plantation and shrimp farming at the same time even if the shrimps die, farmers could still sell rice for cash. Hence, they do not lose all revenue.

Between 2000 and 2001, semi-intensive aquaculture was applied in the village. Those who had capital sources, management skills and political power bought shrimp ponds from shrimp farmers that were not able to invest in commerical shrimp farming. Some sold their land for 5 years. Others sold it for 10 years, or even 15 years and were then willing to work for those rich shrimp farmers. Usually, two or even more people share a pond. In this way, they share the costs and the risk. It is important to note that the majority of local authorities had shrimp ponds, but they were always behind the scene. They either shared the pond with someone else or hired someone who was poor to work for them. For the first two years many earned large profits from shrimp farming. For an area of 8000 m^2 one earned VND 200 million (roughly 13,000 USD), a large amount of money if compared with a meager income earned by a rice farmer. Many people became rich very quickly from shrimp farming. These shrimp farmers owned big houses and even bought nice cars. It should be noted that only men are involved in shrimp aquaculture. According to shrimp pond owners, since shrimp farming is a risky business and requires large amounts of capital, women are not allow to participate in the business. Men have better opportunities to earn much more than women who--due to the persistence of certain patriarchal norms at the village level--have been virtually excluded from the newly privatized aquaculture resources. In other words, women and the poor have become marginalized. They work on resources owned by someone else, while the rich work on their own resources. Some people watch shrimp ponds for the rich for no more than US $28/month.

Between 2002 and 2003 almost all shrimp farms failed. Many lost huge amounts of money and therefore could not pay the loan to the bank[2]. For an area of 8000 m2 one could earn only US $3000, or about one fourth of the revenue during 2000 and 2001. This failure was due to the spread of shrimp disease. At the beginning no one knew why their shrimps died, yet it was later found to be partly due to the fact that there are so many semi-intensive shrimp ponds in the village and it is consequently very easy for the disease to spread around. More importantly, there are no mangroves in the pond to provide food and shade for shrimps when the sun is out or space for shrimp to escape from the water, or to absorb the food residue in the pond. This results in water pollution, which in turn leads to shrimp desease[3]. Since many shrimp farmers have been unsuccessful many local leaders sold their ponds to outside shrimp farmers. Somewhat surprisingly, while shrimp ponds generate more income, they are poorly managed; while rice paddies generate less income, yet are managed much better. Every farmer has to pay irrigation fees to the cooperative for the paddies that they grow rice on. If a household that owes the cooperative VND 100,000 (US $6) for the irrigation fees its land will be auctioned or the household could take the land back if the loan is paid. Meanwhile, a shrimp farmer's pond would not be confiscated if he could not pay back the loan of VND 200 million to the bank.

5. New Property Dynamics: the Arrival of a Community Project

Due to shrimp disease, the province government asked its scientists to discover the reason why shrimp died and if there was any solution to prevent it. The scientists found that loss of the mangroves was the main reason that led to the degrading environment for shrimps. Therefore, planting mangroves becomes a must in order to restore the environment. At the end of 2002 the enterprise was dissolved due to its mismanagement. While waiting for the legal documents, the manager and vice-managers of the enterprise decided to rent its land to outside shrimp farmers for 6 months in order to earn some extra income. This once again created resentment between the enterprise and the villagers, which had been the case historically. The villagers again sent their complaints to the leaders of the district and the province and asked the province to give them the enterprise's land that had been rented to outsiders. Unlike the

last time, the province told the villagers that they did not have the right to ask for the enterprise's land. According to an official of the Fisheries Service, the director of the service was critized for allowing the enterprise leaders to do so and these enterprise leaders were asked to retire.

In 2003, the Management Committee of the Ecological Thi Nai Lagoon project, which is under the Provincial Fisheries Service was established. Its headquarters was based on Con Chim Island. In June 2003, 4 ha of intertidal mudflats were set aside for mangrove plantation. Outsiders were then hired to plant the mangroves, although the villagers were promised by the Director of the Fisheries Service that they would be informed when the plantation took place. All villagers were furious and on July 28 those from Con Chim were protesting. They burned the headquarters of the Management Committee. Many newly planted mangroves were pulled up. According to the Con Chim villagers they were not protesting against the planting of the mangroves. In fact, they are supportive of the project, since they will benefit from the newly planted mangroves. They were angry, because the Fisheries Service did not keep their promise; and the land where the mangroves were planted used to be their parents and grand-parent's land. In addition, they were not allowed to participate in the decision-making process. More importantly, outsiders were hired to plant mangrove trees, while the villagers were not hired at all. After that the provincial and district officials came to meetings with the villagers. An agreement was reached according to which the villagers would be involved in the decision-making process and would be hired by the project. The conflict was resolved. In January 2004, the villagers of Con Chim replanted the mangroves that they had pulled up.

No one knows who is going to manage the mangroves. At the moment four guards, who are outsiders, are hired by the project to protect the mangroves. Each is paid US $31.5 per month. In total, the cost of protecting one ha of mangroves is US $380 per year, which is much higher than the price set by the government (US $10/ha/year). According to the villagers of Phuoc Son, it is impossibe to allocate the newly planted mangroves to households as elsewhere in the country, since the total area of the forest is only 4 ha[4]. All villagers of Phuoc Son want to manage the mangroves. According to those who were interviewed during the field research they would like to be the guards of the mangroves and their salaries would be paid by the project like the present guards. According to the project manager and the Provincial Fisheries Service officials it would be very risky to hire the villagers as the guards since there is no guarantee that they would do a good job. According to them it is very likely that they would log the mangrove forests for shrimp ponds and as a result the mangroves would be gone very quickly. Nevertheless, the villagers said that they have a greater interest in the sustainable use of the mangrove resources than do the Provincial Fisheries Service officials or any outsiders. In addition, they know better than any others about the mangrove forests and their ecosystems, and the condition of the waters. They all agreed that the rules should be drafted and the villagers should be involved in the drafting process. According to these rules only those who graduated from high school should be selected and if someone does not do a good job, he or she would be replaced right away. In this way, the forests would be protected, while bringing benefits to the local people, who in turn would help manage the resources in a sustainable manner. The poor, female-headed households and marginalized groups of people are included in the process and will have a voice in the management decision making as well. In other words, the mechanism would ensure social equity, productivity and sustainability. Nevertheless, villagers still face a long process of negotiations before such an approach is accepted by provincial and national governments.

Although community-based natural resource management attracts international attention, it has not yet been widely implemented in Vietnam. The most pressing issue facing community-based natural resource management is tenure rights. A 1999 government circular guides the elaboration of the convention on protecting and developing forests in the population

communities in the hamlets and villages in the plains and mountain areas. The principle of "majority consensus" is promoted, but the actual means by which such a concept is operationalized through an appropriate legal framework will determine whether Phuoc Son village gains the means to effectively manage its tenure and resource access issues in a sustainable manner.

6. Conclusion

The *doi moi* economic reforms, while opening up economic opportunities for many, have not benefited the entire community. The rich earn more from the mangroves resources due to their greater control of capital, management skills and political power. The poor benefit the least. However, the poor have traditionally depended more on the mangrove forests to compensate for their lesser access to other resources. As a result of *doi moi*, low income and female-headed households have been increasingly marginalized, while other households have more successfully maintained the capacity to buffer uncertainty in a more robust manner. Although the village is stratified and as matter of fact they have responded individually and differently to market demands, they acted collectively to exclude outsiders who threatened to abolish their rights over their local resources.

The present total area of mangrove forest in the environs of Phuoc Son village is still much smaller than it was during the war period. Since Vietnam started its *doi moi* policies, market incentives have led people to harvest a larger portion of the resources. In order to manage the mangroves in a sustainable manner, more equitable and appropriate policies are needed at the village and district levels. These policies would necessarily take into account such factors as political power, economic heterogeneity within the village, institutional arrangements for allocating resources, the implementation of property regimes, conflict resolution, economic and social incentives, and cultural, historical and geographical specificity of local communities.

Institutional arrangements of resource use in Phuoc Son remain highly complex. Neither state control nor private sector control alone can provide a viable solution to mangrove resource degradation. Likewise, it doesn't make sense to propose only “community-based resource management,” as the local community itself is highly heterogeneous and outsiders also use the resources. A combination of national control, private ownership, and community-based management therefore appears to be the most suitable strategy to promote in the context of Phuoc Son. The province would continue to manage the dike system as a breach in the dike system can cause far-reaching damage to many communities. Households would manage individual shrimp ponds according to private sector principals, since the proceeds from the bidding process can be spent on the village’s infrastructure, such as roads, schools and health clinics. And the whole community (probably a cluster of villages) would oversee the management of the mangrove forests and be granted the right to require shrimp pond farmers to post “environmental bonds” or otherwise pay money into a local fund that would be used to offset loss of income to other villagers as a result of mangrove habitat destruction and, of course, provide a fund to be used to reclaim abandoned shrimp farms back into mangrove or some other productive and communally-owned habitat.

The present study is a first step toward understanding changes in local mangrove resource management practices, and how improvements in management can be initiated. Further action research is needed to define what mix of economic incentives and state and community regulation will best achieve and maintain sustainable and equitable management of local mangrove resources.

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Notes

[1] The concept fails to explain the cause of these characteristics or spells out their effect on natural resource use (Ibid.).

[2] Shrimp farmers borrow money from the Social Credit Bank, the Provincial Industry and Commerce Bank and the Vietnam Bank for Agriculture. Unlike elsewhere in the north of Vietnam where shrimp farms are not allowed to borrow the money from the banks. According to Le (2004) the reason is that the government considers shrimp farming a risky occupation and it is therefore afraid that shrimp farmers would not be able to pay back the loan. As a result, they have to borrow money from local moneylenders.

[3]It is based on the comprehensive report on developing a model of preservation and wise use of biodiversity, and community-based management of fragile ecosystems in Thi Nai Lagoon, Binh Dinh Province by the Center for Natural Resources and Environmental Studies, Vietnam National University, in Hanoi in March 2004.

[4]This is not because larger forests for economies of scale would reduce the costs of guards. In fact, it is impossible to equally allocate 4 ha of mangroves to all households in the village.