MUDDY INTERTIDAL MANGROVES AND MURKY COMMON PROPERTY THEORIES

Bradley B. Walters
Department of Human Ecology and
Graduate Program in Ecology and Evolution
Cook College, Rutgers University
New Brunswick, NJ 08901
Fax: 732-932-6667 Tel: 732-932-9167
Email: bbw@rci.rutgers.edu

Stream: Forestry

Abstract

This paper summarizes research on two coastal sites in the Central Visayas region of the Philippines that are widely recognized and show-cased as success stories in community-based mangrove reforestation and management. Investigations of 12 different coastal villages in these two sites revealed considerable within and between village variation, both in the kind and extent of mangrove planting and management. Property rights regimes in mangroves are complex, conflict-ridden and under continuous negotiation between similar and dissimilar resource users. Nonetheless, the most striking pattern across all sites was a clear historical trend towards privatization of open access and common mangrove lands and resources, by poor and rich mangrove users alike. There are important social dimensions to this. In particular, leadership and imitation profoundly influenced the emergence and spread of management innovations like tree planting. But, the direct role of collective action and common property institutions has been small and there is little evidence of sustained community management of mangrove resources. These findings argue for keeping individual actors and private property central in discussions of common property management. As well, lessons from these cases can be used to inform ongoing mangrove management and restoration efforts elsewhere in the Philippines.

1.0 Introduction

Mangroves are a kind of forest that grows in relatively sheltered, intertidal areas throughout the tropics. They are particularly interesting common property resources because of the juxtaposition of a terrestrial (forest) and aquatic (tidal marine) layer and the resources associated with each. In the Philippines and elsewhere, mangroves are utilized by coastal residents for a variety of wood products, seafood and as storm protection for homes and other assets. They are also the locus of intense development pressures and related conflicts as swelling populations of traditional resource users vie for access to a forest resource base that has been

drastically diminished in recent decades by the expansion of brackish water aquaculture and residential/commercial encroachment (Baconguis, 1994; Primavera, 1993, 1995; Walters, 1995).

This case study examines two coastal sites in the Central Visayas region of the Philippines that are widely recognized and show-cased as Asuccess@ stories in community-based mangrove reforestation and management: Bais Bay, Negros Oriental and Banacon Island, Bohol (e.g. Cabahug *et al*., 1986; Paden, 1990; Yao, 1986, 1987; Yao and Nanagas, 1984). These sites are particularly intriguing because local planting and management were widespread in both areas years before the government and NGO=s intervened and began promoting mangrove reforestation and community management on a widespread basis in the country. Yet, even with major investments by various development agencies (including the World Bank), the success of these two Aindigenous@ efforts remain largely unrivaled to date. This is in spite of the fact that promotional efforts by the government, World Bank and some NGO=s have been modeled to varying degrees on these successful, Aindigenous@ cases.

I will argue that this reflects, in part, a failure of these development agencies to appreciate the nature of the underlying social mechanisms, including property rights, which led to success in some cases, as well as a naivete about factors which are likely to impede success in many (if not most) others. Specifically, the paper will examine how property rights over mangrove resources in Bais Bay and Banacon Island have emerged and continue to evolve over time. In particular, it will examine the interplay between property rights and patterns of mangrove destruction, management and restoration.

The paper presents evidence that property rights arrangements exist in complex social contexts and overlap in space and change over time. What is, nonetheless, most striking across virtually all situations is a general historical trend towards informal privatization of previously common and open access mangrove resources. This trend is interesting given that Philippine laws, while permitting the leasing of mangrove areas for various purposes, essentially forbid formal private ownership of intertidal, mangrove lands. Nonetheless, this trend in privatization coincides with a strongly individualistic, Aeach to his own@ ethos whereby local entrepreneurial persons set trends in behavior--e.g. tree planting, clearing for fish ponds, etc.--that others subsequently imitate individually through observation. These findings raise questions about the significance and universality of collective action and common property institutions in rural, tropical settings and suggest, instead, that individual actors and private property should be kept central in discussions of common property management.

[illegible]

This paper is based on doctoral dissertation research that I undertook between April and December of 1997, which is, itself, a follow-up on previous work I did while based in Bais, Philippines in 1992/3 as a project assistant to a CIDA-funded integrated conservation and development project (see Walters, 1994, 1995, and 1997). [illegible]

villages where successful management is widespread with neighboring villages where successful management might be expected, but does not significantly exist.

3.0 Findings: Study Sites in Historical Context

Both Banacon Island and Bais Bay are today characterized by relatively extensive natural and planted mangrove forests and high population densities. Nonetheless, local mangrove planting and management initially emerged and spread rapidly during the late 1950's and 1960's on Banacon and during the 1930's and 1940's and then again during the 1970's in Bais when population densities in both areas were considerably lower than today and mangrove forests more extensive. At first glance, the emergence of management intensification of this kind under these conditions would seem to contradict conventional theory (e.g. Boserup, 1965; Netting, 1993). However, this general relationship masks several important situational factors that appear to have stimulated planting and management in these cases.

First, vast tracts of natural mangrove forest in both Bais and Banacon were actually leased during these periods to commercial firewood concessionaires who held ANon-timber Forest Products Leases@ and who significantly restricted local people from cutting wood from these areas for their personal use. Scarcity conditions were thus created amidst apparent abundance. These commercial leases were both canceled in the late 1970s/early 1980's and this was followed by a period of intense incursion to the forests by local people whereupon cutting is said to have been completely unregulated. However, the plantations and associated management systems were already established and this period of open access cutting was short-lived as both the national and local governments, especially in Bais, have since largely curtailed this unregulated cutting.

A second factor contributing to resource scarcity effects and the subsequent emergence and spread of mangrove planting and management in both Bais and Banacon was the historically prevalent use of fish traps and fish corrals (*bunsod*), which require considerable numbers of long,

straight poles in their construction. *Rhizophora* species are widely regarded as the superior wood for this purpose, but the natural distribution of *Rhizophora* species varies and does not necessarily correlate with the distribution of natural forests, which are frequently dominated by other tree species (Walters, unpublished data). Fortunately, *Rhizophora* species are the easiest to plant and thus, given their value, have been almost exclusively planted by locals in both Bais and Banacon since the beginning.

3.1 Findings: The Case of Banacon Island

It is unanimously agreed that the first mangrove planting on Banacon Island was initiated in the late 1950's by a Mr. Eugenio Paden who had learned the technique of planting from his brother who worked for the Bureau of Forestry. At that time, Mr. Paden planted independently with assistance only from his children, and close to his home. In so doing, he established young groves of mangrove trees that were clearly his property alone, thus removing ambiguities over property rights that were manifest in conflicts between locals and the holder of the commercial firewood seller who held the commercial firewood lease. The population of Banacon was small, socially and occupationally homogeneous (all were fishing-dependent) and characterized by dense kin networks. As well, all homes were located in close proximity to one another. Other members of the community were thus quick to take notice of Paden=s planting and many subsequently followed his lead when the fruits of his labor began to be harvested by him several years later. There is some disagreement as to whether Paden actively promoted his new technology, or whether others just observed and copied him. At the very least, he was a respected figure in the community and was generous with his knowledge and willing to explain to others how to plant if they asked him. However, the very fact that planting took several years to really catch on at Banacon suggests that claims about his active leadership role (e.g. Emma Melana, pers. communic.) may be over-stated.

In either case, Banacon is a remarkable success story today in that nearly 30-40% of households are active planters and an estimated 400 ha=s have been planted by them. All planting is done by individuals or immediate family members working together. Mangroves are planted in parcels typically ranging from 0.1 ha to 2 ha=s and many individual planters have over time planted multiple parcels, often separated by considerable distance from one another. Planting sites are claimed on a first-come, first-serve basis with the result that sites nearest the village have long ago been claimed and planters are now forced to venture 2 km or more to locate unclaimed and potentially suitable areas. So long as trees are planted on a site, property rights to those trees are clearly privatized and respected as such. Many planters even tack signs along the perimeter of their stands indicating their ownership of specific mangroves. Serious conflicts over tenure appear to be rare. Poaching of trees occurs, but this is not a serious problem in Banacon, presumably because of the vast extent of mangroves in relation to the population of interested mangrove users (there are currently about 200 households on Banacon).

The plantations are planted and managed intensively for *Rhizophora stylosa* wood only (B. Walters, unpublished data). Trees of other species are not planted and, where they already exist, are either planted around or deliberately cut back to make additional room for planting *Rhizophora*. Harvesting is done selectively or in small clear-cuts and cut areas are subsequently replanted shortly thereafter to ensure claims to areas are not lost. Wood from the plantations is

used for fish trap, fence and house construction by the planters, themselves, or often sold to buyers from neighboring islands and Cebu City who buy larger trees for construction purposes. Plantations are generally viewed as long-term investments and there have been many instances of persons planting and later selling their areas--trees still standing--to other, wealthier island residents, usually as a means to cover cash shortfalls and in emergency situations. The significant concentration of plantation holdings that is resulting from this is ominous: five of the wealthier residents from Banacon now own between 20 and 30 mangrove parcels each.

Finally, it is worth noting that, in contrast to Bais (see next section), there are few conflicts between mangrove planters and other mangrove users. For example, a remarkable feature of Banacon=s mangroves is the presence of an elaborate Ahighway@ network which crosses through the middle of the larger planted area and between many individual plantations, enabling the efficient passage of people at low tide and boats at high tide (as well, boats are parked here for protection during typhoons). These highways were not centrally planned by the community, but emerged gradually as new areas were planted and it was simply recognized that efficient passage was desirable through these otherwise impenetrable forests. Nonetheless, I observed instances of people having planted recently within the highways. It was explained to me that cases like this were controversial and it was likely that these trees would be removed by other members of the community when the planter was not around.

Shell and crab collecting and even the collection of small branches for firewood is also done pretty much freely throughout the mangrove areas, regardless of the ownership of the individual stands. In other words, planting mangroves establishes clear privatized rights to the trees, but there is no serious attempt made to extend these private rights to other resources associated with the mangrove stands. This may, in part, reflect the fact that it is just unreasonable to effectively monitor such diffuse and low impact activities as gleaning, especially since most planted mangroves are distant from the residences of their owners (as compared to Bais; see below). However, it may also reflect the fact that, while there is a substantial commercial sale of shells and crabs from Banacon, most households engage in gleaning regularly to supplement basic food needs, particularly when fishing is unsuccessful. This widespread but non-intensive resource use would presumable create social pressures against privatization of these resources.

3.2 Findings: The Case of Bais Bay

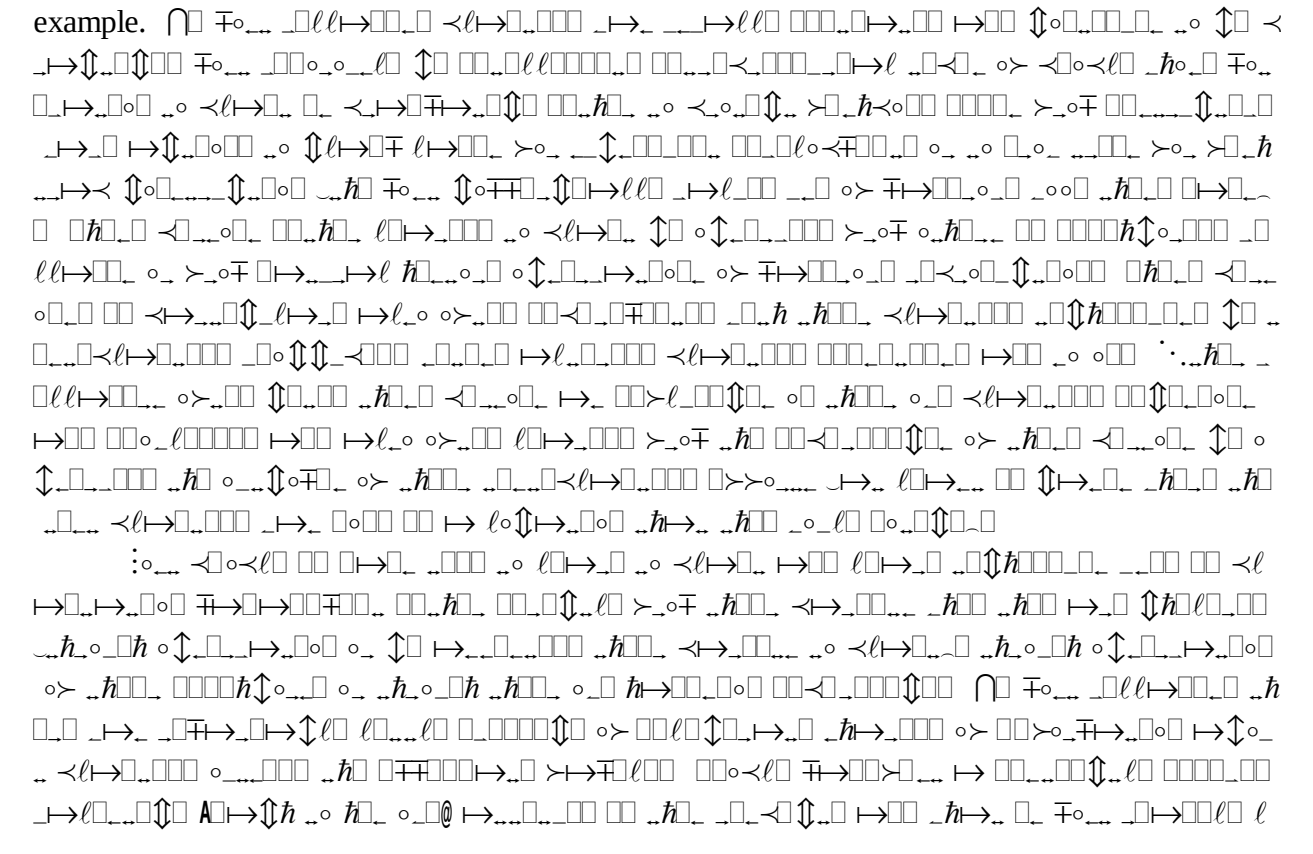
The situation in Bais Bay is far more complex. There are over a dozen distinct coastal villages in Bais and natural mangrove distribution is uneven. Landlessness is also pervasive and, unlike Banacon, development pressures from fishponds and residential housing have been a major cause of mangrove loss.

Existing mangroves are perceived by local residents as either private or government owned. The former includes the many plantations as well as extensive natural mangrove areas that have been claimed informally by nearshore landowners, notably large fishpond owners and *hacienderos* (see below). The remaining natural mangroves are considered government property. In general, I found no clear evidence that these public mangrove forest lands were subject to informal community management of any kind. By contrast, local peoples= use of them tended to reflect two, inter-related variables. First, people tended to collect mangrove resources from areas that were geographically nearest their homes. This kind of proximity-based harvesting was also

documented by LeBlanc (1997) in her study of gleaning in Bais Bay. Second, collecting of mangrove resources, especially wood, reflected also the intensity of monitoring and enforcement by government officials and, in the case of the commercial firewood concession, by private guards. The increased enforcement against cutting that has been implemented under the most recent local government administration has dramatically reduced the amount of cutting by local people. The exception to this seems to be that quite a number of households living close to the natural mangrove areas continue to collect wood illegally, likely because it is easiest to do and one is less likely to get caught with a boatload of wood when one has to travel only a short distance home. The local government also tends to permit wood collecting during certain local fiesta holidays when much firewood is consumed for pig roasting.

Planting in Bais has been done since the 1930's and, like Banacon, emerged probably as a response to the fact that local people were restricted from harvesting wood from most of the natural mangroves in the local area. Also like Banacon, all planting efforts in Bais have been private initiatives. However, Bais is far more socially and ecologically heterogenous. I found evidence of mangrove planting and management in virtually every coastal village in north and south Bais Bay. But, planting is only widespread and thus clearly Asuccessful@ in a few of these villages and, even in these, the extent of planting and successful management is both modest and uneven compared to Banacon Island.

As in Banacon, mangrove planting emerged and spread through the leadership of entrepreneurial individuals and subsequently spread mostly through imitation, either by neighbors copying one another or by children following their parents



keep the rights to the trees they planted, but agree to forego subsequent rights to the area once these trees are cut. The effect of these forces over time has been a trend of fragmentation of backyard plantations into smaller parcels which generally coincide with the boundaries of the home immediately adjacent to the shore. Even more recently, crowding along the foreshore is so intense that it is forcing children to build their homes into the backyard mangrove plantations, thereby cutting portions of household plantations and foregoing the benefits associated with these lost trees.

Conflicts between different types of mangrove users are also more common in Bais and reflect, at least in part, the high population densities found there. Backyard planters vary in their attitude towards permitting others to use their sites for gleaning, fishing or boat passage. In some cases, planters are strict and forbid all others from entering their forest stands. Others restrict access only during times when trees are young and thus vulnerable to disturbance from gleaners and boats. Others still make no serious attempt to regulate the use of their areas by others, so long as their trees are not being cut by them.

I encountered a number of cases of conflicts between backyard planters and boat owners because plantations interfered with traditional boat passage or docking rights. Young trees planted in areas used as throughways and docking areas for boats are usually destroyed passively by the boats as they continue to use the area. There were also cases of conflict between planters and shell collectors and between planters and shallow water Apush net@ fishers. On several occasions, large numbers of newly planted mangroves had been deliberately pulled up by gleaners and push net fishers, thus sending a clear signal to the planter that common rights would be defended. In several cases, homeowners had agreed--in one case reluctantly--to forego planting behind their homes because these sites had a history of being used as points of common access and landing for boats owned by persons living upland from the shore. In one of these cases, the homeowner had property vandalized by locals who did not want to see their traditional access restricted, even though their access point was clearly within the homeowners private property boundary!

Hacienda Management

The second most common mangrove management in Bais--referred to hear as Ahacienda@--occurs along shorelines that border large fish ponds and *hacienda* land holdings, which includes more than half of all foreshore lands in North and South Bais Bay. *Haciendas* are large landholdings that were claimed by Spanish immigrants in the 1800's and developed largely into sugar estates. Later on, some *hacienda* owners diversified and developed foreshore mangrove lands adjacent to their properties into fishponds. Hundreds of hectares of natural mangroves were cut and cleared for this purpose between 1940 and 1980. Today, these coastal areas are sparsely settled, but management issues and conflicts concerning the remaining mangroves are often more serious here than in the more densely populated Abackyard@ areas, in part because of the vast inequalities that exist here between competing interests.

The earliest planting and management in the hacienda lands in South Bais Bay was initiated in the 1940's by one of the first fishpond developers in Bais who wanted to protect his dykes from wave damage. Planting later spread from here to neighboring fishponds and to the small enclaves of fisherfolk that inhabit peripheral hacienda lands along the shore. As with the

residents of Daco Island, these fisherfolk planted primarily for wood to use in construction of fish corrals (*bunsod*).

In North Bais Bay, planting was first done in the late 1940's/early 1950's by fisherfolk living in small villages on the seaward edges of hacienda lands. Early planting here was done also for *bunsod* construction as well as for storm protection since some of the earliest residences here were located in areas highly exposed to wind and waves. It is worth noting also that the emergence and spread of planting in several of the villages here tended to coincide with periods immediately following extensive mangrove clearing for fishpond development during the 1950's and 1960's. This suggests that, as was the case with backyard planting on Daco Island, planting here was partly a response to local scarcity of mangroves. Fishpond developers in North Bais Bay adopted mangrove planting unevenly and later, during the 1960's and 1970's.

Patterns of local planting and management were found to vary dramatically from hacienda to hacienda. In general, the trend over time has been for haciendas to increasingly assert claims and, to varying degrees, dictate management over the mangroves bordering their properties, regardless of whether these forests are natural or planted. A few hacienda administrators were essentially still ambivalent about mangroves and how the local people were using them. ABenevolent@ hacienda owners, by contrast, actually encouraged local people to plant for themselves and guaranteed them their rights to own the trees that they plant, even when clearly on hacienda property. In these two instances, local people commonly planted along foreshore lands and un-used, Ainterstitial@ spaces on hacienda property, like along fish pond dykes and in drainage ditches and canals. Most of these plantations are small (a fraction of one hectare).

Other hacienda and fish pond owners have taken a direct role in planting and management of mangroves, but have been less accommodating to local peoples= interests. Some have paid locals to plant huge numbers of trees for them (this guarantees ownership in the hands of the one who paid for the planting) and many pay guards to watch their areas. Typically, guards have been instructed to prevent local people from cutting mangroves, though often the rights of local people to collect shells, crabs and dead wood for firewood are commonly maintained (though not always). The most problematic cases involved hacienda owners who had usurped, without compensation, ownership of mangroves that had been planted previously by local people. This kind of scenario occurred where ownership of the hacienda had changed hands, thus eliminating any prior informal understanding between the locals and the previous owner.

Frontier Mangroves

Finally, there is a large tract of mangrove forest that has been expanding rapidly on the sediments delivered to the bay from a large river as a result of upland soil erosion. The rate of sedimentation is dramatic: I estimate the mangrove here has expanded outward into the bay 1 - 2 km since the 1960's. This creates a frontier-like situation in that new, unclaimed forest lands are continually made available. Not surprisingly, in a place where landlessness abounds, this is the locus of some of the most bitter conflicts in terms of property claims. Planting of mangrove trees is the principal tool by which various local entrepreneurs and landless folk have been asserting their claims here. One particularly energetic individual has planted more than 50,000 trees over 20 years and claims an area (now largely developed into fishponds) of about 12 ha=s. About 20 people have planted extensively in the area for the purposes of claiming portions thereof and many

more have made smaller claims to build homes.

While there are some particularly interesting plantations in this area, most of the planting is done as land speculation and the historical pattern here is to plant, cut and develop areas into fishponds or residential lots. In some cases, people have planted areas already claimed by others and subsequently sold these to third parties to be used as fishponds. Similarly, some wealthier fishpond developers using illegitimate means have usurped areas used and planted previously by others. In two cases, local traditional users of an area organized to oppose expansion of a fishpond into mangrove areas. The legal conflicts surrounding these cases are complicated and have erupted on occasion into violence, including an act of murder.

4.0 Discussion and Lessons Learned

The most striking pattern across all sites was a clear historical trend towards privatization of open access and common mangrove lands and resources, by poor and rich mangrove users alike.

Local management of mangroves and mangrove tree planting, in particular, is widespread and always an individual or household-based activity. Furthermore, planters do not actively share information relevant to planting and management of mangroves with others. Similarly, land speculation, fish pond development and residential development of mangrove areas--activities undertaken by a variety of both rich and poor stakeholders--was being done often with little regard for other users of those areas, even when such users were members of the same village.

The downfalls of privatization are also apparent and should be considered in policy design.

Because mangroves are so privatized, the specific forms of management varied depending on situational factors and individual attitudes. Individual plantation owners and haciendas owners varied dramatically in their knowledge and practices in management, as well as their attitude toward sharing access with other local mangrove users. In Banacon, for example, situational factors made it inappropriate to restrict access to plantations from non-wood users. In Bais, however, proximity of plantations made it practical to monitor these, but individuals varied in their desire to do so.

Mangrove plantations were often viewed and treated like any capital investment: bought, sold, concentrated in the hands of the wealthy and destroyed by rich and poor alike where more profitable uses of the area presented themselves. Property claims--not the mangroves themselves--are often the underlying motivation to plant.

There is little evidence of sustained, cooperative or "community" management of mangrove resources. However, social dimensions--notably leadership and imitation--profoundly influenced the emergence and spread of management innovations.

There was little evidence that public mangrove areas were being managed in common by

local people. A deeply individualistic, Aeach to his own@ ethos prevails in many of the villages studied. This influenced the evolution of property rights, but it has effected other aspects of the management of mangroves. For example, people in Bais tended not to share their technical knowledge about mangroves with one another. At the same time, the idea and inspiration to adopt novel management innovations almost always came from observing others who had successfully adopted such innovations already. Thus, management techniques, like planting, were passed on from adult to child through the child=s participating with the adult. But, neighbors essentially were inspired and learned by observation and copying only, not by cooperating or interacting directly with one another. This is one reason why the spread of practices was slow and uneven and is probably an important factor explaining the modest success of similar projects elsewhere.

Several dramatic cases of collective action were documented. Most notably, fishing households in one village mobilized on several different occasions to oppose the expansion of large fishponds into mangrove areas traditionally used by the villagers. These were significant events in that they halted or dramatically curtailed these developments and protected substantial traditional access rights, but these were also highly contingent events whose broader, lasting significance is questionable. For example, the former leader of one of these fisherfolk organizations subsequently developed his own fishpond--albeit a much smaller one--destroying a small portion of the area he once fought to protect.

Property rights regimes in mangroves are complex, conflict-ridden and under continuous negotiation between similar and dissimilar resource users.

Conflicts over mangrove resource access are commonplace, recurring, sometimes severe and often not resolved to the satisfaction of all stakeholders involved. In Bais, in particular, the scarcity of lands resulting from a highly skewed historical patterns of land ownership has forced the local government, the landless and many local entrepreneurs into the mangroves in search of property to claim and develop. As a result, mangroves in Bais have frequently been the locus of bitter conflicts between competing individuals and interest groups. More generally, boundaries between neighboring claims of the same type are continuously evolving and being renegotiated in response to changing circumstances, including population density, inheritance and so on. Shifting boundaries and conflicts are even more complicated when different uses are involved. The spread of private mangrove planting, in particular, has created pressure points on common rights in many cases, often with less than subtle acts of retaliation or resistance invoked against the private individual.

Successful management is not always what it seems.

The diversity of management and the ongoing evolution of property boundaries and rights makes it difficult to draw generalizations about what type of Aregime@ is likely to work best for conservation. For one, there were many instances whereby arrangements that "worked well" in one context did not work as well in others. For example, private mangrove planting was increasing mangrove species diversity in some cases by revegetating and introducing new species

to an area, but in other cases, the general trend was one of replacing a diverse mangrove assemblage with a single species forest monoculture. Differences depended on site-specific ecological characteristics and variation in subsequent management practices by different plantation owners.

Second, generalizations about mangrove management can be risky because successful mangrove management is often not what it seems. Planting and protection of mangroves in Bais and Banacon has important environmental and economic consequences, is done with different objectives, and occurs within the context of a variety or property arrangements. But, whether planting reflects effective resource management with lasting environmental benefits, as opposed to development-oriented land speculation, for example, is a question that needs to be understood on a case-by-case basis.

5.0 Conclusions

Common Property thinking emerged and has developed largely within the context of opposing the theoretical and practical dominance of rational actor and related "tragedy of the commons" models in natural resource management. Research in the field has subsequently marshaled an array of arguments and evidence much enriching our understanding of the social, ecological, economic and political dimensions of natural resource management. But, what began as a healthy intellectual and practical challenge has, for many, evolved into an entrenched and stagnant positioning along the ideological continuum that places individualism and privatization at one extreme and collective action and common property at the other, with no mixing of the two.

In fact, it is taken as an article of faith among many enthusiasts that common property institutions are effective and/or desirable in virtually all situations. This reflects, in part, what Susan Hannah recently noted as a curious combination of Awishful thinking and desperation@ in our search for development alternatives (Hannah, 1998). More specifically, CPR theory is increasingly falling prey to its own popular and political appeal. This is a curious blend of Agreen romanticism@, on the one hand, which maintains that poor, local people are inherently conservation-oriented in their behavior and political ideologies from the Jeffersonian right and Marxist left, on the other, that extoll the virtues of local community, self-reliance and rural life. The pertinent argument often offered here is that poor, rural folk are more community-oriented and depend more on common property resources and institutions in their day-to-day lives. Thus, common property advocacy is one in the same with promoting and protecting the interests of the rural poor and marginal.

In general, evidence from the study suggest that common property enthusiasts need to be more critical of their own tendencies to draw theoretical and political generalizations about the significance and role of common property management and institutions. There is certainly a kernel of truth to the observation that local people, given knowledge and a stake in natural resources important to their livelihood, may have a greater incentive to manage these sustainably. But empirical evidence from Banacon Island and Bais Bay suggests that individual actors and privatization of resources--by the rich and poor alike--are the principal forces driving both destructive and restorative changes in mangroves. There are important social dimensions to this, but the direct role of local collective action and common property institutions, per se, has been much less important.

In this regard, it is worth commenting on the relevance of this study to ongoing efforts to promote mangrove planting and management elsewhere. First, as has been noted elsewhere (e.g. Primavera and Agbayani, 1996) and was found in Bais in particular, ecological constraints are often critically important in the case of mangroves and may ultimately guarantee failure even if social conditions are suitable. Second, the experience of Bais and Banacon suggest that the promotion of private, household-based reforestation and management may be more effective than strategies based on community-wide mobilization and collective management (though comments in the previous section regarding the pitfalls of privatization should be addressed). Last, promotional strategies should be based on the mobilization of entrepreneurial persons who are likely to take on a novel initiative with minimal support and the subsequent establishment of successful show-case plantations that the wider community is likely to observe and imitate. Related promotional efforts should be designed in accordance with the recognition that social barriers to the transfer of technology--including the tendency for villagers to not actively share knowledge with one another--pose a major constraint to the rapid spread of management practices.

□□ □.□.□→.. .□ □.□□

Baconguis, S.R., D.M. Cabahug., S.N. Alonzo-Pasicolon. 1994. Identification and inventory of Philippine forested-wetland resource. Forest Ecology and Management 33/34:21-44.

Boserup, E. 1965. The Conditions of Agricultural Growth. Aldine Publishing, Chicago.

Cabahug, D.M., F.M. Ambi, S.O. Nisperos, and N.C. Truzan. 1986. Impact of community-based mangrove forestation to mangrove dependent families and to nearby coastal areas in Central Visayas: a case example. *In:* Mangroves of Asia and the Pacific: Status and Management. Natural Resources Management Center and National Mangrove Committee, Ministry of Natural Resources, Quezon City, Philippines. pp. 441-466.

Hannah, S. 1998. Co-management in small-scale fisheries: creating effective links among stakeholders. Presentation to the International Workshop on Community-based Natural Resources Management, The World Bank, Washington, D.C. May 10-14, 1998.

LeBlanc, S. 1997. Gleaning in Bais Bay: A case study on an informal sector coastal activity in the Philippines. Unpublished Thesis, St. Mary=s University, Halifax, Canada.

Netting, R.M. 1993. Smallholders, Householders: Farm Families and the Ecology of Intensive, Sustainable Agriculture. Standford University Press, Stanford.

Paden, E. 1990. Man-made bakauan plantation in Bohol: making ripple effects. Canopy International 16(3):6-7.

Primavera, J.H., 1993. A critical review of shrimp pond culture in the Philippines. Reviews in

Fisheries Science 1:151-201.

Primavera, J.H. 1995. Mangroves and brackishwater pond culture in the Philippines. Hydrobiologia 295:303-309.

Primavera, J.H., and R.F. Agbayani. 1996. Comparative strategies in community-based mangrove rehabilitation programs in the Philippines. Paper presented at the ECOTONE V: Community Participation in Conservation, Sustainable Use and Rehabilitation of Mangroves in Southeast Asia, Ho Chi Minh City, Vietnam, January 8-12, 1996.

Yao, C. 1986. Mangrove reforestation in the Central Visayas. Canopy International 12(2):6-9.

Yao, C. 1987. Bakauan backyard for wind and tidal break. Canopy International 13(6):7-8.

Yao, C. and F. Nanagas. 1984. Banacon island: biggest bakauan plantation in Central Visayas. Canopy International 10: 1, 4,5,9.