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## "Blue Mountains constantly walking": the re-signification of nature and the re-configuration of the commons in rural Papua New Guinea

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## Resource Management in Asia-Pacific

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# "Blue Mountains constantly walking"[1]: the re-signification of nature and the re-configuration of the commons in rural Papua New Guinea

## Introduction

Lababia is a community of just over 500 people situated on the Morobe Coastline of Papua New Guinea approximately 60 km south of Lae. Although subject to the urban influences of Lae which can be reached in 2 hours by boat, the economy of Lababia continues to be largely subsistence-based and is dominated by swidden agriculture and fishing.

Since 1992, Lababia has been the site of the Kamiali[2] Integrated Conservation and Development Project (ICAD), which is being facilitated by Village Development Trust (VDT), an NGO based in Lae. The most significant achievement of this project to date has been the construction of a Training Centre and Guesthouse facility at Lababia. VDT uses the Training Centre to sponsor a variety of workshops and courses in the areas of eco-forestry, conservation and community development, while the guesthouse facilities are being developed to service a small eco-tourism industry.

Lababia claims a large land and marine area as their exclusive territory and have set aside approximately 43,000 hectares, the majority of their claimed territory, as a Wildlife Management Area. This area stretches approximately 15 km along the shoreline and includes two small islands and a generous scattering of fringe and patch reef. Behind the village lie a series of steep mountain ridges, which encompass the headwaters of four rivers that cut through Lababia territory to empty into the Solomon Sea. On top of the highest and most prominent of these ridges, known as Blue Mountain, scientists have discovered a unique moss-cloud forest that, according to preliminary studies, may well be home to a large number of previously unidentified plant and animal species (Bein 1998).

With very few exceptions the men and women living in Lababia today have never set foot on Blue Mountain, mainly because their subsistence needs are all readily met more close at hand. Villagers do not tend to travel to unfamiliar parts of their claimed territory without good reason since it is expected that such areas will be home to dangerous spirits. Such spirits, often in the form of giant snakes, are considered to be ancestors and the true owners (*papa bilong graun*) of wild spaces. To move freely and safely in these areas one must "have a name" in that area, that is, one must be a relative of the resident ancestor spirit or one must travel with someone who is.

The potency of this set of beliefs has been fading at Lababia over recent generations but today the mystique of Blue Mountain is being reinvigorated by a new set of beliefs – those driving the research agendas of the scientists brought in by the ICAD project. These beliefs place high value on rare and endangered species and ecosystems, and relate to global agendas for bio-diversity conservation. Many villagers are absorbing this set of beliefs as a consequence of their participation in the ICAD project. The mystique of Blue Mountain is enhanced by another factor, as well. In the

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[1] The quotation "Blue Mountains Constantly Walking" is taken from a book of essays by Gary Snyder who gives credit for the phrase to Dogen Kigen, a 13th century Japanese Zen Buddhist monk (Snyder 1990:97). Snyder uses the phrase to evoke the sense of sacredness often associated with wilderness mountains, but also to connote to universal processes of "natural" change that continuously re-shape and transform not only mountains but the human psyche as well. Snyder writes: "His [Dogen's] mountains and streams are the processes of this earth, all of existence, process, essence, action, absence; they roll being and nonbeing together."

[2] When missionaries arrived in the area in the first decade of this century, most villagers were living at a location they called *Lababia*. After World War II, however, the village was relocated to *Kamiali*, an area about 3 km. south of *Lababia*. Villagers thus decided to use the place name *Kamiali*, rather than the official village name *Lababia*, to name the ICAD project.

minds of many villagers, bio-diversity studies are not that different from gold prospecting – each activity creates its own set of development opportunities. What will scientists discover on Blue Mountain and how will their discoveries affect Lababia's future?

This re-signification of Blue Mountain and the changes that are likely to overtake the mountain itself in the near future, can be taken as symptomatic of a larger set of changes, both social and ecological, that are now underway at Lababia. It is in this context that I have set out to understand, most specifically, the changes occurring in the area of resource use and resource management.

A second but also primary goal of my research has been to develop some insight into the nature of the "global alliance" in favour of conservation and sustainable development that is being promoted by the United Nations and affiliated NGOs such as IUCN (the International Union for the Conservation of Nature and Natural Resources) and WWF. Various U.N. agencies have been responsible for a series of books and documents that serve as a kind of blueprint or intervention template for the implementation of their vision of this global alliance.[3]

An important component of the UN's vision for such a global alliance concerns the role of what these UN publications generally refer to as "local communities", which are frequently portrayed as in need of outside support designed to "empower" them to manage their resources sustainably. Lacking, however, is any clear theory of how such a program of empowerment could be carried out effectively, or any concrete description of what such a "local community" might look like once empowered. An important premise of my research design is that this void in planning theory could be filled in part by reliance on the work done over the past 2-3 decades by common property theorists.

## Common Property Theory

Common property theory has developed as an inter-disciplinary approach to understanding the dynamics of resource management regimes in situations where the resources are owned collectively by a community or group of communities, and control over the resources is exercised at the local level. Common property systems thus differ from private property systems, where land is registered to a single owner whose rights of use of existing resources are determined by government legislation, not by a local community. Common property systems can also be distinguished from government property systems, where land and its resources are owned by the government itself and can be utilized directly by that government, or leased or sold at the government's sole discretion. In the case of both government and private property systems, controls over resource use are determined by national legislation and enforcement must be carried out by a government enforcement agency.

Common property systems on the other hand are largely regulated by the local resource users and landowners. They exist on all continents but are by far the dominant type of property system in PNG and throughout the Pacific Islands, as well as in many regions of Asia and Africa. It is useful to distinguish two types of common property systems - firstly, those involving the use of a single resource, as when a group of communities share and collectively regulate a fishery, or when a group of communities collectively organize, construct and maintain an irrigation system. Secondly are those systems in which a number of resources are controlled by one village, as is the case in Lababia where the community as a whole are the owners of a marine area used for fishing, secondary forest areas used for gardens, and primary forest areas used for hunting, the gathering of wild foods, the gathering of materials to be used in the construction of houses, canoes, and so on.

A number of common property theorists have identified what they consider to be the "conditions" for success in a common property system, success being equated basically with the sustainability of the resource or resources in question. This set of conditions can also be understood as a set of

[3] Prominent examples of this body of literature are: *Our Common Future*, the Brundtland Commission Report of 1987 (World Commission on Environment and Development 1987); *Agenda 21*, the publication arising out of the 1992 Rio Summit (Robinson 1993); *Caring for the Earth* (IUCN 1991); *World Conservation Strategy* (IUCN, UNEP, WWF 1980).

characteristics possessed by any given successful common property system. Such successful commons[4] would appear to have achieved exactly what the UN would like to see all "local communities" achieve.

While tentative I believe this set of characteristics, provide a reasonable starting point for further research. The following list is based primarily on the work of Elinor Ostrom (1990), who relied in particular on data from village commons in mountainous regions of Japan and Switzerland, and on irrigation systems in Spain, the Philippines, and the United States. I have modified Ostrom's list, however, on the basis of my own work, the work of Robert Wade (1988) in a village commons in South India, and Evelyn Pinkerton's comparative studies of fisheries in Canada, Latin America, Japan, and elsewhere (1995).

### *Characteristics of a successful common property system:*

1. Resource boundaries are clearly defined.
2. The membership of user groups is clearly defined.
3. Decision-makers are personally dependent on the sustainability of resource use.
4. Decision-making authority is broadly based amongst users.
5. Local communities exercise a significant degree of autonomy over local resources.
6. Decision-makers possess ecological knowledge appropriate to the current pattern of resource use.
7. Resource use can be effectively monitored and sanctions applied against overuse.
8. Mechanisms exist for resolving conflicts and changing the rules of resource use.

It would appear that these characteristics describe a relatively static situation in which a number of important factors are not addressed - the issues of population growth, market conditions, and globalization effects in general. In PNG particularly, village commons are going through a number of very difficult transitional processes associated with the movement from a subsistence economy to a mixed economy. The purely subsistence-based resource use patterns of Lababia, as they have existed until fairly recent times, would seem to place them in the category of having been a "successful" common property system, since their environment continues to meet all their subsistence needs and in fact remains relatively pristine throughout much of the primary forest area, and portions of the marine area as well (Bein 1998). From this perspective then Lababia can now be considered as a "commons-in-transition". One of the goals of my research will be to modify or expand the above set of characteristics so as to better account for the many commons-in-transition that exist in Papua New Guinea and many other parts of the world.

## Patterns of Resource Use at Lababia

What then, do the patterns of resource use at Lababia look like in relation to these proposed characteristics of success? How might the challenges and difficulties, the successes and failures of Lababia, be used to generalize about other common property systems? And finally, how might such a study of Lababia be used to guide interventions, such as the current Kamiali ICAD process, that can be considered to fall within the mandate of the UN's call for a global alliance in support of conservation and sustainable development? In order to address these questions I will first summarize my research findings as they relate to each of the two dominant resource use areas at Lababia, swidden agriculture and fishing. Then I will assess the overall impact the ICAD project has had to date on the community of Lababia.

### *Gardening*

In order to carry out my study of gardening activities at Lababia, I selected a representative sample of 25 households, arranging to go with one or more individual members of each family to visit all the garden areas they were currently using or preparing for use. Family members were interviewed

[4] Common property theorists are not consistent when defining the terms *commons* and *common property system* (compare Bromley 1989, Ostrom 1990, Pinkerton 1995). In this paper I use the term *commons* interchangeably with *common property system*, and the term *village commons* to refer to those situations in which a number of resources are controlled by a single village.

in their gardens concerning their reasons for choosing each particular plot of ground, the nature of their rights to each of their garden areas, and their history of use. I determined the fallow period for each garden, the range of crops planted and the planting strategies employed. I also measured each garden using a compass, measuring line and GPS, in order to map the distribution of village gardens and calculate their sizes.[5]

There are three general types of gardens at Lababia. *Taro gardens* are planted on the steep slopes of the two small islands where the taro beetle has not penetrated. *Mixed gardens* are dominated by plantings of sweet potato but will also contain generous amounts of cooking bananas, sugar cane, pit-pit, papaya and various greens. A typical mixed garden will also contain a few yams, corn, and beans, limited plantings of local taro and chinese taro and occasionally cucumbers, tomatoes, green onions watermelon, green onions and eggplant. Gardens devoted almost exclusively to *tapiok* are planted in sandy soils immediately behind the village and close to the shoreline at the Bitoi flood plain. The Bitoi area is by far the largest, most fertile and most important of the garden areas.

An individual family will work up to 6 separate gardens at any one time, clearing the ground and planting them in sequence in order to ensure a continuous supply of food. Each individual garden will also be planted sequentially, some sections dominated by early maturing varieties of sweet potato, while others are dominated by later maturing varieties. Another typical strategy is to plant one or two gardens close to the village - tapiok close to the house where soils are sandy and a mixed garden further back towards the sago swamp. The remainder of the family's gardens will then be located in the Bitoi flood plain where the best soils and moisture conditions are found.

As a preliminary conclusion, I feel confident in stating that horticultural practices at Lababia currently are sustainable and could remain so indefinitely in the absence of significant population increase or intensification through cash-cropping. My conclusion is based on the fact that all families in my sample were found to be producing adequate or more than adequate amounts of food for their own immediate consumption[6], that all families had a broad set of choices available to them when it came to locating their gardens, and that significant portions of their primary gardening areas have not yet been brought into regular use. Although fallow periods are becoming shorter in certain areas, as short as 8-12 months in a few cases, the average fallow period in the Bitoi flood plain is between 3-5 years, and fallow periods are 10-15 years in other locations.

The shorter fallow periods are mainly the result of individual families seeking to limit the distance they walk to their gardens. Gardens in the Bitoi delta are located between 5-10 km away from the village with the result that workloads are increased significantly when gardens are located far inside the delta. This is especially true for women who on the return journey will usually carry 2 or 3 *bilum*[7] full of produce, each weighing between 10-20 kg. Neither my own visual inspections of Bitoi gardens, nor the evidence presented by informants, indicated that fallow periods of 3-5 years were leading to soil degradation or a significant lowering of food productivity.

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[5] Once I have a chance to fully analyze this set of data I will use it to estimate the quantity of garden land necessary to feed a family of a given size, and determine the proportion of garden land in use at any given time in comparison to the total area of land available for gardening. I will also roughly evaluate the sustainability of current horticultural practices – the estimate will necessarily be rough since I did not have the time or resources to take soil samples, calculate precisely the productivity of specific garden areas, or identify fully the nature of the plant communities occurring in areas with shorter vs. longer fallow.

[6] Every few years periodic flooding does reduce food production for a significant percentage of village families. Just before my arrival Lababia had experienced the worst such flooding in several decades. Many families had to rely for several months on the support of relatives whose gardens were less affected, and the village as a whole had virtually no surplus food available for ceremonial occasions during this period. These periodic "natural disasters" are effectively dealt with by current gardening strategies, however, and, as is the case with many flood plains, have the effect of boosting soil fertility through the deposition of new soil.

[7] *Bilum* is a pidgin term for a woven bag traditionally made from natural fibres but now generally made from strands of colorful nylon rope. In Lababia and throughout most of Papua New Guinea, they are used by women to carry produce from the garden back to the village.

The population of Lababia has, however, doubled since the end of World War II and may well double again within the next few decades. Should the transportation problem be solved it is also likely that a certain amount of cash-cropping will occur in the future. The soils and moisture conditions in the Bitoi area are certainly adequate to grow a number of crops that could be sold at Lae, and many villagers have both the interest and ability to initiate and manage a small-holder operation. The only way to transport goods from Lababia to Lae is by water, since the village has no roads. Water transport is by gasoline-powered dinghies, which are expensive to operate.

It is very possible then that, as the result of intensification due to population growth and the future addition of some cash-cropping, Lababia will arrive at a situation of unsustainability in the horticultural sector in the not too distant future, a situation in which land shortages will occur and soil degradation could begin in some areas. How well positioned is the community to deal with such an issue and what are the key factors that will determine the outcome? In this paper I would like to identify and comment on one key factor - the community's land tenure system.

## *Land Tenure*

Currently the most important landowning groups in Lababia are individual families and family groups. These groups claim land on the basis of their descent from the ancestor known to have first cleared the land in question from the primary forest, or from an area considered "public land". The individuals comprising such groups trace their descent both matrilineally and patrilineally from the founding ancestor, although those descended in the matriline will often, but not always, be considered to have the greater political authority within the group.

Such landowning groups do not generally correspond to the named clans that exist in the village, but rather cross-cut them in infinitely variable ways. Villagers represent themselves (in pidgin and in English) as being organized in two "major clans" of relatively equal size, with each "major clan" composed of a number of "clans" (or "sub-clans"). The genealogical relationship of the clans that cluster within each "major clan" are indistinct, however, and with only a few exceptions this relationship is impossible to reconstruct based on villagers present knowledge of family and clan histories. Clan membership both now and in the past appears to have been a matter equally of residence and genealogy. While a few of the clans are landowning groups, others are not. Moreover the rights to land exercised by clans are not of the same order as those exercised by the smaller, usually unnamed family groups that regularly use given parcels of land.

Clan rights generally exist as a kind of underlying right that tends to be invoked only when a piece of land is to be used for generating cash income. Such a dispute has occurred in the case of *Kurindi*, land leased by the village as a whole to Village Development Trust for the purposes of building the training centre/guesthouse facility. The disputants in this case are one of the clans, *Lumi Yame*, and the "major clan", *Areme*, within which it falls. The dispute hinges partly on the question of whose ancestor can be proven to have originally won the ground in battle, and partly on the question of whether the "major clan" in this case can be considered a legitimate landowning group in its own right, or whether it exists merely as what anthropologists might call one half of a moiety system.

During my stay in Lababia several small land disputes arose at the level of individual families, usually within the cluster of families claiming ownership of a specific parcel of land. This type of dispute, which involves use of garden areas for subsistence purposes, is readily settled in a single meeting or a series of meetings involving the disputants and an informal council of village leaders, or *bigmen*. In the cases I was familiar with, those whose claims were disallowed by the *bigmen* nevertheless abided by their decision, a strong indication of the legitimacy of this form of dispute resolution within the village. The land dispute over *Kurindi*, however, has remained unresolved for a number of years. It was recently referred to the district court system by a land mediator after three mediation efforts failed, and has also resulted on one occasion in a village-wide brawl that has left the community unable to function cooperatively in a number of ways.

The flexibility of the customary land tenure system at Lababia can be considered a strength when analyzed within the context of a subsistence economy and land abundance. It ensures that all members of the community have ready access to land in a number of locations and that no one will go without. In the context of land shortages and a cash economy, however, their land tenure system could become a liability until such time as the community resolves the question of what rights are held at each level of the land tenure system.

## *Fishing*

The marine environment at Lababia is equally as important as the land environment, with fish providing virtually the only source of protein for the village. Unlike garden lands, access to fishing resources is not governed on the basis of family or clan ownership of given areas. The reef areas that comprise Lababia's richest fishing grounds are equally available to all, with only the mouths of rivers considered to have owners.

For several decades now fishing has also provided villagers with their main source of cash income. Annual family incomes in Lababia average about 1000 kina/year or about 600 Canadian dollars, with fishing income accounting for approximately 50% of this amount. Most fish are caught from outrigger canoes with hook and line methods, and are sold in Lae to Momase Fisheries, originally a GTZ-supported, Government-run operation, but now a privatized business.

One of the fundamental assumptions that led to the creation of Momase Fisheries in the late 1980s was that the inshore, or artisanal fisheries of PNG, including those of Morobe Province, have been an under utilized resource (Hair 1994). As a result the Department of Fisheries set out to accomplish two goals: 1) to boost village incomes through a program of support for artisanal fishermen, and; 2) to provide urban centres and non-fishing communities with ready access to a locally produced and affordable source of protein. Momase Fisheries set out to provide fishermen with a dependable market, affordable access to ice, and outreach support directed at making village fishing and transport systems more cost-effective. Although the Momase Fisheries operation has realized its two primary goals, the productivity of artisanal fisheries has not risen as expected in recent years and now appears to be in decline.[8] In the case of Lababia the picture that emerges is one of a significantly depleted fisheries resource. Fish sizes are down, fishermen more and more often come back empty-handed, and good bait is harder than ever to find.

Although fishing productivity is in decline in Lababia, fish prices in local markets have been steadily rising. One result is that many Lababia fishermen have been intensifying their fishing efforts through illegal methods. Fishermen occasionally resort to the use of a poisonous vine (*rop dynamait*) which is indigenous to the area and a traditional method of capturing fish. The vine is pounded until the skin is soft and permeable and the sap begins to flow readily. Once immersed in the water the white sap spreads rapidly, killing all fish in the area. The toxin is not harmful to humans and captured fish can be used as bait, dried and sold in the village market or in Lae, or eaten fresh. Villagers, especially elders, report that, traditionally, *rop dynamait* was used with great discretion. Ancestors chose their time and location carefully and made sure currents did not carry the poison far away from its point of application. Today, however, use is more uncontrolled and directed towards harvesting a large number of fish for commercial purposes.

Fishermen at Lababia also resort on occasion to the use of a more recent innovation - homemade bombs. Unexploded World War II artillery shells, still abundant in the hills around Lababia, are disassembled and a portion of their explosive powder is placed in a glass jar together with a cap obtained from a relative working for a mining company or on a construction site. These bombs most often are used to capture schools of baitfish such as *lala* (scad) that are found close to shore. A few villagers also explode the bombs in reef areas, however, with predictable impacts on the reef and associated fish habitat.

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[8] This conclusion is based on Momase Fisheries records of fish landings obtained from Momase Fisheries (Tumonde 1992, 1999, McClay 1999).

The villagers themselves have previously banned both of these practices as part of the rules that operate within their gazetted Wildlife Management Area. They have also been outlawed by national legislation. Lababia is just out of reach of national enforcement agencies, however, and the village has not yet found the will or means to enforce the rules itself. Many individuals in the community report feeling uncomfortable with the intensifying use of such techniques, and are disconcerted by the clear signs of a depleted fish stock. At least one attempt was made recently at a community meeting to reassert the village ban, but full consensus was not reached and the issue remains unresolved. The likely mechanism for enforcing these rules, assuming consensus will eventually be reached, will be through the WMA Committee who are legally responsible for upholding the WMA rules, and who will act in concert with the village Kaunsil.

Enforcement of the rules banning *rop dynamait* and bombs will not be sufficient, however, to return fishing practices to a sustainable level. The community will also have to institute other regulations such as putting a rotating ban on fishing in specified areas for a few months at a time while fish stock rebuilds. Means will also have to be found to curb the capture of undersize fish. Such regulations cannot be developed on the basis of traditional ecological knowledge alone, but will require some advice from fisheries experts and marine biologists.

## The ICAD Project

How has the ICAD project affected resource use patterns at Lababia, if at all, and how is it affecting other related aspects of village life? Soon after my arrival in Lababia in September, 1998, it became apparent that VDT had not done its homework in regard to resource use patterns in the village, or in regard to land tenure and social organization in general. Also, in the six years of their operation, they had not carried through a single successful project on the side of economic development with the exception of the training centre/guesthouse facility. This facility is providing the community with a significant level of economic support, but for now it also remains financially dependent on the donations of oversees organizations.

Whatever faults might be found with ICAD implementation at Lababia, however, it must be acknowledged, when looked at in terms of resource use patterns, that the current direction of the project is entirely appropriate. Commercial fishing cannot remain the chief source of cash income for the village since they have already reached a state of unsustainability. The wisest economic development path for Lababia will be one of diversity. The extensive work initiated by VDT on the side of conservation, especially the extensive bio-diversity studies of the area, can be used to promote a small-scale but potentially profitable eco-tourism industry.

More problematic is the nature of the impact of the project on decision-making processes within the community. In organizing themselves to participate in an ICAD project the village created a committee – the Kamiali Conservation Project Committee, or KCPC. The committee structure follows customary practices in that it is composed roughly of equal representation by the two major clans, Areme and Gara. In other ways, however, KCPC is a new and rather anomalous and problematic institution. Important community decisions are traditionally made by a council of *bigmen* – men recognized as leaders in the community on the basis of their personal qualities and their seniority or authority within their families and family groups. This group is answerable to the community as a whole but is also able to make important decisions on their own. KCPC occupy a position of less authority and legitimacy as a decision-making body. They are, however, evolving into a community planning committee and their interaction with VDT and other outside organizations brings them a level of sophistication not matched by the *bigmen*. Their membership on the whole is also younger and more educated, and their aspirations for change incorporate urban and outside influences to a greater degree than do those of the *bigmen*.

At the moment the community, with strong encouragement from VDT, is gearing up to replace KCPC with a much more authoritative community-based organization or CBO, that will be registered under PNG's Associations Act, that will in fact be a kind of NGO in its own right. The

move to create such an organization has come about as a result of the perception of VDT and some villagers, that a registered CBO will be more readily able to access funds from a variety of donor organizations. The proposed CBO will have Board of Directors comprised of a majority of village representatives, but also VDT staff and an outside businessman. Potentially they will be the administrator of much larger budgets than has been the case with KCPC and, if and when the larger budgets materialize, they will hire full-time, paid staff. As a community planning group they will take on responsibility for prioritizing and implementing various kinds of community projects and will necessarily have to tackle issues of resource management as they arise in the fisheries sector and elsewhere. Whether this group will have the will or ability to work closely and harmoniously with existing authority structures in the village remains to be seen.

## Conclusion

In conclusion it should be noted that the land and marine areas comprising Lababia's Wildlife Management Area are a rich, largely undisturbed ecosystem. Despite the fact that commercial fishing has reached a point of unsustainability, the marine environment as a whole still harbours a rich diversity of fish species and other aquatic life.

Lababia as a community also deserves recognition for having resisted the offers of mining and logging companies at various times in the past. The community is fortunate perhaps in that the quantity of commercially valuable timber in its forests is limited. Also, the exploratory work carried out by mining companies in the 1970s and 80s have not led to huge offers of money. Sustainable common property systems are not generally found in areas where huge amounts of money can be made from resource extraction.

It is also worth noting that the community has begun to create a kind of new mythology for itself – a kind of origin myth has emerged that recounts the story of how Lababia in recent times has opposed logging and mining operations in order to embark on a more sustainable path. This story incorporates features of western conservationism together with more traditional forms of ecological knowledge and is now regularly acted out by a newly formed village theatre group that performs for tourists and villagers alike. The theatre group thus acts to crystallize and consolidate a set of beliefs and values that support and inform the community's current aspirations within the ICAD process.

Referring once again to the set of characteristics of a successful common property system developed by Ostrom and others, it might now be useful to consider some of the ways in which these characteristics could be expanded or modified to better fit the Lababia situation. In regard to decision-making processes, as one instance, something needs to be said about the manner in which a decision-making body achieves legitimacy and authority in a given community. Something also needs to be said about the processes by which decision-making bodies can re-configure themselves for the purposes of resource management within a cash economy. The issue of ecological knowledge needs fuller consideration since it would appear that local, traditional ecological knowledge would, in many cases, need to be supplemented by the type of knowledge held by marine and agricultural scientists, whose knowledge base extends to global systems. The question of how a community is to deal with outside markets and processes of economic globalization must be addressed, and so also the issue of population growth. The question of what belief system informs the relationship of a given community to its natural resources is also highly significant.

Finally, the process by which a community such as Lababia receives funding from outside donor organizations intent on crafting a "global alliance" with local communities must also be addressed. In a country such as PNG, where NGOs now provide many of the services that government agencies provide in other parts of the world, self-promotion by NGOs and their client communities becomes an inevitable outcome of the inherently competitive process of obtaining funding support.

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