

Although the resolution of these images will not be high enough to enable UMCY to be scored directly from them, their quality should be such that it will be possible to ascertain whether or not the photographs are representative of the surrounding area.

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Participatory planning and management of Pohnpei's watershed and environment: a case study from the Federated States of Micronesia

A.J. Tilling^{1,2}

ABSTRACT

The loss of indigenous forests and biodiversity on the island of Pohnpei in the Federated States of Micronesia is of national and regional concern and of international interest. The country is dependent on the conservation of its natural environment which is one of the most diverse in the Pacific.

Early attempts to conserve the island's watershed and environment ended in failure, due to top-down decision-making and inadequate consultation with the stakeholders. Subsequently, a participatory model has evolved which promises to be more acceptable.

In this paper the participatory planning and management processes are described. The strengths of this approach and the prerequisites for the future success of conservation efforts are outlined.

INTRODUCTION

Empowering local people so that they are actively involved in making decisions about their environment is critical in the Pacific islands. Much of the land and coastal resources are customary owned and used, and Governments have little jurisdiction or enforcement authority at village level. Yet, generally there has been a slow appreciation of this and attempts to impose policies often have disastrous results, as Pohnpeians found out.

In Pohnpei, in the north-west Pacific, attempts were made to protect the watershed of the main island by designating the intact forest in the rugged interior and the coastal mangroves. This approach did not work. A different strategy was necessary. So far, participatory planning and management (PPAM) has proved to be a highly successful alternative to the top-down approach.

This paper discusses the history of attempts to conserve the watershed and the island environment. The futility of acting without the support of the local community and traditional chiefs is contrasted with a more holistic model. The central features of this alternative approach is that it is more attuned to the needs of the community and it integrates conservation and development, rather than attempting to preserve resources by statutory designation. A decision-making framework is used to illustrate the different levels of planning and decision-making that is required and to highlight areas that still need to be covered to make planning and management effective.

BACKGROUND

Pohnpei is a tropical volcanic island of approximately 35,500 ha in the Eastern Caroline islands group of the north-west Pacific. The circular island is steep and mountainous, with the highest peak rising to 780 m. It has an average rainfall of 3090 mm, which is thought to exceed 7500 mm in the rugged interior (Pohnpei State Government 1995). Together with six outlying atolls it forms one of the four states of the Federated States of Micronesia.

The rugged mountain interior of Pohnpei is heavily vegetated, comprising several forest types including upland, palm, swamp and dwarf or cloud forest at high elevations. Agroforestry and secondary forest is found at lower elevations and in coastal areas, together with some grass or fern savannah (Raynor 1991). Extensive mangrove forests, up to 4 km wide, fringe the island. The flora is amongst the most diverse in Micronesia, with the upland

¹ Freelance Community Development and Conservation Adviser, 44 Ilam Rd, Christchurch 4, New Zealand. Recently Programme Officer (Socioeconomics), South Pacific Biodiversity Conservation Programme, South Pacific Regional Environment Programme, Apia, Western Samoa.

² The views expressed are those of the author and do not necessarily reflect those of SPREP.

palm forest being unique. Nearly 15% (111) of the 7676 plant species recorded on Pohnpei are endemic and of these 90% are found mainly in the upland forest (Dahl 1995). The forests support a diverse fauna too. There are 33 avifauna species with resident breeding populations, 25 of which extensively use the upland and mangrove forests. Five species and eight subspecies are endemic to Pohnpei. Though data about fauna are still being compiled, two species of bat, four species of rodents and several reptile species have been identified (Thomas 1996).

The topography, high rainfall and extent of highly erodable soils makes the island an extremely fragile ecosystem. The lowlands have been extensively modified, whereas the interior has been spared the ravages of human occupation until comparatively recently, owing largely to its remoteness and inaccessibility and heavy depopulation during the 19th century (Trustrum 1996). The present population of the island is approximately 34,000 but is growing at over 3% p.a. Settlement has spread around the circumference of the island and has been moving inland. These areas, which were traditionally sustainably used, are now under increasing threat as Pohnpeians move from a subsistence to a monetary economy and a modern way of life.

Of greatest concern is the commercialisation of a traditional crop, *sakau* (kava – *Piper methysticum* of the pepper family) which is mildly narcotic. Once reserved for high-ranking individuals and drunk on ceremonial occasions, it is now widely consumed and fetches over \$US3.30/kg in root form on the local market. Growers receive about half this amount. With the dearth of present employment opportunities and a static and impending decline in jobs in the public sector (due to the ending of Compact of Free Association with the United States in 2001) there is an increasing interest in growing this crop.

Although *sakau* is grown in the lowlands, new clearing is taking place at higher elevations, purportedly because the richer soils and moist conditions in the uplands favour it. However, this could also be a reflection of the decline in fertility of lowland sites, the open-access nature of forested areas and the secretiveness of growers, who do not want to reveal the location of their valu-

able crop. As the over-storey is removed by farmers, because *sakau* prefers direct sunlight, large tracts of high forest have been cleared. Between 1975 and 1995 the intact forest was reduced from 42% of the island (15,008 ha) to 15% (5169 ha), whilst the agroforestry area increased from 17% (5930 ha) to 37% of the island (13,090 ha). This does not include 3054 ha (another 10% of the island) within the upland forest which has been disturbed by farmers (Trustrum pers. comm.). This loss has reduced the biodiversity of plants and animals, which is being exacerbated further by hunting pressure on the popular game birds.

Settlement is also taking place in the upland forest, moving inland up river valleys to as high as 500 m above sea level. This is being facilitated by the construction of roads. Being mostly unsealed and of poor design, they are a source of sediment which is having a detrimental impact on the lagoon and marine ecosystem. All these activities in the watershed are polluting surface water and potable supplies.

FAILURE OF THE CONVENTIONAL RESPONSE

Interest in the effects of deforestation date back to 1983 when the United States Department of Agriculture (USDA) Forest Service and local foresters undertook a vegetation survey. It became apparent that inland population migration and associated deforestation was increasing rapidly. Subsequently, the Pohnpei State Division of Forestry requested assistance from the USDA Forest Service to develop legislation to establish a watershed reserve comprising much of the interior upland forests on public land. The area was delineated by using photos from a 1975 aerial mapping exercise, 1982 soil survey information and five specially flown aerial reconnaissance missions. In 1987 this was backed up with the enactment of the Pohnpei Watershed Reserve and Mangrove Protection Act which designated approximately 5100 ha of the central upland forest (*Nanwel*) and 5525 ha of coastal mangrove forest (*Naniak*) as a protected area in order to safeguard water supplies, cultural and archaeological sites and the high level of endemic flora and fauna and to provide for the economic potential of eco-tourism and recreation (Anson and Raynor 1994).

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However, the survey teams which made attempts to delineate the boundaries of these reserves were forced to abandon their efforts by angry villagers armed with sticks and bush knives. It became apparent that local communities had not been adequately consulted about the purpose of the legislation and its intended benefits. They resented attempts by the State Government to impose rules and regulations on the use of land and resources, despite the fact that these applied to public land, which they regarded as common property.

TENETS OF AN ALTERNATIVE APPROACH

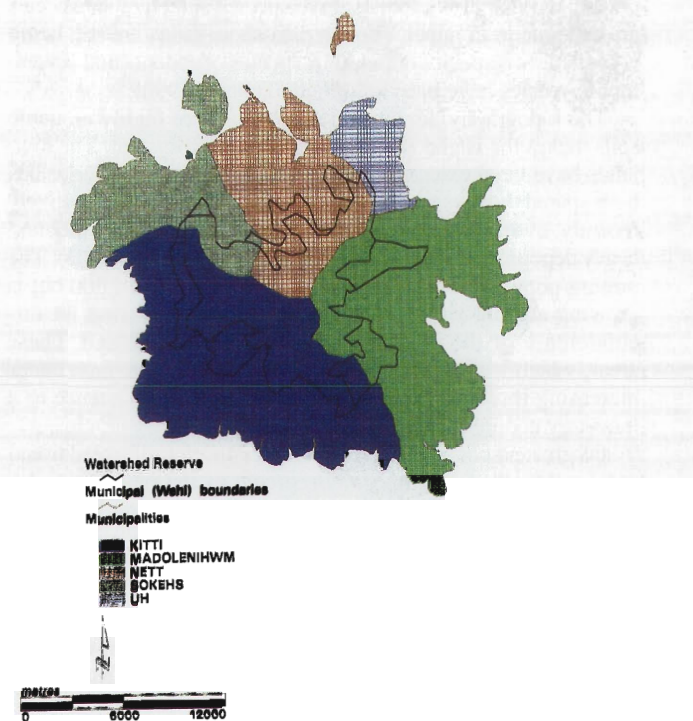
Since then an alternative model has evolved. It is based on the philosophy that environmental planning and management should be an inclusionary process, involving all the stakeholders. It is also predicated on the fact that the State Government does not have the resources to undertake resource management. Some departments and government agencies, such as the Land-use Zoning Board³, are empowered to carry out planning but the reality is that they are ineffective. They do not have the personnel or financial wherewithal to implement their policies. Hence, there is a growing local conviction that villagers should take the initiative themselves, facilitated by the Division of Forestry. One of the fundamental tenets of this approach is that ecosystem management and economic development should take account of the basic needs, values and priorities of the community.

One of the main desires of villagers was that the planning and management system should build on traditional social structures and resource management practices. In historical times land-use activities were controlled by chiefs, headed by paramount chiefs who had jurisdiction over five autonomous territories (*wehi*) which correspond to present-day municipalities (see Figure 1). These chiefs had authority and responsibility over the allocation of all lands and they settled land-use disputes. However, in recent times the powers and authority of the traditional chiefs have waned, beginning in 1912 with the introduction of a land-reform programme which established private land ownership during the German colonisation period. Succeeding Japanese and American administrations did not support the traditional chiefs and the constitutions of the new State and Federation centralised environmental decision-making. But, despite the present *de jure* powers of the State to issue land titles and regulate land use, in practice its authority is limited. It cannot implement its policies effectively. Local people believe that they have unencumbered rights to use the land and are rarely challenged by the Government. Yet, observing that unfettered development is having a deleterious effect on the watershed and lagoon, there is a growing recognition that some action is required. To achieve this, there is widespread local support for bolstering the traditional powers of the chiefs who still command considerable social esteem. Pohnpeians still believe that the respect, honour and dignity of their society rests on the institutions of the traditional political system (Mauricio 1995).

Another feature of the alternative approach is that management is geared towards integrating conservation and development (ICAD). This is unlike the protected area concept which underlies the national parks system of Australia and New Zealand. Customary land tenure and small terrestrial areas occupied by burgeoning human populations, with increasing resource demands but few development opportunities, precludes setting aside large areas exclusively for the preservation of biodiversity. It goes without saying: the use of the natural environment is crit-

Figure 1: Map of Pohnpei

Figure 1 : Map of Pohnpei



Courtesy of PENRIC

ical to the survival of Pacific islanders.

This is not to say that every area of Pohnpei should be open to a wide range of uses. The multiple-use concept embraces a range of appropriate land uses, determined by the ecological and physical sensitivity of an area and community values⁴. In some parts of Pohnpei's watershed, such as the ecologically sensitive intact forest, limited use will be apt. Here, settlement and *sakau* cultivation would be inappropriate, whilst in more robust areas a wider range of activities, including primary production and eco-tourism, might be appropriate. With this concept in mind, a spatial land-use system is required to identify ecologically sensitive areas, physical constraints and opportunities and socio-cultural factors in order to identify areas of the watershed requiring different policies and levels of utilisation.

However, the responsibility for the development and implementation of these policies and the mechanisms for bringing them about does not solely rest with the local community. Just as the top-down approach is dictatorial and one-sided, sole reliance on the bottom-up approach is insufficient. The sum of individual parts (local plans) does not make the whole (national policy and plans). An overview can only be provided by the State or a supra-local institution.

In an ideal system the State should take a lead role in developing an overview of resource management. It should provide legislation which enables and empowers government departments and agencies at national and local level to carry out environmental planning and to facilitate economic and social development. It also provides the financial mechanisms to raise funds to support a bureaucracy to implement its policies (for instance the tax base and allocative system). Within this framework local plans can evolve; without it local planning tends to operate in a vacuum. Furthermore, without a national overview, locally devised environmental and development plans could be competitive rather than mutually reinforcing.

³ At the time of writing, government departments were being restructured.

⁴ See Tilling (1988) for a discussion of the multiple use concept as it applied in New Zealand.

A cooperative system is necessary, recognising specific roles and responsibilities of each tier of governance and different means of implementation, appropriate to each. A conceptualised schema is shown in Figure 2. Although this is an idealised view, it will help focus the discussion and highlight areas where progress has been made in Pohnpei and where additional effort is required.

Figure 2. Conceptualisation of a multi-layered resource management system

Planning Levels	Characteristics		
	Scope of Plan	Way in which it is implemented:	Who carries it out
State	Provides a policy framework and broad overview. Sets State priorities.	Political policy statements. State plans. Legal provisions to provide for and support lower-level decision-making.	State legislature Government agencies
Municipal (<i>wehi</i>) and section	Articulates and develops strategic plan with specific policies for land and resource use and conservation.	Formally recognised land use plans. Legal provisions. Bylaws and regulations. Informal Guidelines	Municipal level and Section (<i>Kousapw</i>)
Site	Development plans and action oriented, resource management plans.	Regulated and non-regulated Traditional practices. Informal Guidelines	Clan Family Individual

Source: Tilling and Moutou (1996)

THE PARTICIPATORY PLANNING AND MANAGEMENT (PPAM) PROCESS

Awareness raising and formalisation of a project

As a result of the setbacks caused by the attempt to impose the watershed designation, concerted efforts were made to involve the local community. A Watershed Steering Committee was formed in 1990 to promote watershed conservation efforts and a long-term strategy, and to seek funding and technical assistance to implement the law. Through a consultative process and field surveys, three priority areas seriously threatened by inland population movement were selected for a watershed education programme. In 1991 the USDA Forest Service funded a pilot watershed extension and negotiation project in these priority areas (Anson and Raynor *op. cit.*).

This process raised community awareness about the issues involved and led to a request by villagers to extend resource management to the entire island, from the mountain tops to the edge of the lagoon, including the agroforestry areas in between (*Nansapw*). This was a reflection of usership patterns and traditional rights, which transcended modern law.

Shortly afterwards, The Nature Conservancy (TNC, a large US-based environmental NGO) and the Pohnpei Division of Forestry formulated the Watershed Management and Environment Project for assistance from the Asian Development Bank (ADB). A grant of approximately \$US800,000 was approved by the ADB, extending over two years from April 1994, to support technical aspects of watershed management and the production of an Integrated Watershed Management Plan which was to include the identification of sustainable development opportunities. TNC was selected to manage the project on behalf of the State Government. The South Pacific Biodiversity Conservation Programme (SPBCP) within the South Pacific Regional Environment Programme (SPREP) is also assisting the project with an indicative budget of \$US227,000 over five years. The broad aim of the SPBCP is to promote the conservation of biodiversity on a long-term, sustainable basis (SPREP 1993a). In Pohnpei it

is providing support for biodiversity conservation, community planning and resource management.

Participation at local level

The state-wide awareness campaign was a necessary step to inform villagers about the importance of watershed management and the Government's intent. It took time but was a prerequisite to the more focused programme at *kousapw* (village) level. It was evident that local communities would have to be intimately involved and that the role of the management team would be to act as a facilitator to enable these communities to realise their basic needs in as much as these related to biodiversity conservation and sustainable development. To achieve this, a participatory technique, Participatory Rural Appraisal (PRA), was used.

Training in PRA methodology was carried out in 1994. Staff from the Division of Forestry, Department of Conservation and Resource Surveillance, other government agencies and selected individuals from the first pilot area, Senpehn, were involved. A team was then formed to carry out fieldwork which was carried out in the local vernacular, with the trainers acting as facilitators and advisers, as and when required.

Subsequently, the PRA team worked with villagers in the Senpehn pilot area to identify community needs and objectives and the values placed by them on the environment. Perhaps the most significant outcome was the realisation by villagers that they themselves could take the initiative, instead of reacting to development proposals or merely talking about detrimental resource-based activities. With the help of the PRA team they produced a community action plan and guidelines for the management of the environment and the development of compatible income-generating activities. This process was eventually extended to the other two pilot areas, which produced their own action plans. Eventually, it is planned to extend this programme to the rest of Pohnpei (Pohnpei Watershed Project Team 1996).

Concurrently, consultants from Landcare Research New Zealand Ltd were engaged in setting up a Geographic Information System (GIS) training staff and digitising biophysical data in order to meet the ADB terms of reference which were to develop a state-wide spatial plan of land-use suitability zones for the optimal and sustainable utilisation of watershed resources.

As community involvement in this process was considered essential, the consultants decided to develop a model plan for the Senpehn community, which consisted of a group of *kousapws* that shared a common sub-watershed. Through the PRA process, socio-cultural, conservation and land-use capability criteria were gathered to help define criteria for land suitability, refine class boundaries and determine map outputs for the state-wide plan. In this way the biophysical data, such as soil and forest types digitised from maps and other sources, were supplemented and modified by community knowledge and preferences (Trustum 1996). As the island is progressively covered by the community planning process, local values can be inputted to the GIS to refine the indicative suitability maps that have now been produced for the whole island of Pohnpei.

LINKING SITE, LOCAL AND STATE-WIDE PLANS

In terms of the conceptualised multi-layered resource management system presented in Figure 2, the development of a number of local plans begs a question: how will they all fit together? There are a number of government departments and agencies undertaking planning but they have not yet come to grips with dynamic, diffuse changes to the environment such as those brought about by *sakau* cultivation. There is also no overall land-use plan which sets out state policies and priorities for resource use and conservation, though a Nationwide Environmental Management Strategy has been prepared (SPREP 1993b). There is a

need to be more specific about natural resources and environments of state-wide importance (other than the watershed and mangrove reserve) and to simultaneously consider economic development priorities too, within a national development plan (which does not exist at present).

Underlying the philosophy of land-use suitability applied in Pohnpei is the current conviction that different land-use policies can be produced and applied to guide conservation and development for each suitability class or zone. These would specify what activities are appropriate, given site constraints and opportunities, taking account of community values, such as *tabu* areas.

In Pohnpei, appropriate uses have been suggested by taking cognisance of the technocratically derived constraints and opportunities revealed by the GIS. The intention is to modify these by linking them to traditional land-use guidelines. The latter were derived by the PRA team working with a committee in Senpehn. An ongoing task is to meld the traditional with the modern, with the aim of conserving the ecological and cultural integrity of each area.

All these presuppose that it will be possible to identify policy areas on the ground, rather than on maps, and that it is feasible and practicable to devise a local management system to implement the communities' intentions (as articulated in community action plans). However, it is not yet clear that this will be possible, though the participatory process has confirmed a desire to do so. This is because of the mountainous nature of the country and inaccessibility and the difficulty of actually delineating and marking boundaries due to land disputes and lack of surveys. There is also a problem of monitoring transgressions by secretive resource users, due to the lack of a formal cadre of resource managers and rangers at local level. Enlisting the support of villagers through the traditional chiefly system seems to offer the only hope of success, but the power and authority of the chiefs would have to be bolstered. This would require the devolution of environmental decision-making from the State to the local level, preferably with the sanction of law.

A review of legislation has revealed that there is no impediment to local natural resource decision-making. However, some legal provisions are vague. It is intended that *Kousapws* and sections will continue to prepare community action plans and it is suggested that newly-formed Land Use Committees will be formed at this level. These plans could be coordinated at the municipal level or *wehi*. The Watershed Steering Committee could be given broader powers and comprise members from the traditional leadership, government agencies and the private sector. They would advise the Director of the Department of Conservation and Resource Surveillance (Tilling and Moutou 1996).

Due to the possible difficulties of implementing the spatial model and to provide practical guidance at site level, it is intended to develop a set of "best" management guidelines. These would be built on soil and water guidelines and incorporate environmental ones too. This approach could supplement a crude spatial, regulatory system if this can be put in place and may be more practical and meaningful to villagers. These guidelines would have to be accompanied by an ongoing educational programme and the possible development of demonstration sites so that an environmental ethic becomes second nature to villagers. This is a long-term task as each new generation has to be educated.

COMPATIBLE DEVELOPMENT OPTIONS

Rules and regulations and informal guidelines will not be sufficient in themselves to prevent the loss of forest cover, habitat and biodiversity if there are no alternative areas in which to carry out development activities, or if there are no substitutes for *sakau*. In order to assess these alternatives, a scoping study was carried out to identify compatible development opportunities that are environmentally and economically sustainable and culturally

appropriate (Van't Slot and Raynor 1995). These and other possibilities were examined in more detail in a pre-feasibility study (Ryan and Crocker 1996). Once this study is accepted by the State Government and the ADB, a full feasibility study will be necessary, followed by implementation of selected options.

POHNPEI'S WATERSHED MANAGEMENT STRATEGY, 1996-2001

Once again, the Government needs to develop a national development strategy which integrates economic development and environment planning to ensure that the opportunities identified in the pre-feasibility study are sustainable and equitable. Clear direction is needed. A start has been made by the Watershed Project Team, with the production of a draft Watershed Management Strategy. This sets out a rationale for watershed and environmental management and proposes objectives and actions for conservation and development for the period 1996-2001 (Pohnpei Watershed Management Team 1996). In January 1996 the draft strategy was discussed at a week-long workshop attended by the Watershed Project Team, project consultants, high chiefs (*Nahnken*), section chiefs (*Soumas*), government officials, educationists and other people interested in the project.

The strategy will now be formally discussed with the State Government. Although it marks the end of the State Government's contractual obligations to the ADB, the project will be ongoing with the support of the SPBCP and TNC. The task in hand is to extend conservation efforts to the rest of the island and help local people realise alternative, compatible income-generating activities.

CONCLUSION

The participatory process has proved to be a far more acceptable approach to the local community than the top-down model. Pohnpeians have learnt from the mistake of trying to fast-track the protection of their forests. Consultation is an imperative, not something that takes place after decisions are made. Because it involves many people, it is bound to be a lengthy process. An island-wide education programme was necessary. It took time but was a prerequisite to the more focused PRA programme at *kousapw* (village) level. This raised community awareness and provided a framework within which they could articulate their objectives and plans, making decisions together using the traditional decision-making system. Nonetheless, the cooperation of the Government, traditional chiefs and local people is crucial.

Integrating conservation and development offers a sensible model for the sustainable development of Pohnpei's resources. However, it does not mean that a whole range of development is appropriate in all locations. Decisions have to be made about the level and kind of activities that are appropriate. This is a social process, which can be facilitated by powerful tools such as GIS to identify land-use changes, critical conditions, constraints and indicative areas for different uses. In Pohnpei, it has been demonstrated that it is possible to incorporate local knowledge and preference into this system too.

However, there are doubts about how a spatial land-use system is going to be implemented in the rugged and mountainous island, devoid of a modern administrative structure for environmental planning and management at local level. These conditions are quite unlike those in the developed world, where zoning originated. On the other hand, neither the developed nor developing worlds have adequately come to grips with diffuse, non-point incremental changes to the environment caused by rural activities such as forest clearance and agriculture.

It seems obvious that greater reliance will have to be placed on the traditional decision-making structure and the influence of the chiefs. But, their power and influence over resource use and management has been in decline in recent years. To be effective

now, their authority needs to be bolstered by a devolution of power from the centre. To date this proposal has not been formally put to the State Government, as studies have only recently been completed and the Project Team's strategy has only just been formulated. (Nevertheless, government officials and politicians are aware of the team's thinking, as they have been part of the participatory process.) The way this proposal is handled will be critical, as the devolution of power from the centre is a potentially sensitive issue if politicians construe it as a loss of influence and control. Rather, they should regard it as one of the few remaining ways of enlisting the support of the community for the future benefit of all Pohnpeians, including themselves.

Conservation efforts in the South Pacific take a long time to initiate and implement, yet time is short and as every year passes more and more options are lost. In Pohnpei it has taken 13 years to reach this point. The intact forest and associated biodiversity is being rapidly lost, yet the project is still in its infancy and planning is only the first step to implementation.

On the other hand, too many projects have failed because of the rush to provide "solutions". Time must be taken not only to raise awareness about the importance of conservation, but to ensure that actions reflect the basic needs and resources of recipients too; they themselves must perceive, and ultimately receive, the benefits of sustainable resource management.

Considerable progress has been made since 1994 principally because of the enthusiastic uptake of community planning and management by key politicians (including the Governor), highly ranked chiefs (*Nahnken*), section chiefs (*Soumas*), and villagers in the municipalities where the pilot projects have taken place. The evidence is not only in the attendance and involvement at meetings, but in the way people are thinking: for instance the Nahnken of Nett commented that this was not just a project, but that conservation of the watershed (and biodiversity) is the most important priority for the whole island. The process has become internalised; people are beginning to believe in themselves and the significance of the task ahead.

Undoubtedly this has been greatly facilitated by the Watershed Project Team, comprising the Division of Forestry personnel and the team leader, Bill Raynor of the TNC. The project has its own focus as a specific unit assigned to the job, supported by dedicated staff working to a deadline. The outside financial and technical assistance to Pohnpei has facilitated this but raises a thorny question about sustainability. This is a fine goal but it has still to be demonstrated that conservation and development projects can generate income to be self-sufficient. But, if external assistance is still required, is this not a small price to pay to protect an environment of world-wide significance?

One of the most fundamental remaining issues is whether growers can be diverted to other crops or activities or can be induced to grow *sakau* in more ecologically robust areas, rather than in the intact forest and other sensitive environments. Unless they are compensated for changing their habits, it is highly unlikely that they will do so. Thus, the question of who gains and who loses from change is critical.

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