

Do community-based approaches to natural resource management work?

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Community-based natural resource management has been advocated as a way of ensuring that communities have appropriate incentives to manage their natural assets so as to maximise the benefits and ensure that resources are preserved for future generations. This article examines a community-based approach to sustainable forest management in Fiji and attempts to identify the necessary conditions for community-based schemes to succeed in meeting the dual objectives of sustainable resource use and livelihood improvement. Agricultural development is often seen as a threat to effective forest management. Any approach to forestry management therefore needs to be pay sufficient attention to the agricultural needs of communities to ensure that agriculture becomes part of the solution rather than the problem.

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Primary indigenous forests in Pacific island countries are rapidly disappearing. Forestry resources make a significant contribution to the economies and exports of Melanesian countries in particular but their ability to do so in the future is being threatened by unsustainable exploitation (Table 1). For example, it is predicted that the Solomon Islands will lose all of their indigenous forests in the next 20 years if logging continues at its current rate.

In Fiji, the primary indigenous forests of Viti Levu, the main island, have almost been exhausted, increasing the pressure on less accessible areas. In addition to pressure from logging activities, forestry resources

are also threatened by agricultural activities as communities clear forested areas to plant subsistence and cash crops.

Community-based natural resource management is premised on the theory that resource owners are best placed to manage their own resources effectively, given the appropriate knowledge, skills and policy framework. Empirical evidence suggests that community-based approaches can lead to the successful regeneration of previously depleted resources (Malla 2000), provide income-generating opportunities for local people (Durst et al. 2005), and generate a change in the attitudes of policymakers from viewing resource owners as agents that



Table 1 Forest product exports: value and contribution to GDP, 2005

	Value of exports (US\$ million)	Contribution to GDP (per cent)
Fiji	28.00	1.07 (2004)
Vanuatu	1.88 ^a	<1.00 (2003)
Solomon Islands	510.00 ^a	15.00 ^b
Papua New Guinea	476.00	8.80 (2002)

^a timber

^b total forestry contribution to non-aid income

Source: Asian Development Bank, 2006. *Key Indicators: measuring policy effectiveness in health and education*, Asian Development Bank, Manila; Independent assessment of the implementation of codes of logging practice: Fiji, Papua New Guinea, Solomon Islands and Vanuatu.

need regulating to effective guardians of their natural capital (Headley 2003). However, experience has not always been successful and is dependent on a number of key factors. These include security of community property rights, the organisational structure of the community and the strength of traditional and cultural norms, active participation of all community members and stakeholders in making decisions, transparency of the decision-making process and the ability of the scheme to meet the income generation and food security requirements of community members.

This article examines a case study from Fiji and looks at the ability of community-based natural resource management schemes to meet the dual objectives of sustainable resource use: ensuring that resources can be enjoyed by future generations while still providing income-generating opportunities for the current community. It is a particularly interesting case study as the project sought to increase community awareness and embed the principles of sustainable forestry management and land use planning before any logging commenced in the area. Most empirical examples are based on projects that are initiated in an attempt to stem the rapid depletion of forestry resources.

Can communities make optimal decisions?

Optimal resource use implies the maximisation of the net benefits from that resource. Activities that generate benefits from the perspective of one particular economic agent (for example, log extraction) may impose costs on other economic agents (for example, land erosion). The question of whether resources are being utilised optimally cannot therefore be divorced from the identity of the resource user. What is optimal from the point of view of a logging company is unlikely to be optimal from the perspective of society as a whole.

Private logging companies will seek to maximise profits from their operations. Private property rights give incentives to logging companies to take into account the result of their activities on the value of the land and the longer term effect on the resource. Short-term concession agreements, involving the allocation of resource use rights to communal land for a defined period of time, are common in Pacific island countries but are likely to produce incentives for companies to extract as much rent from the resource as possible over the period of the concession.



This gives companies little incentive to take into account the long-term effect of their activities on the resource. Landowning communities will have multiple objectives to take into account when making decisions regarding the use of their forest resources. Forests provide communities with valuable timber and non-timber products. They also represent land that can be cleared for agricultural activities and the production of subsistence and cash crops.

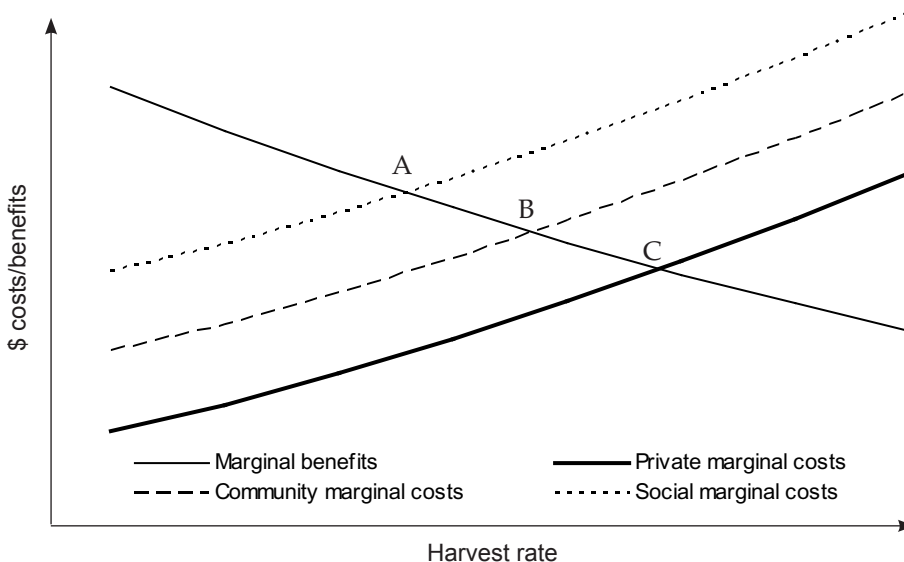
Forests provide environmental services such as watersheds and the prevention of land erosion. These environmental services will tend to be undersupplied by individuals maximising the private benefits from their resources. From a global perspective, additional benefits such as carbon capture and biodiversity protection are also relevant.

In reality, many of these economic effects will not be monetised or captured, leading to sub-optimal land use decisions from the perspective of society as a whole. Given the existence of local and global environmental

externalities, community ownership is likely to produce incentives for resource use that are more aligned with optimal societal resource use than private ownership. Figure 1 is a stylised representation of the different harvest rates that would result from decisions made taking into account the private costs and benefits of logging (C), the community costs and benefits (B), and the social costs and benefits (A).

In Fiji, around 90 per cent of land, including most primary indigenous forest is natively owned by communal land owning units (*mataqali*). From the perspective of society as a whole, community-based decision making is likely to lead to outcomes that are preferred to the outcomes generated when native land is leased under concession agreements to private logging companies, unless these agreements include specific constraints on resource extraction. Community decision making will take into account the environmental services provided by the resource and are likely to take into account the effect of current resource use

Figure 1 Social, community and private marginal costs and benefits of logging





decisions on future generations. This is premised on key assumptions

- community decision makers have perfect information about all the costs and benefits of their actions
- community decision makers will act to maximise the benefits to their community as a whole.

In reality, decision makers may have imperfect information. For example, forests may be cleared from steeply sloping land for agricultural purposes, as this leads to literally less back-breaking agricultural work. Farmers may not be aware of the potentially damaging effect of their activities on land erosion and watershed protection. Decision makers may also not always act in the interests of the community as a whole. Individuals may attempt to appropriate rents and maximise their own personal benefits from the resource use.

Maximising community welfare tells us nothing about the distribution of benefits across the community. Even if acting in the collective interest, different decision makers are likely to take different views on the way benefits should be spread across the community. The equitable distribution of benefits may be important in terms of ensuring community acceptance and ownership of a particular approach to natural resource management.

Based on theory and empirical evidence, there are several factors that, when present, are more likely to result in community-based management approaches leading to optimal resource use decisions from the community perspective. Security over land tenure is a pre-condition for giving communities the necessary incentives to take into account the longer-term effects of their decisions. Communities must own the decision-making process, which requires external parties to limit their activities to creating the appropriate enabling environment for effective decision-making; for example,

through awareness raising and conducting training and education to build capacity.

The decision-making process should be as inclusive as possible to ensure that all members of the community have the opportunity to air their views. This increases the chances that decisions will be made in the collective interest and that members of the community own those decisions; thus making non-compliance or free-riding less likely. Structures can also be introduced to ensure that efficient private incentives are generated where appropriate. For example, a community may take the decision to ensure its forests are logged sustainably and conduct an inventory to determine maximum harvest rates for specific species but contract the logging to a private enterprise that will maximise their returns given the constraints imposed by the community. The decision-making process should also seek to be as transparent as possible in order to minimise the ability of members to extract personal gains from their decisions.

Community-based approaches are more likely to succeed when they build on existing organisational and traditional structures. The effective management of open access resources, such as the ocean, is complicated by the existence of free riding incentives, and difficulties in monitoring and enforcing compliance. A wealth of economic literature on the management of common property resources, that have defined boundaries and user groups, suggests that community-based management can overcome some of the problems associated with the management of open access resources (for a discussion of the literature see Dasgupta 1996). The incentives to free-ride are likely to be lower when cultural norms are strong, community members interact with each other frequently and have long-term ties through kinship and social interaction, and effective community mechanisms exist for disciplining unacceptable behaviour.



Attention also needs to be paid to cultural norms that may hinder the development of entrepreneurial activity. In many Pacific island countries, social obligations are a key component of community life. The successful development of community enterprises is likely to require measures that quarantine the enterprise from these social obligations. This could be achieved by strong community leadership and governance or may require hiring external management.

The Drawa model area, Vanua Levu, Fiji

The Drawa area was identified by the Fiji Forestry Department in 1994 as an area that would be suitable for trialling a participatory approach to forestry and land use management. The project was funded by the German government through the Pacific German Regional Forestry Programme (PGRFP) and involved GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit—German Technical Cooperation), working in partnership with the Secretariat of the Pacific Community (SPC). The Drawa Model Area is located in Vanua Levu, Fiji's second largest island, and

comprises 6,345.5 hectares of mountainous terrain covered with one of the few remaining primary indigenous forests in Fiji. The area is under native land tenure, with customary ownership belonging to eleven *mataqali* (land-owning units) the members of which live in two villages within the Drawa area itself (Drawa and Vatuvonu villages), two villages on the fringes of the model area (Keka and Lutukina villages), and another two located further away from the model area (Batiri and Nayarailagi villages).

Members of these villages, in particular those residing within the model area, have relied on the timber and non-timber products from their forests for subsistence use for generations. However, landowners have tended to place a higher value on the land for its capacity to grow *yaqona* (the plant from which kava is ground) and *dalo* (taro), the two main cash crops, and by the 1990s they were increasingly encroaching on the forest for agricultural uses (Fung 2001).

Fiji Forest Industries (FFI) held the concession to log the Drawa area until 2003 but active logging had not been conducted for many years, mainly as a result of the difficulty in harvesting the resource due to the lack of road access.

Figure 2 Summary of Drawa needs and wants

- Increased visits from government (for example, extension officers) and Native Land Trust Board (NLTB) officials
- Assistance in forming a landowners' committee
- Improvement in their standard of living through
 - more farming opportunities
 - improved infrastructure (road access, water supply, communications)
 - access to training (vocational, including operating a sawmill business)
 - involvement in logging activities
 - training activities, including cooking, food preparation and sewing

Source: Fung, C., 2001. *The People of the Drawa Block, Needs and Wants*, Secretariat of the Pacific Community, Suva.



Participatory approaches

In 1999 PGRFP began working with the communities in the Drawa area to assess their current use of the forests resources and their current sources of income. From the outset the project adopted a participatory approach in assessing the needs of the Drawa community on the premise that any approach that attempts to enforce sustainable management practices on communities, without fully involving the ultimate guardians of these resources in the process, is bound to fail. Resource management plans must be developed in partnership with the local community to ensure that the resulting product is owned by the community and meets their needs for forestry and agricultural subsistence products and cash income generation.

Education and awareness raising about the value of their natural resources and the benefits these resources provide to the local community, such as watershed management and the prevention of land erosion, formed a key part of this process.

This process led to the development of a land use plan resulting in the outright protection of 2287.5 hectares (36 per cent) of forest, the identification of areas suitable for sustainable logging and the identification of alternative areas of land suitable for agricultural activities.

A forest inventory was conducted to assess current stocks and determine minimum diameter requirements by species for the sustainable extraction of logs. A forest management and land use plan was developed, specifying how different areas could be used and what their maximum sustainable harvest rates were. Two community-led management groups were established to oversee the implementation of the plan.

The Land Owners Association of Drawa (LOAD) is responsible for safeguarding

the interests of the landowners, furthering community development, and policing the activities of the Drawa Landowners Forest Management Co-operative Ltd (DraFCo). DraFCo was established as a local enterprise to provide employment and generate income for local families and the wider community from the sustainable extraction of logs. With support from GTZ, training was conducted in log extraction and sawmill operations; and funding was provided to purchase a portable sawmill.

Agricultural development and land use planning

Agricultural development is often considered a threat to the preservation of forestry resources. In the Drawa area, villagers were increasingly encroaching on forested areas and clearing them for agricultural purposes. Highly valued hardwood species were being felled and left to rot in order to plant crops, often on unsuitable, steeply sloping land. As part of the land-use planning process, areas of land more suited to agricultural production were identified and training was provided on agricultural technology and practices suitable to sloping land, including the planting of rows of *vetiver* grasses on steeper slopes to prevent erosion.

Responding to the communities' requests to diversify their agricultural cash incomes, which remain heavily reliant on *yaqona*, teams within the Land Resources Division at the Secretariat of the Pacific Community (SPC), in partnership with the Ministry of Agriculture, provided Drawa, Keka and Vatvonu villagers with training and material for planting *dalo* for sale. Soil samples revealed phosphorous and potassium deficiencies and various fertilisers were trialled to evaluate their performance. In October 2006, a 0.3 hectare site near Drawa village was planted by youth groups from the village as part of the fertiliser

Table 2 Gross margin for *dalo* production (0.3 hectare site)

	Plants	Weight (kg)	Price (F\$/kg)	Revenue (F\$)
Yield	3,000			
Sales	2,700	3,240	1.10	3,564
Operating inputs	Costs			
Fertiliser				248
Planting materials	3,000		0.15	450
		Person days	Wages (\$/day)	
Labour				
Cleaning		6.5	10	65
Digging		9	10	90
Planting		3	10	30
Weeding		3.9	10	39
Harvesting		6	10	60
Transport				135
Total costs				1,117
Total revenues				3,564
Gross margin				2,447

Source: Author's own calculations.

trials. The planting material of the variety preferred by exporters, *Tausala ni Samoa*, was brought from Taveuni and the *dalo* harvest was sold to a Suva-based exporter in May 2007. This sale provided the villagers with income to invest in planting materials for next season's crop and established contact with a key exporter.

The sale of *dalo* generated valuable income for the Drawa community but more importantly provided community members with a supply of planting material and the knowhow to produce *dalo* for commercial sale. The exporter paid \$1.10 per kilogram, which is a small mark up on the price available in local markets, but allowed the villagers to sell the entire harvest in bulk, generating labour and transport cost savings when compared to marketing the produce locally.

An analysis of the gross margins associated with *dalo* production (Table 2)

indicates that commercial *dalo* production has the capacity to increase household incomes by approximately F\$2,447 a year.¹ This represents a doubling of average household income and a four-fold increase in average household cash income.² Cash income is vital for ensuring that villagers are able to access basic services, including paying school fees for their children's education and gaining access to medical services.

The Drawa Landowners Forestry Management Co-operative Limited

The Drawa Landowners Forestry Management Co-operative (DraFCo) was established in 2003 as a community-led cooperative responsible for managing the sustainable extraction of timber resources from the Drawa area. It has operated since 2004 and provides seasonal employment to



some 12 people drawn from the different *mataqali* that comprise the Drawa area. The enterprise sells round logs to FFI and sawn timber to various buyers in the nearest town, Labasa.

DraFCo is accountable to the LOAD committee and has a mandate to maximise profits from the enterprise, within the constraints of the forest management plan. They recognise that the ultimate success of sustainable forestry practices depends on the financial viability of the enterprise and have therefore attempted to quarantine DraFCo's activities from the wider community activities and obligations. Community members can purchase sawn timber at a discounted rate and all transactions are recorded. To date, DraFCo has not generated profits and the small losses have been absorbed from the continuing funding support of GTZ.

A financial evaluation of the enterprise (Manley 2007) revealed that the rates charged by external contractors to provide machinery for log extraction result in small margins on variable costs, making it virtually impossible for DraFCo to be profitable under the current business structure. An evaluation of the returns to investing in their own extraction machinery generated a benefit-cost ratio of 2.17, a net present value around F\$300,000 and an internal rate of return of over 50 per cent. DraFCo are currently examining options to secure external financing for this investment but purchasing their own machinery will entail significant risks to the enterprise in addition to potential benefits. The high rates charged by contractors may be in part due to DraFCo's inability to negotiate competitive rates as a result of their relative inexperience and small scale.

Projected production levels are based on the assumption that productivity will increase with their own machines (Manley 2007). This is likely, given the problems that

they have encountered using contractors—including the removal of the machinery by the contractor with no explanation, and the failure to comply with other aspects of their contract such as the purchase of fuel to operate the machinery and the reimbursement of the wages for DraFCo staff operating the machinery. However, the projected production levels have never been achieved and taking on external debt comes with increased risks. An external debt servicing requirement would require increased financial discipline and leave them vulnerable to operational difficulties such as interruptions due to bad weather.

Another key operational weakness identified is the lack of capacity in business and financial management skills. The lack of detailed record keeping results in an inability to calculate costs and profit margins, all essential for making sound business decisions.

DraFCo were provided with business and financial training before operations commenced but project staff have commented that the training was rather abstract and irrelevant to DraFCo staff prior to actual operations. Further training has been provided this year, not only to DraFCo but also to other members of the community who are involved in income-generating projects, such as the commercial *dalo* production. Achieving financial viability is crucial for the co-operative as project support from GTZ will cease at the end of 2008.

Indirect factors

The project has focused on forestry and agricultural activities but other issues have emerged during its lifetime, directly impacting on the success of the project and the ability of community members to improve their income and food security. It is debatable whether the project indirectly improved community infrastructure but



community members believe that the project raised the profile of the area and at the very least contributed to securing these indirect benefits within a shorter timeframe than would otherwise have been the case.

A road to Drawa village was completed in 2004. Prior to this, villagers had to walk 5 km to the nearest access road. The completion of the road has enabled farmers to sell agricultural produce at the market more easily and for DraFCo to access areas of the forest near the village. The road has also enabled villagers to travel more easily to work, school, and medical facilities.

Running water was installed in Drawa in 2005. This led to significant labour saving, especially for the women who were responsible for carrying water from the river for cooking purposes.

SPC activities in Drawa have included a training session on plant propagation and nursery development after villagers expressed an interest in the return of some varieties of *dalo* that had been lost to the village but had been conserved at the Regional Germplasm Centre.³

The involvement of the village as a model for community-based natural resource management has given villagers significant exposure to the outside world. Members of the community, including women leaders, have participated in various workshops and seminars—increasing their confidence and their ability to communicate effectively with external stakeholders.

At the national level, the Sustainable Forestry Management Steering Committee set up as part of the project activities has contributed to national policy development and has helped to develop political support for sustainable forest management practices. Political support is a crucial factor in ensuring that communities receive the appropriate support from government officials and programs.

Future challenges and opportunities

The preservation of the forestry resources in the Drawa area was largely due to the previously poor access to the forests, which made large-scale logging unattractive. FFI held a concession to log the forest between 1969 and 2003 but little logging was carried out during this period. With the expectation that improved road access would lead to increased pressure on forest resources, GTZ, in partnership with SPC and the Fiji Forestry Department, sought to raise community awareness of the benefits that the forests provided and to embed the principles of sustainable forest management at the community level.

With the completion of the road to Drawa village in 2004, access to the Drawa area has improved dramatically. This has significantly improved the welfare of village members, improving their access to alternative employment opportunities, and educational and medical services, and enabled them to transport agricultural produce to the market more easily. However, improved access has also lowered the costs and hence raised the returns to agricultural production, which could lead to increased pressure on forest resources.

A survey of econometric studies (Kaimowitz and Angelsen 1998) concluded that deforestation tends to be higher when land is accessible, when timber and agricultural prices are high (encouraging logging and conversion), when rural opportunities are low, and when there are opportunities for long-distance trade.

Since the project commenced in 1994, significant resources have been directed to the Drawa community. The key test of whether the principles of sustainable forestry management have been adopted by the community will come in the years following the ending of project support.



To date, villagers have enjoyed visible benefits from adopting sustainable forestry management practices, in terms of training opportunities and an increase in visits and support by government and other agencies. GTZ's partnership with SPC to develop alternative income-generation projects has also given villagers access to a variety of agricultural development projects such as vegetable gardens, organic fertiliser trials, supply of *dalo* planting materials, and training in commercial *dalo* production. Once this visible support diminishes, community members may question the benefits of strict adherence to the land use plan, and compliance may depend on the community leaders and their ability to influence household decision making processes.

The next few years are a crucial period for DraFCo. Achieving financial viability is vital for producing visible benefits for the community from sustainable forestry practices. The longer DraFCo fail to cover the opportunity cost of leasing the forests, the greater the pressure will be to lease the land under concession to external logging companies, which are likely to be more interested given the improvement in access.

Conclusions

The Drawa Model Area was conceived as a project that could be used by the Fiji Forestry Department and others in the region as a model of community-based natural resource management. The project was timely as it sought to embed the principles of sustainable forestry management through raising awareness and education prior to infrastructure improvement that would inevitably increase the pressure on the forest resources. With the project nearing completion in 2007, several key lessons can be drawn from the Drawa experience.

Agriculture as part of the solution, not the problem. The demand for land for agricultural activities puts pressure on forestry resources. It stands to reason therefore that approaches to forest management need to address the requirements of community members for land suitable for growing subsistence and commercial crops. Development of income-generation opportunities for community members needs to be conducted in conjunction with capacity building about forest and land management, to avoid the potentially perverse situation of increasing pressure on forested areas as a result of increasing returns to agricultural production.

Community ownership. As guardians of their natural resources, the community members are key to the success of any project. Participatory approaches to developing natural resource management plans should devote adequate attention to raising awareness and generating debate at a community level about the value of their natural assets, involve the community in an assessment of their needs and wants, and ensure that the resulting management plan addresses these issues. Empowering communities with education and information can provide a platform from which to discuss with them the best approaches to utilising their natural capital in a sustainable way.

Involving other stakeholders. Partnerships need to be built with local government agencies and they should be involved in the project from the outset and have an input into the development of project activities. Persuading government agencies of the benefits of community-based approaches is crucial in ensuring that these are incorporated into policy development. The Fiji Forestry Department has been a key partner in the project's activities and is currently examining new areas in Vanua Levu suitable for rolling out the Drawa approach.



Other stakeholders with an interest in the natural resources should also be brought into the process if at all possible as their support for the approach could be crucial in cementing the process rather than undermining it. For example, FFI, the former concession holder and one of the main purchasers of round logs from DraFCo, were involved in the process from the outset and have supported DraFCo's development.

Facilitating development or dependency?

A balance needs to be struck between facilitating the development of income-generating opportunities and ensuring that communities do not become reliant on external support. DraFCo is currently very dependent on support from GTZ and implementing organisations should see that sufficient attention is paid to financial and managerial training to ensure that enterprises develop financial discipline quickly. This training includes allowing enterprises to make mistakes and learn from them. Support should also be focused on developing an appropriate enabling environment for sound decision-making, such as awareness raising and capacity building, rather than distortionary measures such as taxation incentives.

Organisational structures. The security of property rights to resources is crucial in ensuring that communities have the appropriate incentives to manage the resources effectively. If property rights are disputed or otherwise insecure, users may over-exploit resources in the expectation that they may lose access to the resource in the future (Kajembe et al. 2003).

The existence of relatively secure communal ownership systems in Fiji provides incentives for communities to manage their land resources for the benefit of the community, provided that decision makers act to maximise community welfare and do not seek to appropriate rents for

themselves. Introducing organisational structures that promote open and transparent decision-making processes and accountability can assist in cementing good governance practices. An indirect benefit of project activities has been an improvement in communication within the community and an increase in transparency of activities conducted in the Drawa area. For example, community leaders remain unclear as to whether they received the land rents owed to them by the Native Land Trust Board (NLTB) whilst FFI held the concession. The organisational structures that have been put in place as part of the project—in particular, the LOAD committee and the DraFCo management board—have led to an improvement in the transparency of community-led decisions and an increase in the information shared within the community. While these community structures have improved transparency and increased the exchange of information within the Drawa area, internal conflicts within and between *mataqali* are not unheard of and appropriate dispute resolution mechanisms therefore need to be built into community organisational structures.

The experience of the Drawa community suggests that there are several necessary conditions for communities to meet the dual objectives of effectively managing their natural resources and providing income-generating opportunities for their people. These include secure property rights, a strong organisational structure, transparent and participatory decision-making processes, appropriate capacity building and a supporting policy framework. These findings support much of the existing literature on community-based natural resource management. However, although necessary conditions they are by no means sufficient and future challenges certainly lie ahead if Drawa is to continue to manage



their resources effectively once the safety net of project support has disappeared. This suggests that if projects are to have a lasting impact on sustaining natural resources sufficient attention needs to be devoted to ensuring that activities do not create dependency and that projects plan their exit strategy appropriately.

Notes

- ¹ Based on household interviews about their expectations for the number of plants they would aim to be growing, per household, in five years time (3,000).
- ² Based on household surveys conducted in 2006.
- ³ Now known as the Centre for Pacific Crops and Trees (CePaCT).

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