Problems with Centralised Fisheries Management in Pacific Islands

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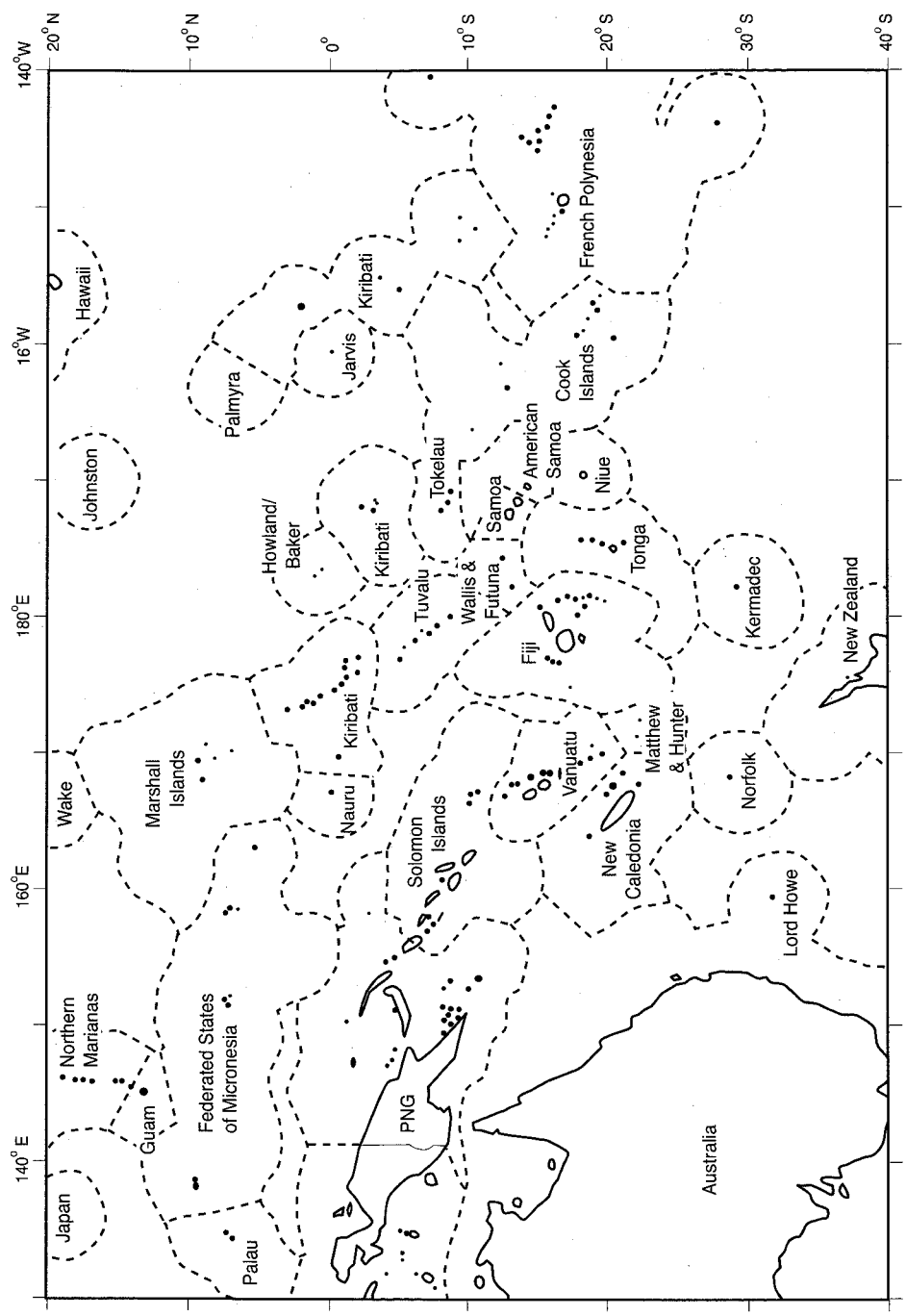
Michael King
Fisheries Consultant

1. THE DIVERSITY AND USE OF SEAFOOD SPECIES IN PACIFIC ISLANDS

The diversity of inshore marine species in Pacific Island countries varies with both latitude and longitude. The number of different marine species decreases with increasing distance from the equator. Diversity also decreases from west to east with increasing distance away from what is believed to be a centre of speciation in the Indonesian/Philippines area. Diversity is also related to the type of island and the number of different ecosystems present. Mountainous high islands, including those in Melanesia such as Papua New Guinea, New Caledonia and Fiji, often have large river systems with associated estuaries and hence a larger diversity of marine species.

In the western equatorial Pacific there is an important upwelling system resulting from the divergence of the South and North Equatorial Currents. Through the food chains, this upwelling results in an abundance of pelagic fish such as tuna. Pacific Island countries control the use of pelagic resources within their Exclusive Economic Zones (Map1). The areas of EEZs vary greatly and, in the independent Pacific nations, these range from 120,000 km^2 for Samoa to 3,550,000 km^2 for the atoll islands of Kiribati.

In most Pacific Islands, seafood has traditionally been the most important source of protein.



Map 1 Pacific Island countries.
The Exclusive Economic Zones (EEZs) of each country are indicated by broken lines.

Subsistence fishing, the catching of fish to eat rather than to sell, results in a total catch that is often several times larger than that from commercial fishing. Seafood consumption is highest in low-lying islands and coral atolls, such as many countries in Micronesia where soils are too poor to support agriculture. In Kiribati, for example, seafood consumption is 150 kg per person per year (compared with a world average of about 12 kg per person). Even in high islands where agriculture is practised, seafood consumption often approaches 50 kg per person per year.

2. SUBSISTENCE (VILLAGE) FISHERIES

Subsistence catches of fish and shellfish have been declining in the lagoons and inshore reefs of many Pacific Islands for some years [HORSMAN and MULIPOLA 1995; SAUCERMAN and KINSOLVING 1995; DALZELL et al. 1996].

In some cases lifestyle changes, including loss of traditional culture and increased involvement in the formal employment sector, have meant that less people are engaged in subsistence fishing. However, in spite of the lack of hard data, most authorities and fishing communities agree that catch rates are decreasing, indicating that stocks of seafood species are declining.

Figure 1 shows a yield curve fitted to annual catches (kg/ha) of seafood from thirty Samoan villages which had similar ecological characteristics but in which there were varying degrees of fishing pressure (from the methodology given in King 1995). The yield curve suggests that marine resources in eleven of the thirty villages surveyed are fully or overexploited.

Other than increases in human population sizes (particularly in urban areas) the most

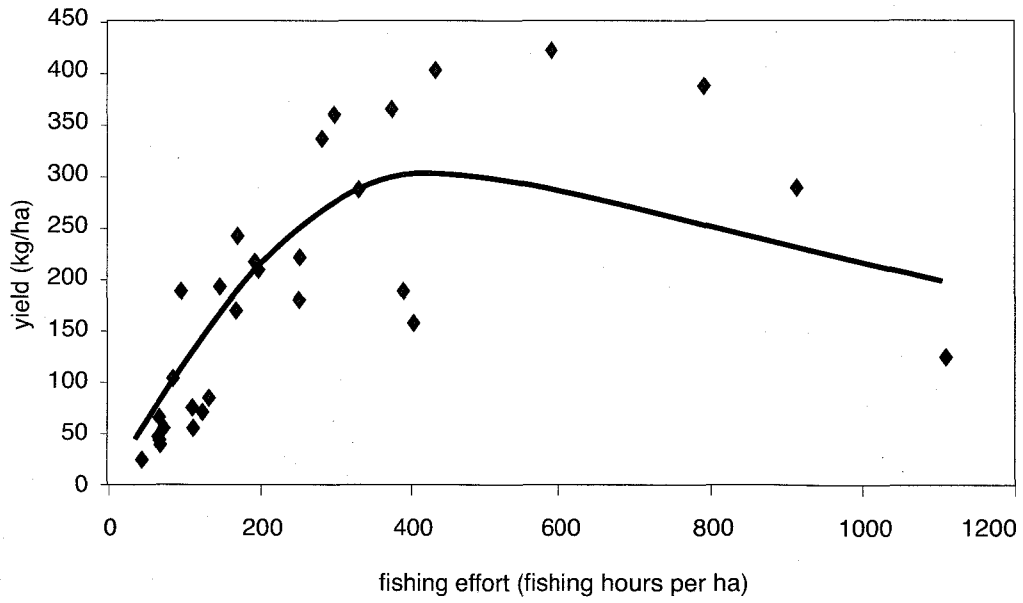


Figure 1 Yield (kg per hectare) against fishing effort (fishing hours per hectare) in 30 Samoan villages.

obvious reasons for the decline of inshore fish stocks are the use of overly efficient and destructive fishing methods and environmental disturbances.

The development of overly-efficient fishing methods has caused some fish stocks to be threatened. The use of modern materials such as chicken-wire for fence traps and monofilament nylon for gill nets has made fishing effort more effective. In some cases, quite modest developments such as the availability of underwater torches, which allow the spearing of fish resting under corals at night, have resulted in a dramatic increase in fishing efficiency.

In some countries, the use of explosives and poisons to disable and capture fish represents a serious threat to marine ecosystems and the long-term viability of fisheries. These destructive fishing methods include the use of toxic plants, commercially available poisons such as bleaches (sodium hypochlorite), insecticides, and explosives. Poisonous plant material may be derived from the roots of the climbing vine, *Derris elliptica,* and the nut of the coastal tree, *Barringtonia asiatica,* which are ground into a paste. More seriously, commercial poisons, including bleaches, are poured into pools isolated at low tide to capture small coral fish. Explosives are either thrown from a canoe into a school of fish such as mullet, or set on coral where fish have been encouraged to gather by setting bait. Explosives and severe poisons are many times more damaging to small animals, such as fish larvae and coral polyps, than they are to large fish. Destroyed coral reefs result in low fish production, and may not recover for over 20 years.

It is a common but erroneous belief that all destructive fishing methods are modern in origin: traditional fish drives and some collecting activities may involve damage to corals, either directly as a result of breaking coral to catch sheltering fish, or indirectly through the impact of many people moving over the reef. In the past the marine environment was more likely to be able to sustain such damage because the frequency of the activity was low and fewer people were involved.

Environmental disturbances have resulted from not only natural events such as cyclones and storms but also from human activities. These activities include the destruction of nursery areas (including mangrove areas) by road construction and land reclamation. Corals are collected for sale as souvenirs and coral blocks are used for building. Harbour dredging and coastal building projects often release waterborne silt that reduces sunlight penetration or smothers coral. Poor land management practices have resulted in erosion and the siltation of lagoons. Environmental disturbances and habitat destruction have been linked to increasing incidences of ciguatera fish poisoning and outbreaks of crown-of-thorns starfish.

3. COMMERCIAL FISHERIES

The trend towards cash economies in South Pacific Islands has resulted in an increased rate of participation in commercial fishing. Many seafood species including fish such as mullet, molluscs such as giant clams, crustaceans such as spiny lobsters, and echinoderms such as sea cucumbers, have been overexploited. Because of the requirement for foreign exchange, species which are the bases of valuable export fisheries are particularly at risk from overexploitation.

In local tuna fisheries across the Pacific it is widely believed that local fishing pressure will not overexploit such a vast, widespread and migratory resource. However, the lure of substantial profits in foreign currencies has resulted in many local fisheries being overfished

in economic terms.

Samoa has a valuable longline fishery for tuna. The main species targeted are large albacore, *Thunnus alalunga* (71% by weight of the total catch), yellowfin tuna, *Thunnus albacares* (12%), and bigeye tuna, *Thunnus obesus* (5%). Other species, including skipjack, wahoo, and dolphinfish, make up a bycatch of 12% by weight. In terms of both fishing effort (the amount of fishing) and annual catch weight the longline fishery has grown rapidly since the early 1990s (Figure 2). Catches have increased from 844t in 1994 to about 6000t in 2001 and tuna is now the most valuable of all Samoan exports. However fishing effort has increased at a higher rate than the annual catch (at an average of almost 2 million additional hooks set each year). This has resulted in an overall reduction in catch rates. Ignoring an outstanding year in 1995, catch rates have decreased from 94 kg per 100 hooks in 1994 to less than 70 kg in 2001, equivalent to an average decrease of over 6 kg per 100 hooks per year.

One of the difficulties of managing a vast fish stock that is shared by many countries is that it is generally impossible to estimate a sustainable yield for a local fishery. However, the approach taken in Samoa was to consider the tuna in Samoa's EEZ as a "discrete" stock and fish moving into the EEZ as "recruitment" (the latter was assumed to be relatively constant from year to year). The collection of catch, effort and cost data, thus allowed a yield curve (in terms of catch value) to be fitted through the annual catch data (Figure 3).

As fishing effort (the size of the fishing fleet) increases, the same quantity of fish has to be shared by more and more fishers. Although the total tuna catch may increase marginally, catch rates (catch per boat) and profits to individual fishers will decline. From the country's viewpoint, even if the total annual catch remains high, the cost of a large fleet making low

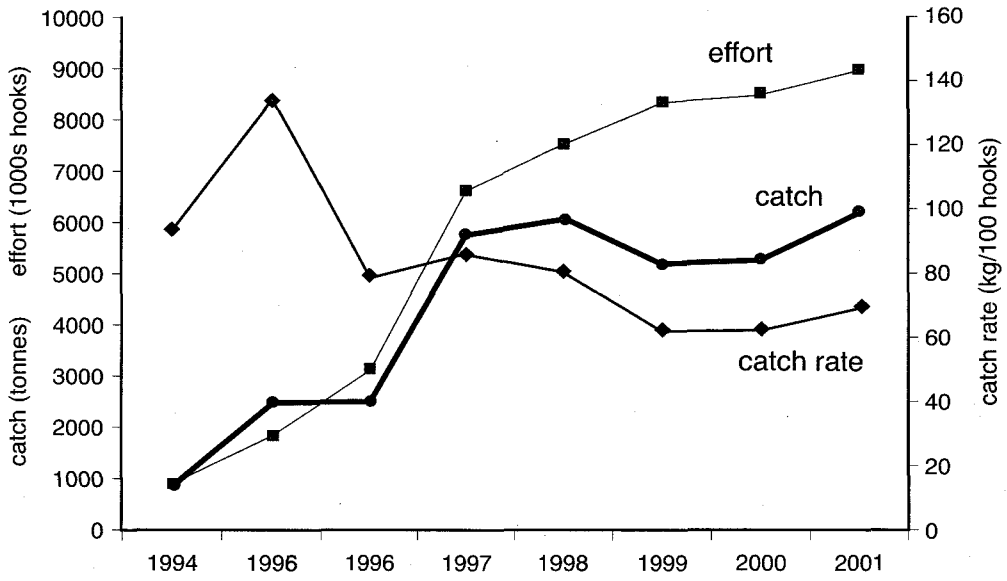


Figure 2 Fishing effort (millions of hooks set), total catch (tonnes) and catch rates (kg per 100 hooks) in the longline fishery for tuna in Samoa.

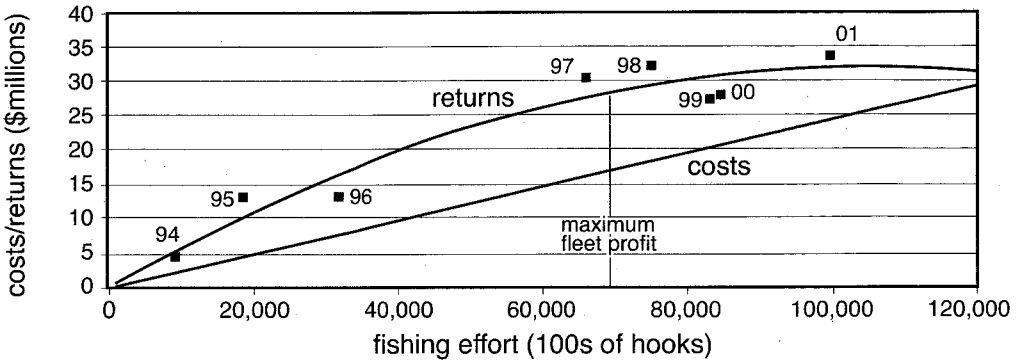


Figure 3 The longline fishery for tuna in Samoa.Yield in terms of returns (gross profit) and fishing costs in $millions of Samoan tala. Based on albacore selling for $6,750 per tonne and fishing costs of $246 per 100 hooks.

individual catches will reduce the net value (export income less total fishing costs) of foreign earnings. This is especially so as all fishing equipment, fuel and bait used in the fishery are imported into Samoa. Figure 3 suggests that the maximum economic yield from the fishery was obtained at a fishing effort of about 7 million hooks and overall profits from the fishery have been decreasing since 1998.

As with all living resources, tuna stocks are biologically limited. However, tuna are widespread across the Pacific region and stocks of albacore and yellowfin are believed to be large and not under threat from overfishing. In addition, the amount of tuna caught by small Pacific nations is relatively small (the amount of albacore caught in Samoa, for example, is only 12% of the total Pacific catch). These facts are often used by the governments of island countries as justification for allowing excessive amounts of fishing effort in local tuna fisheries. Such local fisheries will almost inevitably become overcapitalised and fail to maximise economic benefits to the country.

4. THE NEGLECT OF SUBSISTENCE FISHERIES

In most, if not all, Pacific Island countries, the total weight of seafood caught in subsistence, or village, fisheries is greater than that from commercial fisheries. And, when a nominal value per kilogram is put on the subsistence catch, it is often found to be of greater value than commercial catches. This is particularly so if one considers the net profits from commercial fisheries, many of which rely on imported boats, equipment, and even bait. Subsistence fisheries on the other hand, are intensive in labour but generally low in other fishing costs.

Subsistence fisheries also provide health benefits and cost savings beyond their intrinsic value. Locally caught and consumed seafood decreases a country's reliance on cheap and low quality protein imported from overseas; sheep ribs from New Zealand, turkey tails from the United States of America, and canned fish from Japan are ubiquitous food items in island countries. Decreases in local seafood consumption also contribute to the high incidence of heart disease and diabetes in Pacific Islands. Hence increasing seafood consumption, or restoring

it to previous levels, will have benefits in reducing the cost of health care as well as in foreign exchange savings.

In spite of the obvious importance of subsistence fisheries to local populations, most government fisheries agencies devote the majority of their financial and human resources to assessing, developing and managing commercial fisheries. Subsistence fisheries are largely ignored. In defence of local fisheries agencies, the surveying and management of subsistence fisheries are difficult tasks. Subsistence fisheries are made up of a large number of fishers, using many different fishing methods, making small individual catches of a great variety of species from around the entire country. Commercial fisheries, on the other hand, are usually based in urban areas and target a smaller number of species.

National governments in Pacific Islands have imposed a variety of conventional regulations that either restrict fishing (input controls), restrict the catch (output controls) or protect the marine environment. For a number of reasons these actions are rarely successful. Although fisheries regulations may be applied in urban areas, they are rarely enforced in village areas. Indeed, because of the traditional governing structures of some communities, it would take a brave fisheries officer to enter some villages to enforce national laws. Effective national regulations rely on strong government enforcement around the entire country and this is both time consuming, expensive and sometimes traditionally impossible.

In most countries, there is little stake-holder input into the formation of national regulations. The community is given no ownership of either the resource or the problem and therefore feels no responsibility or accountability in managing fish stocks.

5. INVOLVING STAKE-HOLDESRS IN FISHERIES MANAGEMENT

In view of the above difficulties, fisheries agencies have few options in the conservation and management of subsistence fisheries. Indeed, the only option, or at least the most effective one, involves encouraging and supporting commercial fishers and fishing communities to manage their own fisheries resources. Stake-holder involvement results in the ownership of fisheries management actions and regulations.

6. THE CO-MANAGEMENT OF COMMERCIAL FISHERIES

In commercial fisheries, the formation of Management Advisory Committees (MACs) that include representatives from industry as well as from government is an increasingly common method of providing ownership and responsibility.

In Samoa, the key to the development and management of the tuna fishery (now producing the most valuable of all Samoan export commodities) was the involvement of fishery industry stakeholders. This was achieved by the formation of a Commercial Fisheries Management Advisory Committee (CFMAC) in which representatives of boat-owners, fishers, boat builders, and seafood processors outnumbered representatives from government agencies. A manual on introducing co-management in commercial fisheries (based on the Samoan tuna fishery experience) has been produced by the Secretariat of the Pacific Community [WATT 2001].

7. THE COMMUNITY-BASED MANAGEMENT OF SUBSISTENCE FISHERIES

In some Pacific countries, communities are being encouraged to become involved in the management of subsistence fisheries [e.g. AMOS 1993; FALANRUW 1994; KING and FA'ASILI 1999]. The following account is based on a community-based fisheries management project which began in Samoa in 1995.

A desirable goal in all community-based fisheries management programmes is likely to include having a particular number of villages effectively managing their own fisheries resources within a certain time period. One of the possible strategies to achieve this goal would be to encourage each participating village to develop its own fisheries management plan. In designing a strategy for the introduction of community-based fisheries management the following four principles should be considered.

7.1. Maximum community participation

Community ownership will be optimised if as many people as possible are allowed to contribute to the process of developing the village fisheries management plan. This will require involving all groups, including women and untitled men, to ensure the widest community participation and eventual ownership of the plan. The length of the extension process in each village has to be sufficient to allow the community time to establish ownership of their plan and undertakings. Ownership by the community requires sufficient time for people to consider their own problems and causes, and think of their own solutions. It may take many months of facilitated discussions by community groups before the plan can be regarded as owned by the community.

7.2. Motivation not education

The knowledge of island and coastal people regarding the marine environment has often been underestimated. Most coastal communities have an awareness of, and concern for, their marine environment [e.g. JOHANNES 1981]. Although public awareness-raising activities may be required, the prime need is not for education, but for motivation and support. Part of this motivation depends on the availability of economically viable alternatives to the present unsustainable and destructive fishing practices. The key task is to convince communities that being resource users, they have the primary responsibility to manage their marine environment.

7.3. A management system which is demand-based

For reasons of efficiency and sustainability, the management system must focus on villages in which communities have a concern for the marine environment, and are prepared to participate and contribute in finding solutions to problems. Although it is tempting to concentrate on villages where the need is greatest (for example a village where destructive fishing methods are known to be used), community-based management will not work unless the community has a strong desire to address its own problems. The strategy involves working selectively with village communities eager to participate in the programme. As the programme progresses more villages may develop the desire to participate.

7.4. The development of alternative sources of seafood

Whether community-based or not, fisheries conservation measures, including the prevention of destructive fishing and the imposition of fish size limits, will cause a short-term decrease in catches [KING 1995]. The same is so for community-owned marine reserves as they reduce the area available for fishing.

As most subsistence fishers require seafood for their families on a daily basis, it is unreasonable to expect fishing communities to adopt conservation measures which will initially reduce present catches of seafood even further without offering alternatives. Accordingly, an extension programme should include the promotion and development of alternative sources of seafood to those resulting from the present heavy and destructive exploitation of near-shore reefs and lagoons.

The alternatives may include the diversion of fishing pressure to areas immediately beyond the reefs through the introduction of other means of fishing, the promotion of community-level aquaculture, and the judicious introduction of depleted shellfish species. A community-based extension programme which does not provide support by way of promoting alternative means of obtaining seafood is unlikely to be sustainable.

8. COMMUNITY-BASED FISHERIES MANAGEMENT IN SAMOA

In the Samoan community-based fisheries management project, staff training began in 1995 [KING and FA'ASILI 1999]. An extension process was developed which recognised the village *fono* (or council of chiefs) as the prime instigator of change, while still allowing ample opportunities for the wider community to participate. Each village in the programme was encouraged to analyse its fishing practices and problems, and suggest solutions. Community undertakings and actions to solve these problems included introducing fisheries regulations and

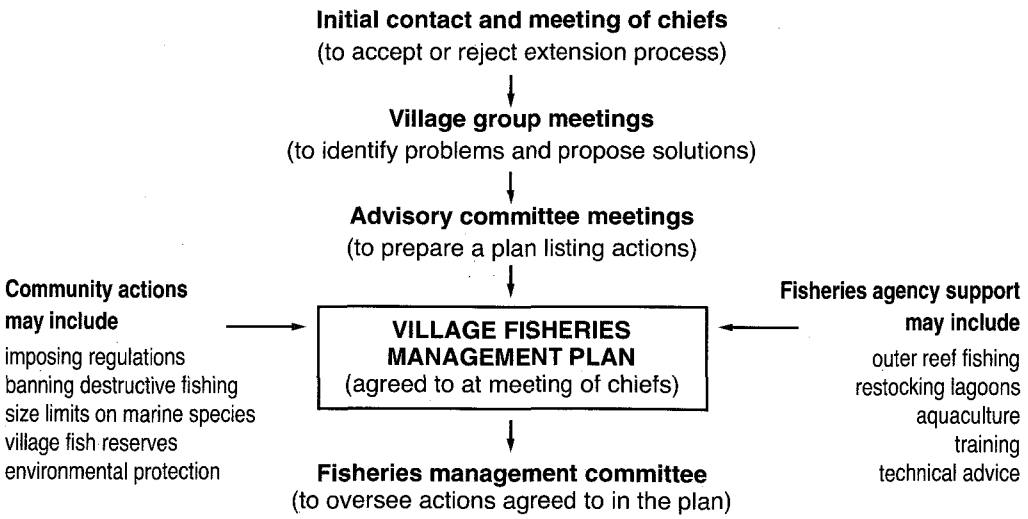


Figure 4 The community-based fisheries extension process in Samoan villages.

pursuing other conservation measures. These undertakings and actions were listed in the community-owned village fisheries management plan. The process is briefly described and illustrated in Figure 4.

Following an indication of interest, a village *fono* meeting was arranged to provide the

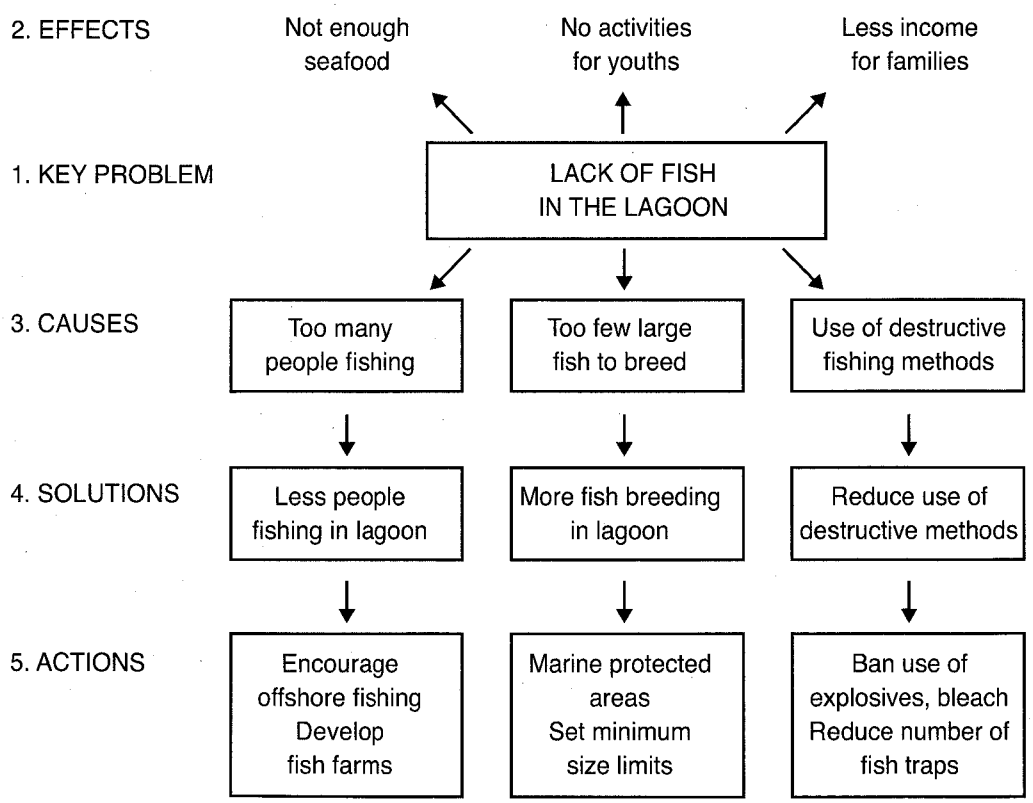


Figure 5 A simplified example of a problem/solution tree as constructed by a village community. The process begins with Step 1 (Key Problem) before proceeding in the numerical order shown. All information is provided by the community and recorded on a white-board by trained facilitator.

community with information to allow either acceptance or refusal of the extension programme. If the *fono* accepted, it was then asked to arrange for meetings of several village groups, including women and untitled men *(aumaga)*. Over a series of meetings, each group held separate meetings to discuss their marine environment and fish stocks, decide on key problems, determine causes, propose solutions, and plan remedial actions. Problem/solution trees were recorded on a portable white board by a trained facilitator (Figure 5).

Finally, a village Management Advisory Committee was formed, with three people nominated from each group. As approximately one third of all village group meetings were for women only and approximately one third were for untitled men only, these two groups eventually made up about two thirds of each Management Advisory Committee. This strategy ensured the participation of women, not only in the interests of equity, but because women are more likely than men to have a long-term (inter-generational) view of the benefits of conservation.

The key task of the Fisheries Management Advisory Committee was to prepare (assisted by Extension Officers) a draft Village Fisheries Management Plan for discussion and approval by the village *fono*. Each Village Fisheries Management Plan listed the resource management and conservation undertakings of the community, and the servicing and technical support required from the Fisheries Division. If the plan was accepted, the *fono* then appointed a Fisheries Management Committee to oversee the working of the plan.

A manual based on the above methodology was produced by the Secretariat of the Pacific Community for the guidance of other Pacific Islands wishing to pursue community-based fisheries management [KING and LAMBETH 2000].

9. INITIAL CONSIDERATIONS FOR COMMUNITY-BASED FISHERIES MANAGEMENT

In order to establish community-based fisheries management, there are initial considerations.

- Is the government willing to commit to giving communities control over their fisheries resources? Some governments and fisheries agencies may have (unjustified) concerns regarding a programme which encourages village communities to take actions for which they see themselves responsible.
- Do communities have Customary Marine Tenure (CMT) or control over their adjacent fishing areas? Such control, either legal, assumed or *de facto,* is necessary before communities can be expected to manage their marine resources.

In many Pacific Islands, communities have claimed ownership of their adjacent waters, even if this is contrary to current national legislation. Some communities claim ownership of their adjacent sea areas and resources that extend from the land to reefs, while others such as the *qoliqoli* in Fiji may be more extensive.

Alternatively, some countries allow open access to all fishing areas—fishers are free to fish anywhere along the coastline. Although superficially attractive on equity grounds, open access systems, where anyone who wishes has the right to exploit a resource, are resulting in severe cases of overexploitation around the world [FAO 1997]. A resource that is for everyone's use, it seems, is no one's responsibility. And relevant to the present context, open access fisheries

provide no basis for community-based fisheries management.

However, in order to facilitate community-based management some countries without customary marine tenure are assigning property rights to communities. In Tonga, for example, where community-based management is being planned, the government is considering allowing villages to set up "Special Management Areas" over which communities have control [S.FAKAHAU pers.com].

10. WHAT COMMUNITY-BASED MANAGEMENT CAN DO

Community-based fisheries management programmes have the potential to create communities that have set their own fishing regulations and conservation rules and are abiding by them. If communities make their own conservation laws, as they have historically done, they are more likely to respect them. Because communities are regulating fisheries for which they see themselves responsible, there is a considerable saving on enforcement costs, which may otherwise fall on government agencies.

However, it is unrealistic to expect all communities to do equally well in managing their marine resources and some assessment of individual villages in the programme must be made [KALLIE et al. 1999]. Some villages will do poorly for a variety of reasons, including intra-village disputes and unrealistic expectations. In Samoa, the community-based fisheries management programme includes 64 villages with Village Fisheries Management Plans. Of these, 52 have elected to establish community-owned Marine Protected Areas (MPAs). The most recent assessment of community-based management (in 59 villages) suggested that 23 communities were managing their fisheries and marine environment very well (with a score greater than 85%) and 2 were doing poorly (with a score less than 55%).

Communities taking stringent management actions will almost certainly suffer a short-term decrease in catches of seafood. The hope of better catches lies some way off in the future, and communities may become impatient. However, the management and conservation activities of communities, particularly if they include the setting up of community-owned marine protected areas [KING and FA'ASILI 1998], are likely to eventually result in increased catches in fishable areas.

A household survey in Samoa [PASSFIELD et al. 2001] was designed to estimate fishing effort and catches from subsistence fisheries. The data were collected from 65 villages, of which 17 were in the community-based extension programme. A comparative study revealed that fishers in villages with community-based fisheries management plans made average catch rates of 2.8 kg per person per hour whereas fishers in villages without such plans made average catch rates of 1.8 kg. Although this difference is highly significant, care must be taken in drawing conclusions as there is the possibility that people in villages joining the community-based extension programme were already better and more aware fishers.

11. WHAT COMMUNITY-BASED MANAGEMENT CANNOT DO

Community-imposed fisheries rules and regulations cannot replace (or even compromise) national fisheries regulations. For example, if a minimum size limit is imposed on a particular

species under national regulations, communities may be allowed to locally enforce a higher but not a lower size limit.

It must be recognised that there are many things that a local community cannot do. Some environmental problems are complex and involve activities and areas beyond the control of a local community. For example, fish catches may be falling in a particular village because silt from a nearby river is killing the corals in its lagoon. Mangroves may be dying because a sea-front road has been built without proper planning. These effects may be caused by decisions and actions taken some distance from the village. Siltation, for example, may be the result of poor farming techniques or the logging of timber in hills many kilometres away from the village.

Such problems can only be addressed by an integrated effort by government agencies and community groups working together. Integrated Coastal Management (ICM) takes into account the inter-dependence of ecosystems, and the involvement of many different agencies (for example, those responsible for agriculture, forestry, fisheries, public works and water supply) and other stake-holders.

Although such problems are beyond the power of individual small communities to solve, it may be possible for extension staff to provide the necessary link between communities and government to begin to address these and related issues.

12. CONCLUSIONS

The involvement of fishing communities in the management of fisheries and the marine environment is possibly the only way of ensuring the sustainability of seafood stocks. The task of promoting this involvement requires a wide range of interdisciplinary skills. Studies of the traditions and culture of target groups are required. In many cases legal assistance is required to assign ownership of resources and to give communities the ability to prosecute wrong-doers from outside their communities [FA'ASILI 1997]. Sociological and financial data are needed to make governments aware of the intrinsic value of subsistence fisheries. And, self-interest aside, advice is required on matters relating to fisheries biology.

The training of local people to facilitate community-based fisheries management reflects the wide range of skills required. Conventionally, extension officers in the fields of both fisheries and agriculture are technical people. However, a community-based extension officer requires a balance of both basic scientific knowledge and community facilitating and motivating skills; in the latter, listening skills, cultural knowledge and sensitivity are key requirements.

An interdisciplinary approach to fisheries management, involving sociologists, ethnologists, economists, and legal workers, as well as biologists, is required to involve and empower fishers in the management of fisheries and the marine environment. Regardless of national legislation and enforcement, the responsible management of fisheries resources will only be achieved when fishing communities themselves see it as their responsibility rather than that of the government.

ACKNOWLEGEMENTS

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REFERENCES

AMOS, M.
1993 Traditionally Based Marine Management Systems in Vanuatu. *Traditional Marine Resource Management and Knowledge Information Bulletin* 2: 14–17.

DALZELL, P., T. ADAMS and N. POLUNIN
1996 Coastal Fisheries in the Pacific Islands. *Oceanography and Marine Biology: An Annual Review* 34: 395–531.

FA'ASILI, U.
1997 The Use of Village By-laws in Marine Conservation and Fisheries Management. Pacific Science Association Intercongress, July 1997, Fiji.

FALANRUW, M.V.C.
1994 Traditional Fishing on Yap. In *Science of Pacific Island Peoples: Ocean and Coastal Studies.* Volume 1. Institute of Pacific Studies, University of the South Pacific.

FAO
1997 *Technical Guidelines for Responsible Fisheries.* Number 4, p. 82. Rome: FAO.

HORSMAN, N. and A. MULIPOLA
1995 Catch Data and Collection from Market Surveys in Western Samoa. South Pacific Commission and Forum Fisheries Agency Workshop on the Management of South Pacific Inshore Fisheries, p. 17. New Caledonia: Integrated Coastal Fisheries Management Project Technical Document. South Pacific Commission.

JOHANNES, R. E.
1981 *Words of the Lagoon: Fishing and Marine Lore in the Palau District of Micronesia.* Los Angeles: University of California Press.

KALLIE, J, T. TAUA and U. FA'ASILI
1999 *An Assessment of Community-based Management of Subsistence Fisheries in Samoa.* MRAG Workshop on Aspects of Coastal Fisheries Resource Management, Fiji.

KING, M. G.
1995 Fisheries Biology, Assessment, and Management. *Fishing News,* p. 341. Oxford: England Blackwell Scientific Books.

KING, M. G. and U. FA'ASILI
1998 A Network of Small, Community-owned Fish Reserves in Samoa. *PARKS* 8: 11–16.
1999 Community-based Management of Subsistence Fisheries in Samoa. *Fisheries Management and Ecology* 6: 133–144.

KING, M. G. and L. LAMBETH
2000 Fisheries Management by Communities: *A Manual on Promoting the Management of Subsistence Fisheries by Pacific Island Communities.* New Caledonia: Secretariat of the Pacific Community.

PASSFIELD, K., A. MULIPOLA and M. KING
2001 A Profile of Village-based Fisheries in Samoa. *Report of the AusAID-supported Samoa Fisheries Project, Samoa.*

SAUCERMAN S. and A. KINSOLVING
1995 Fisheries Management and Conservation in American Samoa. Country Paper 6. Joint FFA/ SPC Workshop on the Management of South Pacific Inshore Fisheries. Noumea: South Pacific Commission.

WATT, P.
2001 *A Manual for the Co-management of Commercial Fisheries in the Pacific.* New Caledonia: Secretariat of the Pacific Community.