

Village Fisheries Management and Community-owned Marine Protected Areas in Samoa

Michael King and Ueta Faasili

Abstract

As in many tropical countries, subsistence fishers in Samoa live in discrete communities which have a high level of marine knowledge and some degree of control of adjacent waters. These factors provide an ideal basis for motivating communities to manage their marine resources. In Samoa, a community-based fisheries extension program encouraged each village community to define its key problems, discuss causes, propose solutions and take appropriate actions. Various village groups provided information which was recorded as problem/solution trees. The extension process culminated in a Village Fisheries Management Plan which listed the resource management and conservation undertakings of the community. Undertakings range from enforcing laws banning destructive fishing methods to protecting critical marine habitats. Within the first eighteen months, the extension process commenced in 57 villages of which 40 have produced Village Fisheries Management Plans. An unexpectedly large number (32) of these villages chose to establish Marine Protected Areas, the first community-owned marine reserves in the country.

Introduction

In many coastal and island countries in the tropics, catches of fish and shellfish are declining. Reasons for this include overexploitation, the use of destructive fishing methods (including the use of explosives, chemicals and traditional plant-derived poisons), and environmental disturbances. Catches of seafood from lagoons and inshore reefs of the Pacific Island of Samoa have been decreasing for over ten years (Horsman and Mulipola 1995).

Declining fish stocks are of particular concern to coastal communities where subsistence catches of seafood provide a traditional and important source of protein. In spite of this concern, government actions to protect fish stocks are rarely successful. This is due to many factors, including poor enforcement regimes and lack of community participation. However, fishing communities are often repositories of valuable traditional knowledge concerning fish stocks and have a high level of awareness of the marine environment (Johannes 1982). In addition, many subsistence fish-

ers in tropical regions live in discrete communities that have some degree of control, either legal or traditional, of adjacent waters. Together, these factors provide an ideal basis for communities to be encouraged and motivated to manage their marine resources. This paper describes a community-based fisheries extension program in which each participating village was assisted to develop its own Village Fisheries Management Plan.

The Extension Program

The fisheries extension strategy was based on four principles: (1) maximum community participation; (2) motivation rather than education; (3) a demand-based extension system; and (4) the requirement for alternative sources of seafood due to the heavy and destructive exploitation of lagoons and nearshore reefs.

The need for maximum community participation was based on the belief that, 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. Given the high level of marine awareness, it was recognized that the major need was not for education but for motivation and support. The key task was to convince communities that they, not the government, have the primary responsibility to manage their marine environment.

The project was demand-based for reasons of efficiency and sustainability. Extension staff selectively worked with villages in which communities were eager to participate in the program, and were prepared to undertake marine conservation actions. The program also recognized that it was unreasonable to expect communities to adopt conservation measures, which would (at least in the short-term) reduce present catches of seafood even further, without offering alternatives. Accordingly, the extension program included: (1) the diversion of fishing pressure to areas immediately beyond the reefs through the introduction of medium-sized, low-cost boats; (2) the promotion of village-level aquaculture; and (3) the re-introduction of depleted species.

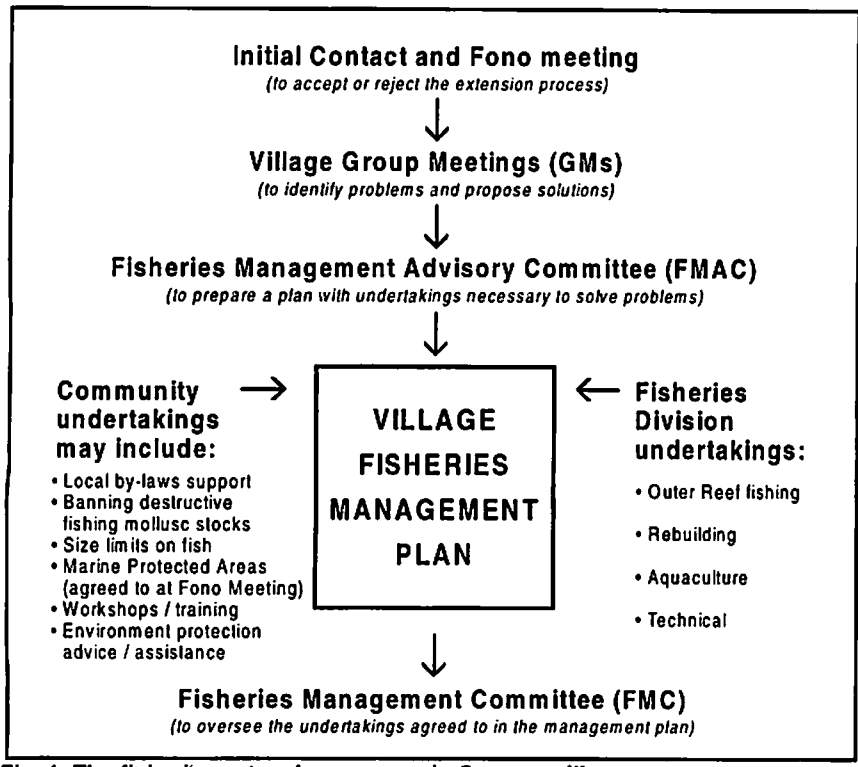


Fig. 1. The fisheries extension process in Samoan villages.

Preparation for the fisheries extension program consisted of designing a culturally appropriate extension process, and training extension staff to facilitate the process effectively. Training for extension personnel was based on the requirement for a balanced understanding of both basic technical knowledge and community motivating/mobilizing techniques. In particular, extension staff were trained to unobtrusively encourage communities to discuss their problems and propose their own solutions.

The fisheries extension process involved recognizing the village council (*Fono*) as the prime instigator of change, while allowing ample opportunities for other community groups (including women and untitled men) to participate. The process, from initial contact with the village to the production of a community-owned Village Fisheries Management Plan, is summarized in Fig. 1 and described in detail in King and Faasili (in prep.).

Following an indication of interest, a village council (*Fono*) meeting was arranged to provide the community with information to allow them to either accept or refuse the extension program. If the village council decided to accept the process, it was then asked to arrange for meetings of several village groups, including women and untitled men. These groups held separate meetings to analyze the condition of their marine environment and fish stocks. Each group decided on key problems, determined causes, proposed solutions and planned remedial actions. These elements were written as a problem/solution tree (Fig. 2) on a portable white board by a trained facilitator. Finally, a Village Fisheries Management Advisory Committee (FMAC) was formed with three people nominated from each group to prepare a draft Village Fisheries Management Plan for discussion and approval by the village council. The Village Fisheries Management Plan was in the form of an

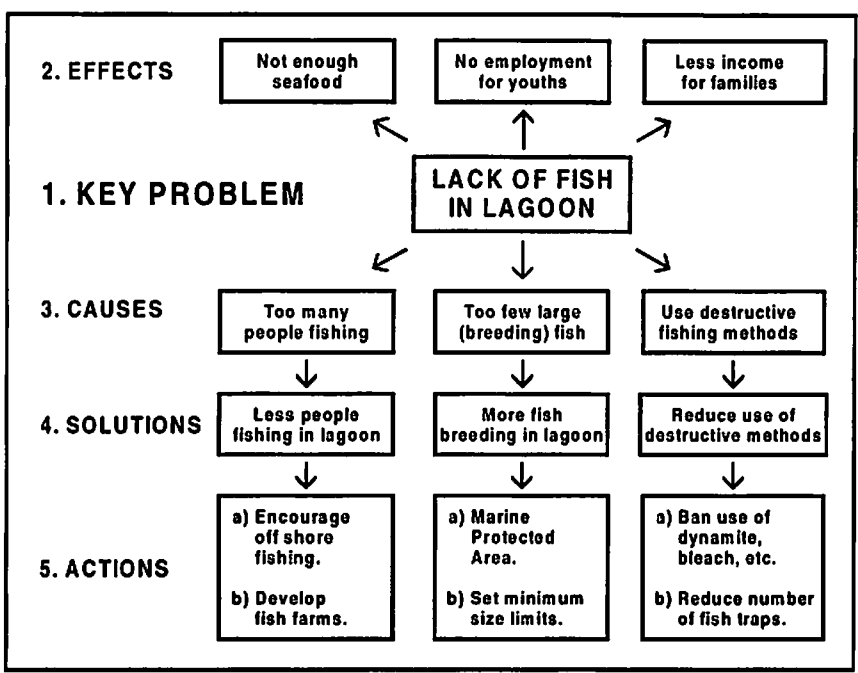


Fig. 2. A simplified example of a problem/solution tree as constructed by a village community.

The fisheries extension program was designed to encourage each village participating in the extension program to analyze its fishing practices and develop a community-owned Village Fisheries Management Plan. Each plan contained

a community undertaking to introduce appropriate regulations and pursue other marine conservation measures. Reciprocally, the Fisheries Division supported the community by providing scientific advice and assistance.

agreement between the village and the government. It listed the resource management and conservation undertaking of the community, and the servicing and technical support undertaking required from the Fisheries Division. If the plan was accepted, the council then appointed a Fisheries Management Committee to oversee the implementation of the plan.

Results

Within the first eighteen months of full operation, the fisheries extension process commenced in 57 villages and 40 of these have progressed to the stage of producing their own Village Fisheries Management Plans. The time taken, from initial contact to approval of the plan by each village community, averaged 13.4 weeks. In the early stages of the program, the process was discontinued in 8 villages because it was felt that there was lack of community commitment. The process has been delayed in other villages for a variety of reasons, including other community obligations and local political disputes.

Community obligations have included decisions to support and enforce Government laws banning the use of chemicals, dynamite and plant-derived poisons to kill fish. Additionally, many villages have banned traditional destructive fishing methods such as the smashing of coral to catch sheltering fish (*fa'amo'a* and *tuiga*). Most villages have made their own rules to enforce national laws banning the capture of fish less than a minimum size, and some have set their own (larger) minimum size limits. Some villages have placed controls on overly-efficient methods of fishing, such as the use of nets and the use of underwater torches for spearfishing at night. Community conservation measures have

included collecting crown-of-thorns starfish, *Acanthaster planci*, as well as banning the removal of beach sand and the dumping of rubbish in lagoon waters. An unexpectedly large number of villages (32) have chosen to establish Marine Protected Areas (MPAs) in part of their traditional fishing areas, where fishing is banned.

Some Village Management Plans have been in place for a period of over 12 months, and joint Community/Fisheries Division assessments suggest that the commitment to continue them remains high.

Discussion

Factors affecting the success or otherwise of marine resource management by communities are related to the extension process, community commitment, and the support of the agency promoting community-based management (King and Faasili, in prep.).

Village Fisheries Management Plans

Target communities must have a desire to take actions to address problems in the marine environment and fisheries resources. They must also have either traditional, *de facto* or legal control over their adjacent waters. In countries where this is not the case, it may be necessary to grant rights (Territorial Use Rights in Fisheries, or TURFs) such as proposed in the Philippines (Agbayani and Siar 1994). In Samoa, villages have *de facto* control of adjacent fishing areas, and also have the ability to devise fisheries by-laws which, after government approval, become enforceable under national law (Faasili 1997).

The extension process was designed specifically to encourage communities to discuss problems and propose solutions relating to

fisheries and the marine environment. The length of the extension process in each village had to be sufficient to allow the community time to establish ownership of their Village Fisheries Management Plan and undertaking. In practice, however, it was found that a very long planning process led to communities becoming impatient, and a compromise was reached.

The prime indicator of success in the fisheries extension program was the number of villages which not only continued with the undertaking and activities agreed to in their Fisheries Management Plans, but enforced their own regulations. In Samoa, most village councils have actively enforced their own rules and applied severe penalties for infringements. Councils have imposed traditional fines of pigs or canned goods on people breaking village rules. In addition, some villages have made their village rules into fisheries by-laws so that these can be applied to people from other villages.

Community-owned Marine Protected Areas

An unexpectedly large number of villages have chosen to establish Marine Protected Areas in part of their traditional fishing areas, where all fishing is banned. Of the villages with management plans, 32 have established their own MPAs—the first community-owned MPAs in Samoa.

The biological benefits of Marine Protected Areas are usually stated in terms of providing areas where invertebrates and fish stocks can grow and reproduce without interference. Although hard evidence of the benefits of marine reserves in increasing inshore fish production is lacking (Roberts and Polunin 1991), intuitively they provide the means by which adjacent fishing areas may eventually be replenished

through breeding and larval migration. The sociological benefits of village-owned MPAs compared with national MPAs are related to community ownership and management. Features, requirements and potential problems associated with the establishment of community-owned MPAs are discussed in King and Faasili (in prep).

Each participating community was responsible for deciding whether or not to establish its own Marine Protected Area. Most villages also suggested the location and size of the MPA. However, as location and size play an important role in the effectiveness or otherwise of MPAs, scientific advice was usually required from the Fisheries Division. In all cases, the ecological advantages of a large MPA had to be balanced against the sociological disadvantages of banning fishing in a large part of the fishing area of a village.

In cases where the village elected to ban fishing in a large area of the lagoon, young men would still be able to go fishing beyond the reef. However, women and the elderly were likely to lose the use of easily accessible, shallow-water fishing areas. Women who traditionally collect echinoderms and molluscs in subtidal areas would be particularly disadvantaged. Hence, extension staff were often obliged to curb over-enthusiasm for large MPAs.

Support Requirements

Fisheries authorities must have the technical and scientific capacity, as well as willingness, to support community plans and to encourage the development of alternative sources of seafood. It is doubtful that community-based fisheries management would continue on a sustainable basis without such ongoing support.

It must be recognized that most conservation measures, in-

cluding the prevention of destructive fishing methods and imposing fish size limits, as well as establishing MPAs, will cause a short-term decrease in fish catches. Hence it is unreasonable to expect communities to adopt conservation measures which will reduce catches of seafood even further without offering alternatives. Accordingly, the Fisheries Division in Samoa supported the diversion of fishing pressure to areas immediately beyond the reefs through the introduction of low-cost boats, promotion of village-level aquaculture, and re-introduction of depleted species of molluscs in village fishing areas.

Scientific support is also required to advise communities on the placement of MPAs, monitor biological changes within MPAs, and collect data on fish catches in areas adjacent to MPAs. A side benefit for scientific staff working closely with fishing communities is that the collection of data on subsistence fisheries is greatly facilitated. A trial run in Samoa involved village high-school students keeping a "weekly fishing log" of all fishing activities (fishing methods, effort and catches) in their own household or extended family. A surprising amount of information, and even estimates of sustainable yield by area, may be gained from such extensive surveys on subsistence fisheries. Where data are collected from different areas with similar ecological characteristics, it may be possible to apply a surplus yield model (over area rather than time) to estimate the sustainable catch and also indicate villages where resources are presently under pressure (King 1995).

The main benefit of community-based fisheries management to a government is that conservation measures necessary to exploit seafood resources on a sustainable basis become a com-

munity responsibility. An associated benefit is the reduced cost of enforcing fisheries regulations.

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M. KING and U. FAASILU are from the Fisheries Division, P.O. Box 244 Apia, Western Samoa.

A Taste for Live Fish: Hong Kong's Live Reef Fish Market

Christine Lee and Yvonne Sadovy

Abstract

This paper provides an overview of the live reef fish market in Hong Kong, which accounted for about 15 000 t/yr (US\$345 million) of live fish imports in the mid-1990s. The live fish trade has spawned a number of management concerns, including overfishing of highly-valued species, use of destructive fishing techniques and human health risks. Recent actions by the Hong Kong government in response to these concerns are reported and possible region-wide initiatives are briefly discussed in this paper.

Introduction

Hong Kong has a big appetite for seafood. It has one of the highest per capita consumptions (46 kg/person/yr) of seafood in the world. While frozen fish is consumed, it has long been a popular custom among the Cantonese Chinese to keep the fish alive until moments before cooking. This is said to be the best way to preserve the taste and texture of a fish and consumers are prepared to pay well for this.

Until the 1980s, live reef fish consumed in Hong Kong came largely from local waters and the northern sector of the South China Sea (Johannes and Reipen 1995). As desired species became overfished locally and as demand for volume and novelty grew, live fish were shipped or flown in from more distant areas such as Indonesia, the Maldives, Australia and the western Pacific. As one area became depleted of desired species, businesses simply moved on to new lo-

cations to keep pace with the burgeoning market. Imports of live fish increased from 2 000 t in the late 1980s to about 15 000 t by the mid-1990s. The great majority of fish are caught in the wild.

The key role of Hong Kong in this trade was first recognized by Johannes and Reipen (1995). Hong Kong is the major importer of live reef fish for food in Southeast Asia, accounting for as much as 60% of the total annual regional trade of 25 000 t (Johannes and Reipen 1995). The total value of imported live fish of about US\$345 million (using an average wholesale price of US\$23/kg, from Sham 1997) is well in excess of Hong Kong's total annual seafood production from capture fisheries (US\$278 million—1995 figures), making live fish the major seafood commodity in Hong Kong.

This rapidly growing high value trade, made possible by great improvements in transportation, holding facilities and the rapidly growing regional wealth, has spawned a number of resource and

health concerns. We provide a profile of the trade in Hong Kong, discuss some of these management concerns and report on recent actions by the Hong Kong government to address these problems. We also explore possible initiatives available to responsible importing economies.

Live Fish Trade in Hong Kong

Live fishes for food are sold at thousands of markets and restaurants throughout Hong Kong. The two largest markets are at Sai Kung and Lei Yue Mun, with many small shops, each with numerous small tanks on display to the public. They sell fish and a wide variety of crustaceans and molluscs, almost all of which are wild-caught. Seafood is purchased live by the public and then usually sent to one of the many restaurants nearby for preparation. About 80% of the live marine fish consumed in Hong Kong is im-