Formulating Policies for Existing Community-Based Fisheries Management Systems

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Partly because of the failure of biological and economic models used to manage fisheries in industrialized countries, community-based systems have become widely advocated to manage tropical inshore multispecies and multigear fisheries. The modern usefulness of traditional systems, in particularly, has been closely examined, especially in the Asia-Pacific Region. Whereas community-based systems have distinct advantages over centralized management, they are not axiomatically a best solution to complex fishery problems. In some cases they may retard economic development. This demands that clear development priorities be established together with an unsentimental assessment of the role that traditional systems can play in implementing them. In this paper three policy alternatives for the future of traditional community-based systems are discussed; case-by-case decision making, dilution or invalidation and reinforcement. The merits and demerits of an invalidation policy are exemplified and the problems of adopting a reinforcement policy examined. Criteria for policy determination are set out.

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Introduction

That contemporary fisheries management is experiencing serious problems is now all too familiar, and needs no recapitulation here. Most highly publicized problems have occurred in the fisheries of industrialized countries. Yet the same biological and economic models responsible for those problems are still generally recommended for fisheries development and management in Third World contexts. This is ironical because in many such societies there already exist sophisticated traditional, community-based fisheries management systems well-adapted for local use.

Traditional fisheries management systems have been documented throughout the world. They are especially rich in the Asia-Pacific Region, where they are generally common property regimes to which access to a particular territory is limited to a defined user group, in which operational rules are specified and where control resides in traditional local authorities (Ruddle, 1994a). Many such systems were either deliberately or inadvertently weakened or destroyed by colonial administrations (Ruddle, 1993) and replaced by centralized fisheries institutions nominally responsible for all aspects of fisheries management, from policy formulation through enforcement.

The cumulative effect of that restructuring of fisheries management was often the impoverishment of tropical fisheries resources and fishing communities. The administrative and technical abilities of government agencies attempting to manage inshore fisheries are generally relatively weak compared to the scope of the problems facing them. As a result, devolution of resource management and allocation decisions to local communities, within the framework of co-management, is increasingly seen as an alternative to ineffective management under taken by distant, understaffed and underfunded government agencies.

The Characteristics of Traditional Community-Based Systems of Marine Resources Management

Unlike conventional fisheries management, traditional community-based systems of marine resources management are focused on resolving gear externalities and allocation problems. They are implemented based on defined geographical areas and controlled access, self-monitored by local fishers, and enforced by local moral and political authority (Ruddle 1994a, 1995). These are the great strengths of such systems and what they have to contribute to co-management designs.

Both the problems of gear externalities and assignment are overcome in traditional systems by (1) control of a fishing area, as a property, and (2) defining exactly who has access rights to that area. Rules of operational behavior then specify assignments of time and place within that space and group having access. Control of a fishing area is sustained by rights of exclusion, or limited access, that maintain the private area of a community of local fishers against outsiders, and intra-group operational rules are sustained by local authority that has the power to invoke sanctions on offenders (Ruddle, 1995).

A Modern Role

Although eroded or even broken-down in parts of the Asia-Pacific Region, especially because of colonialism or neo-colonialism and the predominance of imported scientific concepts, community-based fisheries management systems are still used to manage coastal fisheries in a wide range societies. Thus it has frequently been asserted, although usually with scant proof, that traditional community-based systems of inshore fisheries management can play a potentially major role in the modern world by ensuring equitable access to fisheries, as well as in managing and enforcing conservation measures to ensure the sustainability of coastal fisheries. The thesis generally is that the more the responsibility for the control of local resources can be left to local, traditional users, the fewer will be the social, political, legal, conservation-related and management cost problems that must be addressed by governments (Ruddle, 1988a).

At first sight the adaptation of traditional systems to a modern purpose may appear to invite strong local resistance, since they are often so much a part of the way-of-life. But traditional community-based systems of marine resources management in many parts of the Asia-Pacific Region already incorporate important elements of conventional fisheries management. For example, parallel management strategies include limited entry, seasonal, spatial, gear, size, or species restrictions, prior appropriation rights and the concept of sole ownership, among others (e.g., Johannes, 1978). In fact, the use of many such strategies in the Pacific Basin (Johannes, 1978) and Japan (Kalland, 1984, 1989; Ruddle, 1985, 1987) antedated their adoption in the West. In conventional marine economics terms, sole ownership, limited entry, individual transferable quotas and other such fisheries management schemes are based on the theory of the firm. On the other hand in many societies in the Asia-Pacific Region the community is the sole owner, and traditions of resource use and management are enforced by community norms that control the behavior of the membership (Ruddle, 1988a). But this, too, has its parallels in New England and Western European fishing communities, among other places, where socially binding yet unwritten and informal rules carry more weight than official regulations (Acheson, 1987).

Most nations in the Asia-Pacific Region face an array of dilemmas in determining rights and delineating responsibilities in marine resources management and development, including what institutions should manage and enforce regulations for subsistence fisheries, legal support for traditional regulation and enforcement, the managerial and developmental role of the central government in small-scale commercial fisheries, the feasibility of centralized management plans versus local decisionmaking, and the nature of the consultative and collaborative process among fishers, local governments and national authorities. Initially these look like local versus central jurisdictional matters, but the underlying issue is one of the policy toward and the means of managing marine resources and of adapting traditional concepts to modern needs and frameworks, such that the range from subsistence fishery to the highly commercialized industrial fishing is served properly.

Alternative arrangements can help in overcoming the weaknesses of conventional fisheries management. The most appropriate form of fisheries governance is one in which management authority is decentralized, within a broad policy framework, to enable local governments to fundamentally control local fishing via community-based management systems. Such a system is co-management, whereby decision-making is shared between central and/or provincial governments and community-based management authorities (Pinkerton, 1989). Such arrangements have long-existed *de facto* in many parts of the Asia-Pacific Region, particularly in far-flung archipelagic nations.

The immediate goals of co-management are more appropriate, more efficient and more equitable management than hitherto. Broader objectives include community-based development and participatory democracy (Pinkerton, 1989). In the Asia-Pacific Region co-management of coastal fisheries has the potential to conserve and enhance fish stocks, improve the quality of data and its analysis, reduce excessive and competitive investment by fishers, permit a more equitable and flexible allocation of fishing opportunities, and harmonize the relationship between fishers and government agencies. In particular it holds the promise of greatly reducing the expense and wastage of all aspects of coastal fisheries management.

There can be no single system of co-management; such systems must be based on cultural and physical factors, especially resource characteristics and antecedent viable systems of management. Essentially this form of fisheries management will be a syncretic model that blends the complementary domains of conventional management and scientific knowledge with traditional management and local knowledge. In many places there are few practical alternatives to the future management of tropical coastal fisheries being neo-traditional fisheries management.

Traditional fishing rights are an ill-defined factor that can be construed either as hindering the use and development of national fisheries or, in contrast, as encouraging their effective use and management. Two major problems arise from them:

(1) providing access to "outsider" commercial fishermen to underutilized grounds and species from which they are now excluded by traditional fishing rights claimed by people who themselves do not fish commercially; and

(2) preserving the valuable role played by and social organizations associated with community-based traditional marine resource management systems and traditional rights.

Regardless of the precise legal situation, individuals, group, clans or villages, as locally appropriate, claim exclusive fishing rights over certain areas. Further, despite their legal basis, such claims will be zealously guarded. Thus outsider commercial fishing is generally not possible, which hampers the development of a modern, efficient, inshore national fishery sector.

Policy Alternatives for the Future of Systems

Clearly, some systems will have a future usefulness, both nationally and locally. But equally there will be valid grounds for either diluting, modifying or abolishing outright other systems. Deciding which course to follow will basically depend on national priorities. It should also be based on national fisheries management capacity.

Essentially there are three basic alternative policy approaches for community-based fisheries management that consider its relationship to the development of fisheries and other economic sectors:

(1) The case-by-case approach,

(2) dilution policies, and

(3) reinforcement policies.

(1) The case-by-case approach

This option essentially implies that no clearcut policy is established and legislated for. Rather, each problem is resolved as it arises in terms of the relative costs and benefits to nation, region and local community. This approach has the advantage of political acceptability, since no fundamental changes are required, and traditional sentiments and rights are reinforced. The disadvantages are that traditional rights-holders incur no obligations, such that development of other sectors will be difficult at best and impossible at worst. Further, because this process is *ad hoc*, solutions to problems will be piecemeal, and no guidelines would emerge for the legal interpretation of traditional fishing rights and their articulation with national development priorities. The case-by-case option is therefore at best a stopgap approach, since it is obviously unsatisfactory in the longterm.

(2) The dilution option

A dilution policy requires legislative action to curtail and strictly define the powers of traditional rights-holders, and to modify traditional management systems to enable the use of some traditional fisheries rights areas for other economic activities, including commercial fisheries. Some systems would be abolished entirely.

The advantages of a dilution policy are that it allows both commercial fisheries and other economic sectors to develop rapidly, clarifies property rights and related issues, and defines the modern rights of traditional rights-holders. Its disadvantages are that it is often politically difficult and numerous implementation problems would arise. In many cases, the losses of rent, administrative costs and problems and possible social unrest would outweigh the economic and other benefits derived. Further, once traditional management systems are either abolished or severely eroded, they would be difficult if not impossible to re-introduce, should the need arise.

(3) The reinforcement option

The advantages of a reinforcement policy that also specifies the scope and power of traditional rights are a recognition of historical and present situations and, possibly, the promotion of resource conservation. That this approach would make conventional development difficult may often not be bad, although many would regard it as a disadvantage. But the reduction of the powers of central governments while placing responsibility on the rights-holders would likely be construed as a disadvantage by vested interests. However, this could be overcome by reinforcing the scope of traditional systems within a concurrently legislated framework of co-management.

The Invalidation of Systems

It makes little sense in terms of overall national development to prolong unnecessarily the existence of traditional community-based management systems that have outlived their historical usefulness. Such a situation arises most clearly near urban-industrial centers where, depending on the density of onshore developments, the invalidation of systems could also be justified by the potential health hazard of fish taken from polluted waters. Weakening or invalidating traditional systems is a course of action than can be justified where such systems impede alternative and more important uses of coastal-marine space.

But some would demur. Johannes (1988), for example, believes that the invalidation or weakening of systems is unjustified, except where they are finely subdivided through "nested" rights, since rights within rights seem to have a large potential for problems, and they appear to have little or no conservational potential. Regarding situations where traditional authority has lapsed beyond the point of possible revival, as around urban centers, Johannes (1988) feels that fisheries management may best be pursued by cooperatives. This was done in Japan (Ruddle, 1985, 1987). Nevertheless, it is no easy task, and failures have been legion.

Negative Consequences of Invalidation

Whereas in many cases community-based management systems ought to be invalidated or weakened, in the national or regional interest, when such a policy is implemented nationwide it carries with it enormous costs. This is particularly obvious in such archipelagic states as Indonesia, the Philippines, Kiribati, Tuvalu, Solomon Islands, and Vanuatu, but no less so in any developing nation that lacks the financial and physical ability and personnel capacity to police its inshore waters. Solving this major problem of costs provides one of the most persuasive reasons for retaining well-functioning community-based marine resource management systems.

Invalidating traditional community-based systems together with the local knowledge base that underpins (Ruddle 1994b) them also eliminates local policing of resources, which results in increased financial, administrative and personnel burdens on governments that cannot handle them. In dispensing with such systems "the government would thus be disposing of services it got for free and assuming expensive new responsibilities it was ill-equipped to handle" (Johannes, 1988:32). As Bailey and Zerner (1992:3) observe of Indonesia:

> The Indonesian government is incapable of designing effective fishery management systems due to limited understanding of the complex and highly variable nature of fisheries resources. Government management policies which fail to recognize local institutions and economic needs may be creating more problems than they solve. Moreover, the Indonesian government has limited ability to enforce what regulations are in place due to staff and budgetary constraints.

But the ability of local community management systems, based on a depth of traditional ecological knowledge, is quite the opposite. However, to be effective these local rules require recognition, acceptance and protection under statutory law.

As Bailey and Zerner (1992:3) state bluntly with respect to Indonesia, "... the Indonesian government has limited ability to enforce what regulations are in place due to staff and budgetary constraints". Indonesia has an extremely long coastline and is estimated to comprise some 13,000 islands. Under such physical conditions over 1 million small-scale fishers can also double effectively as managers:

> [This] combination of physical presence and the application of informal means of social control is far more efficient than dependence on government agencies to enforce regulation. The cost of enforcing regulations along thousands of kilometres of coastline is prohibitive and in practice rarely occurs. In practice, government attempts to centralize fisheries management authority have resulted in de facto open access conditions throughout much of Indonesia. The failure to recognize local community resource rights and responsibilities undermines

community capacity to manage local resources and local incentives to comply with fisheries laws (Bailey and Zerner, 1992:4).

Zerner (1991) spells out in detail the shortcomings of the existing Indonesian national fisheries administration, and indicates how community-based systems can help overcome them. Enforcement is severely and chronically flawed at the national and provincial levels. "Many if not most..." regulations are not enforced, and implementation is both irregular and inconsistent. The fundamental problem is that the country lacks the capacity and capability to monitor its vast coastline and sea space. Fisheries departments at all levels, and particularly at the provincial and regency level, to say nothing of the village, are grossly understaffed and underfunded, and they lack both the infrastructure and equipment for data gathering and implementing, monitoring and enforcing fisheries regulations. For example, in five regencies in South Sulawesi Province, officials reported that they had no staff, no budget and no facilities or equipment to implement any fisheries regulations whatsoever (Zerner, 1991). The Fisheries Department is not represented on BAKORKAMLA, the body responsible for marine security and law enforcement, including the prosecution of fisheries violators. But BAKORKAMLA makes few patrols, and its power does not extend far beyond the limits of provincial capitals; fishing boats are inspected only if they happen to be encountered, and patrols in response to reports of violations are hardly ever made. When Fisheries Department officials are on board they are severely hampered by having no policing powers, and can be used only as expert witnesses in court proceedings. So there is virtually no official enforcement of government fisheries regulations throughout most of Indonesia!

It is little wonder then, that data and information on which present "planning" and "management" are based are mostly worthless; they are neither accurate, sufficiently disaggregated, nor, at the village level, based on adequate and representative sampling. Catch-reporting by the commercial sector is highly suspect; landings are underreported, lies told about their provenance and reports are late, if made at all. The situation is bad: "At best, experienced fisheries observers estimate that 10-15% of the reported information on 1/4 of the entire licensed fisheries enterprises are valid" (Zerner, 1991:8). One Indonesian official summarized the situation, saying "We have almost all the fisheries rules we now need on paper. The key area of institutional development is the creation of an effective mechanism for enforcement and monitoring as well as mechanisms (staff and budget) for accurate, disaggregated, continuous information from the desa [village] and province levels" (Zerner, 1991:8).

A further problem is that centralization of management activities in Jakarta, for example the Fisheries Licensing Law No. 15/1990, may undermine provincial fisheries budgets and act as a disincentive to regional implementation. Provincial fisheries officials claim that this will deprive local fisheries departments of income (licit as well as otherwise), encourage local entrepreneurs to operate without licensing, and act as a disincentive to the implementation of national laws by local departments (Zerner, 1991).

Another problem is the incompatibility between national and provincial levels fisheries regulations. National laws are too general to protect small-scale fishers in different locations, and lead to often violent conflict between users of different gear types. Local regulations can obviously tailor generic policies as locally appropriate. A further major problem is that vast numbers of "invisible" illegal gear, such as undersized mesh on nets, operate throughout Indonesian waters with impunity.

It does not take too much imagination to envisage that this horrendous set of interlocking problems could be mitigated were local communities built into marine resource management. There is a great future role for community-based marine resource management systems in providing regular information on activities, particularly on coasts along the unvisited rural hinterlands that in reality comprise the bulk of countries like Indonesia. This role is emphasized by provincial fisheries officials, who, in South Sulawesi, for example, note that small-scale fishers report violations by outsiders and foreign vessels (Zerner, 1991).

In those rural, mostly subsistence level societies, where traditional authority remains strong, enforcement and punishment are often largely traditional. This can also be used to serve a modern purpose.[1] Traditional punishment can be severe and feared more than that meted-out by government, as in Okinawa (Ruddle and Akimichi, 1989), Palau (Johannes, 1981) or American Samoa (Wass, 1982). As Wass (1982:81) observes of American Samoa, "Management regulations instituted on the village level are much more effective than those of the territorial or federal governments because they are promulgated within the cultural context by traditional leaders and, consequently, are more likely to receive the approval and fealty of the villagers." Thus

where traditional authority remains strong, a community-based management system can still provide a solid foundation for modern fisheries management. However, ironically, when such authority is eroding or has disappeared, it is often the fault of the government (*vide supra*).

Determining a Future Role

Three basic factors require analysis to determine if an existing traditional management system can be adapted to modern requirements or if an entirely new system should be created. These are (1) compatibility with government policy, (2) definition and robustness of rights, and (3) contribution to conservation (cf. Johannes, 1988, 1989 and Johannes and MacFarlane, 1990, 1991).

(1) Compatibility with government policy

Both national development and fisheries policies differ widely in objective and definition. The future role of traditional resource management would vary depending on such policy priorities as rent maximization, food production or employment generation.

Formerly, colonial governments often ignored or overrode traditional systems, granting access to industrial fishers lacking traditional rights in an area (Ruddle, 1993). Nowadays many governments, especially in the Pacific Islands, recognize the legitimacy of traditional management systems. When such systems are likely to hamper fisheries development they may reconcile through mediation the needs of traditional and industrial fishers. This is sometimes done by compensating traditional rights-holders for allowing access to outsiders (e.g., Johannes, 1982; Baines, 1985). Thus a balance is sought between employment and rent for national development.

If maximizing economic rent is the main government fisheries objective, then it should be determined if traditional rights-holders exercise their property rights in a manner that prevents or discourages overcapitalization as well as overfishing. When a traditional system operates to discourage outsiders from entering a heavily exploited fishery this helps limit overcapitalization. But overcapitalization may still occur within the traditional rights-holding group itself, unless operational rules on effort prevent it.

Such a performance test of the ability of a traditional management system to forestall rent dissipation was performed in Sri Lanka by Panayotou (1984, 1989). If a fishery is being managed successfully by such a system then its members ought to be earning incomes above their opportunity costs, which can be estimated by comparing what workers with a similar educational background earn in "adjacent" economic sectors. Incomes of boat-owners and crews were estimated and compared with their opportunity costs. Boat-owners were found to have average annual incomes ranging from US$ 1,150 (for traditional vessels) to US$ 5,000 (for 3.5t mechanized vessels). In comparison, owner-cultivators, sharecroppers, office workers, and state employees earned an average of less than US$ 500 *per annum*. And crewmen earned an average of US$ 5.0/ day, some 2-3 times more than the daily earnings of agricultural laborers or unskilled and semi-skilled workers. In contrast, in Thailand and the Philippines, where traditional systems of fisheries management have totally or largely disappeared, small-scale fishers earn incomes far below their estimated opportunity costs, and must engage in a range of other economic activities to earn a living (Panayotou, 1984). The relatively higher incomes enjoyed by Sri Lankan fishers were attributed to the efficiency of the traditional restricted access management system, after competing hypotheses, such as religious prohibitions on Buddhists taking life, were rejected (Fernando et al., 1985).

(2) Definition and robustness of fishing rights

The clarity of definition, strength with which they are upheld and permeability of fishing rights varies enormously. This is potentially a major difficulty. One major problem might be precise determination of the location of traditional boundaries; they may be imperfectly remembered, and written records would but rarely permit a legal settlement of conflicting claims (e.g., Johannes, 1982, 1988). Equally complex is the identification of traditional rights-holders, deliberate relocation of settlements by churches or governments, compounded more recently by urbanization, having diminished the role of kin groupings, such that individuals' rights are only hazily recalled. Thus efforts to resuscitate or resurrect a traditional system under such circumstances might lead to territorial disputes and long-lasting conflicts (e.g. Johannes, 1982). Given such potential problems it is not surprising that governments might be loathe to codify traditional tenure systems within statutory law, unless they have functioned continuously or at least until historical times, as in Solomon Islands (Allan, 1957).

(3) Contribution to marine resources conservation [2]

Whereas traditional management systems often provide an incentive to harvest in moderation, in some rights-holders do not limit their own fishing pressure

(e.g., Polunin, 1984; Carrier, 1987). In some communities, for example, a causal relationship between the contemporary rates of exploitation and future fish yields is not perceived (e.g., Carrier, 1982, 1987). Sometimes this might be because there has been no such relationship, abundant supplies having always exceeded demand, as in parts of Melanesia where human population densities are low, like the Torres Strait Islands (Johannes and MacFarlane, 1991). Later, when marine resources in such areas are threatened by increased fishing pressure, as when they become commoditized, for example, fishers may not recognize the need for conservation because there is no cultural precedent (e.g., Johannes and MacFarlane, 1991).

But this is not to say that traditional management systems serve no conservation purpose. Almost universally rights-holders limit fishing by outsiders. Regardless of motive, and although not guaranteeing efficient marine resource management, this demonstrates a vital prerequisite for conservation in a fishery threatened with overexploitation.

Despite the common assertion that the traditional practise of area or temporal closures on reefs enhance fish stocks, by (1) maintaining species abundance and diversity and possibly enhancing these characteristics over the longterm; (2) providing undisturbed breeding sites; (3) exporting biomass by emigration of adult individuals; and (4) enhancing larval dispersal over a wider area (Roberts and Polunin, 1991), there have been few direct tests to verify this via natural or manipulative experiments. This is a severe drawback, since further advances in tropical coastal fisheries management depend on it becoming experimental and testing empirically the consequences of various management regimes (Larkin, 1984).

In one such test, Alcala (1981) attempted to relate protective management to fish yields in the Central Visayan Islands of the Philippines, at the Sumilon Island Reserve, which was closed to all fishing from 1974 to 1984. At 16.5 mt/km2/yr over a five-year period, the areas adjacent to the reserve produced one of the highest average yields of any reef area in the world. However, because no data were available on reef fish abundance at Sumilon before the reserve was established, it was impossible to verify the assertion that protective management caused the high abundance and species richness at the site. But given the extremely high fishing pressure on Philippine reefs, it can be argued that protective management was a major factor in maintaining the high abundance of many species. Also in the Central Visayan Islands, Russ (1985) compared three sites, at Sumilon Island, Apo Island and Balicasag Island, focusing on Serranidae stocks, a highly favored target species worldwide, and therefore vulnerable (Randall, 1982).

Limited evidence in support of the first three of the assertions noted above is provided by the Sumilon evidence. The fourth needs detailed research on the patterns of dispersal and recruitment of coral reef fish.

Alcala and Russ (1990) reported further on a natural experiment to test directly the use of area closure as a management strategy on Sumilon Island. After a ten-year closure, protective management broke-down in 1984, resulting in intensive fishing by 100 small-scale fishers. In the 18 months following breakdown of protective management compared with an 18-month period while it was in operation, there was 54% increase in the total yield of reef fisheries. Their research indicated that protective management maintained high abundance of fish in the reserve and resulted in significantly higher yields in adjacent areas, presumable owing to the migration of adult fish.

Although in many cases access and other controls which pertain to harvest optimization and social equity do contribute to sustainability, alone they are not enough to ensure it (Chapman, 1991). Rather, longterm sustained yields depend on conscious planning and monitoring and control of harvesting rates. Achieving this may or may not coincide with harvest optimization and equity goals.

Chapman (1991) suggests that three basic elements are required for the sustainable development of fishery resources. First, there must exist within a community preconditions for recognizing a need for conservation and implementing measures to ensure it. These preconditions are that the resource must be valued and, based on local knowledge, perceived of as finite; the community must be both willing and able to forego shortterm benefits to ensure longterm yields; and both the resource and its biophysical and socio-economic environments must be predicable, such that there is an assurance that if today's benefits are foregone, tomorrow's will arrive. Second, community consensus should be achieved on both the need for and means of regulating a resource for sustainability. Third, access to the resource must be regulated by access controls that are enforced.

Where fisheries have traditionally been managed sustainably, all three basic elements are probably to be found. Where not, they are probably lacking. This may

change through time, such that at certain periods a resource might not be managed in a sustainable manner, whereas at other times it is.

Technical assistance programs usually treat these elements in isolation. This is a mistake. For example, some regard the preservation of fishing rights as the key to sustainable development. That focus alone will not ensure sustainability. To ensure sustainability, rights must be preserved in conjunction with the other elements mentioned above.

Conclusions

Whereas many traditional community-based marine resource management systems might play a major role in the co-management of inshore fisheries, it is important that several cautionary points to be borne in mind:

(1) assertions regarding the potential management value of traditional systems remain to be verified;

(2) wholesale transfers of concepts would be hazardous since, by definition, systems arise from the deeper cultural patterns of the societies in which they are enmeshed (Ruddle and Akimichi, 1984; Durrenberger and Pálsson, 1987). So, much more than an understanding of just the local, traditional fishery alone is required; entire national systems of fishery production, and particularly on the relationship between household (traditional) and capitalistic (modern) production requires understanding (Ruddle, 1988b). But this is not to suggest that some of the underlying principles on which some traditional systems are based could not be introduced. However, much interdisciplinary research, combining human ecological, biological, and economic approaches, is first required to elucidate those principles, as well as to correct many of the misplaced concepts and erroneous interpretations that have characterized some of the earlier research on the topic (Ruddle, 1988a, 1988b);

(3) traditional systems could be "fossilized" through explicit, detailed legal definition in the terms of statutory law. This may weaken the adaptive flexibility of a traditional system (Ruddle and Johannes, 1985), unless flexibility is explicitly legislated for;

(4) applying traditional knowledge and management practises to the solution of contemporary marine resource management problems is also a relatively new approach. However, is now the focus considerable academic and applied interest, partly because of the inadequacy of the biological and economic models usually applied. Largely as a consequence of this newness, the relevant concepts and methodologies are not yet well-defined; and

(5) perhaps most important, traditional community-based management systems are not an automatic godsend to fisheries managers. They create difficulties. Not uncommonly, therefore, governments and entrepreneurs attempt to either weaken or invalidate them.

Deciding on a policy alternative is not easy with respect to the role of small-scale fisheries and traditional management; there are no quick and simple solutions to the inter-locking problems. The question of traditional fishing rights is one of the most interesting, vexing and emotionally highly-charged practical, political and philosophical problems confronting fisheries management in the Asia-Pacific Region. If the present situation is maintained and rights reinforced, fisheries development will have to take place within the context of exclusive properties, which is the historical pattern of the Pacific. Throughout the Region full debate on the issue is required at village, local government and national levels, and the national governments should thoroughly appraise the local governments and the villages of their rights. Further, before any action is taken, it is imperative that the nature of existing fishing rights systems be documented, particularly those that have been or are being exercised.

Thus the future of traditional community-based marine resource management systems over much of the Asia-Pacific Region is uncertain. It rests on the establishment of a consensus regarding national development goals, priorities and processes.

Policy-makers in the Region should be aware that replacing a traditional system with "open access" would entail much more than all the familiar discouraging results of fisheries management experienced by industrialized countries. Those problems would be greatly compounded. This would occur because:

(1) the multispecies nature of tropical fisheries demands more cumbersome regulations and correspondingly more enforcement than systems in temperate waters;

(2) the scantiness of biological data for use in management and the large percentage of the small-scale catch that is used for subsistence create immense logistical problems in developing essential data sets from very widely scattered fishing communities;

(3) the vast number of geographically scattered fishing units would create almost insuperable financial and logistical problems for regulation and monitoring compared with Western commercial fisheries;

(4) the zeal with which data are collected and analyzed, together with poor official enforcement of

regulations and lack of professionalism among officials leaves much to be desired; and

(5) most governments are too poor - or fisheries has too low a priority - to implement conventional regulatory systems that are required by open access regimes or to handle the resultant problems.

Notes

[1] An excellent example of this occurred when the Government of Indonesia banned trawling and the small-scale fishers enforced the ban. They did so with such eagerness, employing often violent means, that Indonesian biologists did not dare use their research trawlers, and thus could not monitor the initial phase of the recovery of stocks following the ban.

[2] To evaluate a system in terms of its actual or potential conservation value presupposes a prior assessment of whether or not marine resources involved are now or likely to be overexploited and/or degraded or destroyed by pollution, destructive fishing practices, or other human activities.

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