

Accounting for the mismanagement of tropical nearshore fisheries

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Abstract The underlying reason for the mismanagement of tropical nearshore fisheries is the implementation of policies and programs based on Western models and approaches, coupled with an inability and/or unwillingness to consider non-Western alternatives of empirically proven value. Such attitudes are embedded in donor and development agency behavior, and are demonstrated by the temperate bias in conventional approaches to fisheries education and management, with a corresponding lack of understanding of tropical milieux, and in the persistence of various prejudices. Adaptive Management, The Ecosystem Approach, Local Knowledge, and Protected Areas are discussed from the perspectives of Western models and pre-existing Pacific Island systems as alternative models. Given the parlous condition of the global environment and resources, the best non-Western pre-existing models and Western approaches must be blended to provide sustainable solutions.

Keywords Adaptive Management · Colonial legacy · Ecosystem approach · Knowledge systems · Nearshore fisheries · Pacific Islands · Prejudice · Protected Areas · Temperate bias · Tropical milieux

1 Introduction

The standard mantra held to account for shortcomings in the management and development of tropical nearshore fisheries runs something like the following. Despite a belated

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recognition of the importance of small-scale fisheries, a focus on industrial fisheries has been the long-standing policy of all international agencies and most national fisheries services. And notwithstanding a rise in the study of small-scale fisheries since the mid-1970s, they are still not well understood. Worse, they have been subject to major and varied misinterpretation. Policy, administration and management have focused on making small-scale fisheries more economically efficient while conserving fish stocks. Programs have been sectoral, and it was not widely appreciated that fisheries are but one of a range of economic activities that occur in coastal zones. Also detrimental to small-scale fisheries is that they have not been included within the general framework of rural development programs during the last half-century, when activities focused on small-scale farm development and related infrastructure and institutions.

Although there are multiple causes of the mismanagement and failure of development in tropical nearshore fisheries, it has not been stated unequivocally that the underlying cause is the projection of Western policies and programs based on Western models and approaches into areas for which they are inherently unsuited. We contend that this is the basic reason, and that it stems from an underlying and continuing legacy of an unfortunate history of colonialism and cultural imperialism still demonstrated in donor and development agency behavior. This prevents a fuller consideration of the basic principles and operational designs of many non-Western systems of proven viability, and instead continues to rely on unproved models and approaches designed largely by Western fisheries biologists, social scientists and policymakers. Whereas non-Western models were formerly disparaged openly, these days disparagement is more subtle; it often takes the form of labeling them as “traditional” or “special cases”, and then dismissing them with no further discussion, while the “serious” examination then turns to the Western models, with which authors are familiar.

Without clearly recognizing and rectifying that fundamental problem, nothing will be improved. But that will be a difficult task now that development approaches and models are viewed through the distorting lens of the North-South divide, since many of them emanate from Western-dominated UN agencies, the World Bank, or from the national aid programs of Western countries that cleave to them closely. This is echoed at regional and national levels, where the earlier Western approaches of colonialism, technical assistance and financial aid are now perceived as having been repackaged as development aid conditionalities, technical expertise and the training of local professionals. Suspicion abounds: the hidden agenda of co-management, for example, is seen as the enforcement of participatory democracy to replace customary law institutions with democratically elected institutions, rather than the stated goal of better resource management (Hara 2000).

That is reinforced by the continuing historical legacy of colonial interventions. In the Asia-Pacific Region the colonial era had a major and lasting impact on pre-existing systems for managing nearshore fisheries. Its main impacts include undermining or displacing traditional tenure systems in conjunction with an added legal complexity, with the Western-based State law at odds with local customary law. In general, Western-trained lawyers believe that customary law is invalid for upholding legal claims and inferior to the Western legal tradition. This has been a major “external” factor that either deliberately or by default undermined customary law and community resource rights (Ruddle 1994a, b, c, 1995, 2007a). In general, national independence has changed the situation but little, partly because the devolution of authority conflicts with the basic task of “nation-building” (Ruddle 1994a).

The foci and trends in rural development policy have also reflected the biases of donors. Broad trends of development policy since the 1950s may be summarized as community

development (1950s); modernization led by small farm growth (1960s); state intervention and integrated rural development based on small farms (1970s); market liberalization and structural adjustments (1990s); participation, empowerment and multiple actors and perspectives in development (1980s and early-1990s); sustainable livelihoods as an integrating framework (1990s); and (from 2000) poverty reduction (without ever defining 'poverty' or simply measuring it in terms of GDP) and education for all (meaning Western education while not acknowledging traditional forms of education and knowledge). This ignores some lengthy gestation periods. For example, the currently popular "sustainable livelihoods approach" was first outlined in the 1980s but only since 2000 entered the mainstream of rural development theory and practice. Inevitably, there have been inflated claims about "new" approaches without adequate recognition of antecedents, an unfortunately all too common omission in the interstices of disciplines and in international agencies. Although there have been several key foci as well as several main points of change during those six decades, the small farm has remained the focus from the 1960s (Ruddle 2007b).

In the 1980s and 1990s the national policies, or top-down approach based on external technologies, switched to the bottom up, or grass-roots approach, enabling empowered rural populations to participate in or control their own development. Increased exposure to realities of poorer rural areas led to new approaches, the more important of which were farming systems and participatory research, the use of local knowledge, and gender issues. Disenchantment also played a role; big government had disappointed, so international donors sought different national partners. At the same time structural readjustment and market liberalization caused governments to withdraw from large-scale agricultural and rural development, and grand theories gave way to an emphasis on the uniqueness of local areas. Thus NGOs became the new partners for donors as 'non-state actors' (Ruddle 2007b).

But rural development has always been much broader than just a concern with small-scale farmers, infrastructure development and economic growth. Implicit have been concerns with health, education, participation in the political process, poverty reduction, and the protection of vulnerable groups. The poverty agenda articulated by the World Bank in 2000 (World Bank 2000) re-focused rural development activities on "opportunity" (basically growth and better marketing access to the poor), "empowerment" (basically making state institutions more responsive to the poor and enhancing the social capital of poor people via democratic, decentralized and participatory approaches to governance), and "security" (managing risk and reducing vulnerability).

Poverty and environmental destruction were the two critical global problems discussed at the 1992 "World Conference on Development and Environment", the so-called "Rio Summit". The resultant *Agenda 21* was adopted as the master plan to address them. But, as noted a decade later in Johannesburg by the 2002 "World Summit on Sustainable Development" (WSSD), the gravest trends had still not been reversed. Indeed, during the intervening decade challenges had been met with only half-hearted responses, and world councils had failed to design and implement a management and governance system for sustainability. So the "Plan of Implementation" was adopted.

The objectives for fisheries set out in the Plan were, by 2012, to eliminate destructive fishing practices, establish marine protected areas (MPAs), implement proper coastal land use and watershed planning, and integrate marine and coastal areas management into key sectors. This was to be achieved using diverse approaches and tools, including the Ecosystem Approach. The general approaches to be adopted to change unsustainable patterns of consumption and production would include measures that protect indigenous resource

management systems and support the contribution of all appropriate stakeholders in rural planning and development; that recognize the rights of local and indigenous communities who are holders of traditional knowledge, innovations and practices; that promote the effective participation of local communities in decision and policy-making concerning the use of their traditional knowledge; and that improve collaboration between natural and social scientists, and between scientists and policy makers.

1.1 The question of differing perceptions

Fisheries management in industrialized countries is mostly top-down, centralized, science-based and bureaucratic, and, like most natural resource and environmental management, states exercise special claims to control common pool resources. This model has mostly been conceived of as a failure, as evidenced by the collapse of fisheries under this management approach, and replaced by models based on decentralization and approaches that emphasize participatory management and co-management. But there are formidable stumbling blocks inherent in this model, too.

The question of perceptions must be paramount in any evaluation of the co-management approach. There are normally three main actors involved in fisheries co-management projects; national governments, donors and user communities (Hara 2000). They mostly have different perceptions of the benefits, basis and hidden agendas in the co-management process, such that conflict is inevitable, thereby undermining the undertaking from the outset. Among the most pernicious of all these differing perceptions is that national governments and donors commonly assume that user communities are not organized, and that existing local institutions based on traditional systems and custom law are not suitable for use in a new management regime. As a consequence, it is usually assumed that the national government must organize and mobilize the community to participate effectively in the new management regime. Usually, the new institutions are created by government facilitators employing Western democratic principles and process.

Given the likely different perceptions of the three main actors, at the outset of any analysis of national co-management projects it is fundamental to understand why they have been proposed, and how and by whom they are implemented, as well as the intended objectives of the different actors. Were this to be done, it is not unlikely that it will be realized eventually that what national governments should be doing is not proposing a 'new' management system at all, but strengthening the effective elements of existing local systems with recognition, support and some new tools.

For example, national governments will most likely see co-management as a strategy to arrest over-exploitation of capture fisheries. Apart from mere lip service in application documents, social objectives will probably always remain secondary, at best. In other words, governments will see co-management as an alternative strategy, acceptable to donors, for controlling fishers, and they will reformulate existing technical regulations, like mesh size, closed seasons and area restrictions, to suit both government control requirements and donor acceptability. Neither content nor structure of the regulations, nor their monitoring and enforcement, if any, would be significantly changed. Similarly, democratic and transparent arrangements for the participation and support for the new management system from the fishers would be written into the documents, largely without an intention to ever implement them (Hara 2000).

The perceptions of donors have different roots. In large part they arose from the well-developed participation of the general public in both environmental debates and grassroots

democracy in many Western societies, particularly in North America and Western Europe. Since the early-1990s this tradition has become an integral part of all donor conditions for development assistance. Donor perceptions were also impelled by the structural adjustments of the World Bank and the greatly reduced role of state authorities spelled out in them. Donors naturally seek to get the best result for their money. Implicit in the World Bank thinking was that local actors and institutions, acting out of self-interest, would display a greater sense of responsibility for local sustainable development and resource management than would centralized state institutions. Also involved in this were notions of “empowerment” and the enfranchisement of formerly marginal populations, and gender equality. Whereas these social motives were reasonably well thought out by donors, few national governments and user communities seem to have grasped their implications. Whether converts, or more likely not, government officials have had no choice but to accept donor requirements in order to gain much needed cash infusions for their otherwise resource-limited departments (Hara 2000).

Local users are at best skeptical of formerly autocratic government officials now saying that users must become participatory decision-makers in the management process; as their first lesson in democracy they are given no choice, but compelled to participate in democratic institutions, whether they like it or not! The irony is not lost on local fishing communities, who can quickly see from this that nothing is going to change, despite the fine words. However, the irony may well be lost on donors, NGOs and many Western academics.

Common sense would suggest that the principal interest of fishers is not in the type of management system under which they operate, so much as an improved household and community economic situation, and general social well-being. Although there is much theory, there is little practical evidence that co-management would contribute to this any more than the failed management regimes it is advocated to replace. It probably would not, since the principal general economic issue in fishing communities is not the condition of fishery but of the narrow economic base of rural fishing communities and all other rural communities. The principal goal of management should surely be the widening of the general economic base and job opportunities, which would go a long way to solving problems in both fisheries and the rural area in general.

An additional problem is that in the design of co-management projects little thought has been generally given to other major problems in the governance of many non-Western societies. For example, writing 30 years ago, but still as relevant now as at that time, Rondinelli and Ruddle (1978) identified local administrative capacity as a critical weakness at the local level that severely constrained the success of development projects, and that the shortage of skilled manpower to plan, manage and operate projects is a major bottleneck to implementing development strategy. They observed, too, that planning is often unnecessarily over-sophisticated, aimed more at satisfying the methodological rigor of scholars or the requirements of international funding agencies than at meeting the needs of national and local decision-makers for useful information and recommendations for action. Overly sophisticated or needlessly exacting procedures can hinder rather than facilitate decision-making. Effective planning must be appropriately tailored to the constraints in rural areas. Planning techniques must be simple, appropriate to local conditions and needs, and directly related to programming decisions. Simple procedures and usable techniques do assist policy-makers and administrators in analyzing their problems, but that the temptation to introduce ever more complex requirements and measures, more elaborate models and more sophisticated analytical tools in many cases simply paralyze activity and overwhelm the communities involved.

Overcoming the weaknesses that constrain the ability of communities to manage themselves and their resource endowment in an integrated manner is a key to local development; not some elaborate plan devised from afar. Unfortunately, many of the Western-designed projects simply take too long, their design is too elaborate, they involve too many actors and levels, and there is far too much scope for sabotage. In contrast, many of the earlier studies on non-Western management systems (e.g., Johannes 1977, 1978, 1981, 1982) proposed using pre-existing local systems for a modern purpose in precisely those locations (e.g., Samoa, Vanuatu and Solomon Islands) where traditional systems remained either still functional or well remembered, as had been done effectively long ago in Japan (Ruddle 1987). Unfortunately, others, in the service of donors, latched onto these concepts and devised convoluted schemes to have “locals” in many diverse parts of the tropical world want what they needed, whether they realized it or not. That was a serious misapplication of ideas.

1.2 The temperate latitudes bias

Approaches to nearshore fisheries development in the tropics have long been characterized by a Western scientific bias exacerbated by a lack of interest in or understanding of local management systems, and an unwillingness to try alternatives. As a consequence of development assistance, in the tropics, as in temperate latitudes, conservation of fish stocks became the main goal of transplanted Western fisheries management models, with fisheries policy and management based on a conventional bioeconomic model consisting of a biological component and an economic component.¹

However, the most pernicious impacts of this conventional and long-applied Western model derive from the assumption of the lack of prior local institutional arrangements among fishers to govern a fishery, and that fisheries are unregulated by local collective action. The bioeconomic management model argues that to manage stock externalities institutional arrangements must be imposed on local fishing communities by some external level of government. Such schemes are based on the assumption that the institutional context of the fishery is one of open access. *This is simply not true for vast tracts of the world's nearshore waters.*

The fisheries biologists and social scientists who advise them often have only limited or sometimes no experience in the tropical milieu. Further, there is an extremely negative connotation to the term “tropics” among fisheries scientists based in the temperate latitudes. In a concise and insightful essay, inspired by a peer review that he received, and which in its entirety read “Rubbish, may apply in the tropics—but not here”, Pauly (1994) summarized the prevailing attitude. Not surprisingly fisheries biologists and social scientists commonly fail to appreciate differences between the temperate zone industrial fisheries, with which they are familiar from their own training and research experience, and tropical nearshore fisheries. This means that erroneous interpretations are passed to those who fund and make development policies and programs. This is exacerbated because local scientists educated in the West and increasingly isolated from their own rural communities have largely adopted the same attitudes: “colonial bodies are being replaced, but scientific colonialism lingers” (Johannes 2003:119), so much so that university-educated local fisheries researchers do not even imagine the value of their elders’ knowledge. In general,

¹ The former is usually the familiar Schaefer parabolic function representing the population dynamics of a fish stock. Based on this production function, optimal levels to maximize either production (MSY) or income (MEY) are established.

none of the following principal characteristics of tropical nearshore fisheries and their importance for management are appreciated (Ruddle 1994d).

1.2.1 Fishing limited geographically to nearshore areas

Not uncommonly, an areal limitation is set on fishing activities because craft are small and often unmotorized, fish cannot usually be kept fresh, and neighboring areas might be off-limits owing to exclusive rights systems. Therefore opportunities for increased catches are limited.

1.2.2 Fishing areas defined socially

In many tropical areas marine tenure with associated rights limiting entry has been customary for centuries, with traditional fisheries management based to a large degree on such qualitative controls as limited access, closed seasons, areas and species, and a range of behavioral prohibitions which limited fishing pressure (Johannes 1978, 1982; Johannes and Hickey 2004; Hickey 2006, Hickey 2007). In contrast, an all too common and incorrect generalization is that the problem with fisheries lies in their open access nature. Further, tropical nearshore fishers may possess a profound local knowledge of their tenured waters that is put to use to increase catches and to manage resources (Johannes 1981).

1.2.3 Fishing communities are numerous and dispersed geographically

Because they are often isolated in remote rural regions, with numerous fishing communities and landing sites and complex distribution channels, these fisheries are difficult and expensive to develop and manage through Western scientific models that require extensive data collection, including catch and effort.

1.2.4 Biological and technical complexity

Compared with temperate areas, nearshore fisheries in the tropics are typically far more numerous in terms of per unit of fish catch or areas fished, numbers of fish species and gear types. This makes for levels of complexity unfamiliar to temperate region scientists and planners, who typically deal with single-species fisheries.

1.2.5 Employment options are limited and alternative jobs are scarce

Cultural factors, like caste systems, limit or preclude occupational mobility and limit employment alternatives, as do a lack of education and access to basic information. In many parts of the world, a redistribution of wealth through social inter-dependence and traditional credit systems is the norm. That may also bind fishers to their communities and occupation, as does the "ethos of the fisher" and a sense of sub-cultural identity. Further, the opportunity cost of labor is zero or close to zero, and there often exist strong barriers to exit from the fisheries sector. Labor costs are low but capital high, and these are often complexly interrelated. For example, crew sizes may be determined more by the social imperative to share limited economic opportunities and benefits than by work load. Such relationships can be devastated by the introduction of capital-intensive techniques, which heighten inequity and lead to conflict among segments of the overall fisheries sector and

within communities. In contrast, management that regulates capital equipment would give priority to preserving traditional employment patterns and concepts of social equity and sharing.

1.2.6 Discount rates and future returns also militate against conventional development

Small-scale fishers have a limited ability to reduce present catches in anticipation of future higher yields. Such behavior always has associated costs. These may be as extreme as hunger or even starvation in impoverished communities. Thus whereas dynamiting and poison-fishing are destructive of fish habitats, and so reduce or eliminate future harvests, they will still be practised if the only alternative is hunger. High discount rates therefore make effective fisheries management based on conventional concepts virtually impossible. They also illustrate the futility of planning for the fisheries sector alone, without consideration of job creation in other economic sectors.

1.2.7 Geographical and social territoriality is widespread

In addition to its positive aspects, this limits the mobility of small-scale fishers geographically and socially, and prevents access to fishing communities by outsiders.

1.2.8 Economic rent extraction

The factors noted above combine to create market imperfections such that nearshore fishers in many tropical regions receive less than the free-market price for their catch, yet pay excessively for inputs and usuriously for loans. These are the principal ways in which rents are extracted. They are also extracted by the requirement to share catches in small, traditional communities and among kin, as well as by other customary practises, such as ritual performance and donation. With commercially valuable export products, governments can extract rents by paying fishers less than the market price, and then selling higher on the export market, or simply by imposing export taxes.

1.2.9 Conflict

Conflict results primarily from the multi-species nature of the fisheries. There are basically two causes, gear externalities and target conflict, where the prime target species of one group of fishers is the incidental catch of another.

Many of those difficulties could be easily overcome were it not for the persistence of prejudice and lack of integration of knowledge that are perhaps the major and most persistent handicaps for the development of nearshore tropical fisheries. The crux of the issue is that “natural scientists have routinely overlooked the practical knowledge possessed by artisans It is one manifestation of the elitism and ethnocentrism that runs deep in much of the Western scientific community” (Johannes 1981: x). This elitist bias virtually deifies objective Western science and regards other knowledge systems as illegitimate, and those who challenge conventional theories and formal models are belittled. Such deeply embedded attitudes inhibit unconventional projects and research, and innovation is dissuaded when only empirical, quantitative methodologies are acceptable. This results in a standardized technological transfer being promoted by the structure of research institutions and professions. Similarly, deeply held stereotypes and mistrust

long-inhibited both understanding and practical application of women's knowledge of resources and environments. Such attitudes, formed in pre-colonial days and reinforced by male-dominated colonial research institutions and extension services, have been perpetuated in the successor independent nations. Further constraints on cooperative research and practice are that local scientists are undervalued relative to expatriates; that there is a lack of mutual understanding and respect between 'hard' fisheries scientists and 'soft' social scientists; and that 'hard' scientists usually define research projects narrowly. Donors who fund research and projects commonly trust their funds only to expatriate scientists doing 'hard' science.

Hara (2000) crystallized the issues admirably when he observed that professional pride coupled with a profound sense of insecurity seem also to be important factors in accounting for a lack of genuine reforms on the part of government. In general, biological scientists are likely to feel threatened in terms of loss of jobs and influence as a result of the increasing realization by most government agencies of the need to employ social scientists, who are more suited to the new approach as part of a multi-disciplinary team.

2 Western development models and approaches

In this section we examine briefly Adaptive Management, The Ecosystem Approach, Local Knowledge, and Protected Areas from the perspectives of Western models and pre-existing Pacific Island systems as alternative models. These four topics are central to the current focus on ecosystem management.

2.1 Adaptive Management

Adaptive Management explicitly acknowledges uncertainties and knowledge gaps about the response of a system to management actions (Lee 1993). It is an iterative process which aims to improve the rate of learning about the management of complex systems to reduce uncertainty. Managers, scientists and other stakeholders work together to identify those indicators (quantitative measures of the state of the system that help select among management alternatives), management actions or policies that will affect the system, and the ecological processes that link actions to changes in the indicators. Simulation models or other tools are used to examine trade-offs among alternative approaches. The main uncertainties and knowledge gaps are identified and prioritized based on how reducing these uncertainties will help in the trade-off analysis. Typically, management experiments are implemented at an operational scale, and are designed to test hypotheses or qualitative relationships between management actions and changes in indicators. Indicators are monitored, and based on the new knowledge acquired, changes are made or not in the management plan.

Adaptive Management is important because of the inherent uncertainty or risk involved in any attempt to manage natural resources and the environment, and because scientific knowledge of ecosystem functions is usually not enough to provide unequivocal answers to management problems. Uncertainty is usually ignored and management proceeds on the assumption that its impact on ecosystems and resources is certain. Because this is often not the case, management policy can itself cause environmental degradation, the loss of ecological goods and services, and economic and social instability (Walters 1986; Walters and Holling 1990).

Adaptive Management is a "learning by doing" approach that, as has been stressed repeatedly (Holling 1978; Walters 1986), should begin with a concerted effort to integrate existing interdisciplinary experience and scientific information into dynamic models that attempt to make predictions about the impacts of alternative policies. This is done to clarify problems by enhancing communication among all actors, screening to weed out unrealistic policy options, and identifying key knowledge gaps.

Since it is impossible to manage most marine fisheries to achieve optimum yields, the only practical option is to adopt a precautionary approach that aims to protect resources from serious depletion. Because manpower and funds are not available to produce scientific data for each managed fishery, Johannes (1998) argued that it is necessary to go beyond precautionary management to data-less management. He made "back-of-the-envelope" calculations to demonstrate that, in countries like Indonesia, underwater censuses using transect surveys would be infeasible, and that Rapid Rural Appraisal of fishing villages would be even less realistic. The recourse would be to use data-less management, which, of course, is the universal traditional system of management employed for centuries by indigenous fishers all over the world.

The Adaptive Management approach is eminently suited for application in nearshore tropical fisheries management and development. For the Pacific Island states, Johannes (1998) emphasized that research in support of village-based management is also urgently required. Such research requires the interactive and pragmatic testing of various management strategies on the fishing grounds, based on the fishers' ideas. Subsequent management decisions are then based on the outcomes of those tests. In other words, this is an old trial-and-error management research approach. Ideally it should be complemented by the scientific hypothesis-testing approach to research, but realistically, given time and financial constraints, it will probably replace it. Seriously declining fisheries require immediate action, an idea guaranteed to make conventional fisheries biologists hesitant without the huge quantities of data they require to fine tune management. There has very been little experimental management research, although there are excellent opportunities for it throughout the Pacific, where village tenured waters are available. The research design could be simple "before-closure-and-after" surveys, since many of the experiments now being performed by villagers are suitable for this, particularly in Samoa, Fiji, Vanuatu, and Solomon Islands (Johannes 1998).

For example, in many villages of those countries traditional leaders are increasingly introducing marine resource management measures within their tenured waters to address overfishing (Johannes and Hickey 2004; Hickey 2006, 2007). These measures include species-specific closures (especially for high value and 'charismatic' species, like trochus, green snail, bêche-de-mer, giant clams, and turtles), gear restrictions (especially introduced gear like nets and use of spearguns at night), as well as complete fishing ground closures, including long term closures. In many villages species specific closures may last for some 3 or 4 years, to allow stocks to recover. Area closures may also last many years before harvesting again resumes, depending on observed stock recovery trends as well as the social and economic needs of nearby villages. This system has been maintaining the biodiversity of the Pacific islands for centuries, and is essentially Adaptive Management in process as new gear types and fisheries (for example, the Aquarium Trade or Live Reef Fish Trade) are introduced, and new measures established to manage them. Social and economic considerations in management remain paramount in this model because people depend intimately on resources for sustenance, and increasingly for cash needs. Commercial pressure is balanced by the number of species available (including deepwater and pelagic species, in addition to those from the nearshore) as well as the economic potential

on land, including agriculture and tourism. Tourism is an increasingly larger incentive to manage resources well, to increase revenue from eco-tourists interested in diving and snorkeling, while diversifying sources of income.

Adaptive Management as it is being applied to nearshore fisheries in many Pacific Islands also responds well to cooperative management/data-less management through awareness regarding resource growth rates and lifecycle that are introduced to help fine tune management needs. Fishers monitor resources qualitatively to measure changes in resource levels, and adapt their harvesting and management regimes accordingly.

2.2 The Ecosystem Approach

The approach was adopted in 2000 by the *Convention on Biological Diversity* (CBD 2000). Despite puffery, there is nothing new or startling about the “Ecosystem Approach”. It is not a prescription for unified action, but an outline of an interdisciplinary methodology for environmental research, planning and management. In fact, its basic ideas are inherent in most pre-existing or traditional systems of management that acknowledge ecological relationships.

One need look no further than various places in the South Pacific region, where the “Ecosystem Approach” was expressed traditionally in the concept of “corporate estate”, a territory held jointly by a kinship-based group to whom it both provided a collection of rights and imposed duties. On high islands in the Pacific, “estates” are usually wedge-shaped, extending from a central watershed along lateral ridges into inshore marine waters. These are or were self-contained units that include a complete set of the resource areas and habitats required to provision the society which inhabited them. It remains a widespread integrated management strategy, and, as Ruddle (1994c) noted, examples include the Hawaiian *ahupua’a* (Meller and Horowitz 1987), the Yap *tabinau* (Lingenfelter 1975; Schneider 1984), the Fijian *vanua* (Ravuvu 1983), the Marovo (Solomon Islands) *puava* (Hviding 1990, 1996), the Cook Islands *tapere* (Crocombe 1967), and the estate of the Yolngu aboriginals of North Australia (Davis 1985). Examples also occur in Africa and other areas (Manshard 1974; Ruthenburg 1976).

The Ecosystem Approach is a strategy for promoting the integrated management of environments and natural resources to ensure their conservation and sustainable use in an equitable way. It focuses on the biological organization, structure, processes, functions of and interactions among organisms and their environment, and recognizes that humans, with their cultural diversity, are an integral component of ecosystems. It demands Adaptive Management to deal with the complex and dynamic nature of ecosystems in the absence of complete knowledge or understanding of their functioning. Because there is no one “correct” way to implement the Ecosystem Approach, which depends on local, provincial, national, regional or global conditions, it seeks to integrate various approaches and methodologies (e.g. biosphere reserves, protected areas, and single-species conservation programs among others), and not replace them (CBD 2000).

The main points proposed for implementation of the Ecosystems Approach are to (1) enhance benefit-sharing, especially for local stakeholders responsible for their production and management; (2) use Adaptive Management practices; (3) manage at an appropriate scale and decentralize to the lowest possible level with stakeholders empowered and supported by enabling policy and legislation linked in a co-management framework by appropriate institutions of governance to make resource and environmental management decisions and resolve conflict; (4) promote inter-sectoral co-operation because the

management of natural resources, according to the Ecosystem Approach, calls for increased inter-sectoral communication and co-operation at all levels from local communities through to the central government, within and among geographical regions; and (5) integrate local knowledge as a major source of management information (CBD 2000).

However, there are important limitations to the Ecosystems Approach. First, it is a political and societal concept rather than one solely grounded in science, as is readily apparent in the problems of defining the Ecosystem Approach itself, and by a lack of definition and facile use of terms like “ecosystem health” or “ecosystem integrity”, which mostly lack substance as used. Second, although concrete rules for action are required, universal rules cannot be provided because there is no single correct way to achieve an Ecosystem Approach to management, and the underlying principles can be translated flexibly to address management issues in different cultures, societies and environmental context. Thus the Ecosystem Approach is not a set of guidelines for ecosystem management, but a comprehensive framework for ecologically informed decision-making that places people at the centre of environmental and resources management. Third, a major weakness is that “societal choice” and “decentralization” implies a degree of democracy that is not always present in many societies. Further, it requires an appropriate balance in management between conservation and use of resources. While laudable, implementation depends entirely on national policy choices regarding poverty alleviation and national development, and the resiliency of various vested interests, as well as on the cultural perceptions governing environments and resources. Finally, a significant constraint on adopting an Ecosystem Approach is the weakness of the different concepts being applied by international agencies. Some have apparently failed to realize that ecosystems themselves cannot be managed, and that management can be applied only to human activities.

What seems nowhere to have been appreciated is that adoption of the ecosystem management concept is a major paradigm shift that would demand a fundamental change of the Western-style fisheries management institutions (Ruddle 2007b). Although still not fully thought out as either a concept or in operational definition, the Ecosystem Approach requires the phasing out of sectoral policies for the marine environment and resources. Fisheries management would become part of a broader ecosystem management strategy with new and longer term time horizons, and so would cease to be based on a sectoral policy. Present organizational structures and the institutional inertia behind them would be unlikely to cope with such changes. Fisheries co-management would also either fall by the wayside or be incorporated into the new paradigm.

2.2.1 Pre-existing systems as alternative Ecosystem Approaches

Resource enhancement and habitat protection are two inter-related management functions, since stock enhancement is pointless if the habitat(s) on which it depends cannot simultaneously be protected. This brings fishing communities into a relationship with upstream and in situ users of other resources, with the impacts that those resource uses have on the aquatic environments on which stocks depend. Other such resource uses include, inter alia, industrial fisheries, agriculture and forestry. It also raises the issue of property rights.

Rural economies in the tropics have never been just about farming. It is noteworthy that throughout most of the Pacific Island nations a non-specialized approach that included farming, fishing and exchange systems was traditionally adopted in order to spread the risk resulting from various threats. The production activities of most tropical rural households consist of several complementary economic activities that as a whole provide a balance of

subsistence goods and a spreading of risk. These may be closely linked, as in traditional integrated farming systems, that combine cropping with animal husbandry and aquaculture or ricefield fisheries (Ruddle 1991; Ruddle and Zhong 1988). This means that pre-existing or traditional Adaptive Management, as expressed in the “Estate Concept” and other social arrangements, can be interpreted as a logical attempt to spread risk in an uncertain environment with limited resources. This idea has now been re-packaged by Western donors and academics as the “Livelihoods Approach”.

In addition, a fragmented view of traditional household economic activities is grossly misleading because individual rural households rarely function without reference to others in the community. Typically, a high degree of interaction exists, and household economics is dominated by tradition, kinship and the community wide needs for security and survival. In the long run, household welfare depends on that of other households and on such relationships as mutual assistance, welfare and patronage.

The Ecosystems Approach would address those issues. But as elaborated so far it has several basic weaknesses, which probably will not be overcome before the global environmental situation has deteriorated even further. As was noted above, these are that: (1) it is a political and societal concept rather than one grounded in science; (2) concrete rules for action were not spelled out; and (3) implementation would require an unrealistic degree of Western-style democracy for many societies.

Since it was agreed by those who formulated this approach that universal concrete rules for action were impossible to establish because there are various ways to achieve an Ecosystem Approach to management, and that its basic principles need adapting to different cultures, societies and environmental contexts, it would make eminent good sense to examine the alternative approaches to be found in many pre-existing ecosystem management systems in many different tropical areas. This would also overcome the problematical issue of “societal choice” and “decentralization” and, more importantly, slice the knot of the different concepts being applied by international agencies, some of which seem almost jubilant with their “discovery” that ecosystems include humans and all their untidy social and cultural bag and baggage!

Western social scientists have expended major efforts on understanding the nature of property rights, and their various arguments are now so familiar as not to merit recapitulation here. Nevertheless, it came as a major surprise for them to learn that other societies have ancient and highly sophisticated but totally different kinds of property rights and associated rules, such as those in the Pacific Islands. A large body of literature examined the potential modern role of traditional systems of community self-management for fisheries and coastal zone resources, especially in the Pacific Islands (for example, Johannes 1977, 1978, 1982; Ruddle 1989, 1994c, 1998a; Ruddle et al. 1992), and a renaissance of systems in the same region has recently been documented (Johannes 2002; Johannes and Hickey 2004).

One advantage of such property rights systems is that for small-scale fishers risk and uncertainty about resources and social organization is reduced. Risk and ill-affordable wasted effort is greatly reduced because fishing behavior is predicated on local knowledge of resources; socially, risk is reduced because cooperation and reciprocity, among other values, are emphasized and reinforced, as is long-term resource sustainability; and risk is reduced by protection of the resource through the exclusion of outsiders (Ruddle 1989).

Were that commonsensical route taken the devising of an Operational Guidance of the Ecosystems Approach would become moot. Benefit-sharing, management practices, appropriate scale and decentralization, inter-sectoral co-operation and the integration of

local knowledge as a major source of management information would all become issues decided locally, as appropriate.

2.3 The local knowledge approach

A coalescence of biological, physical and social science concepts is already lurking beneath the surface within Western societies. But steadfastly held prejudices remain powerful. Similarly, at least in cultures with a Western liberal tradition, revisionist approaches have been exploring the common ground among disciplines and cultures. And more than lip-service is finally being paid to alternative systems of knowledge. As a consequence, the denigration of alternative knowledge systems as backward, inefficient, inferior, and founded on myth and ignorance has begun to change, having been confronted with evidence that they often have rational bases and are supported by scientific scrutiny. Many such practises are a logical, sophisticated and often still-evolving adaptation to risk, based on generations of empirical experience and arranged according to principles, philosophies and institutions that are radically different from those prevailing in Western scientific circles, and hence all-but incomprehensible to them. Four basic characteristics are also increasingly recognized regarding different systems of knowledge/science often held by traditional societies: (1) different knowledge about similar things, (2) knowledge of different things, (3) different ways of organizing knowledge, and (4) different ways of preserving and transmitting knowledge (Ruddle 2000).

The whole idea of what constitutes useful knowledge for the purposes under discussion here requires enlargement. Indispensable components include local knowledge, gender-based knowledge, and inter-generational and adaptive knowledge, among others.

2.3.1 *Local knowledge*

Empirically-based and practically-oriented local knowledge of the environment and resources used is fundamental to sustainable resource management. Among nearshore fishers in coastal-marine societies, for example, most such knowledge combines empirical information on fish behavior, marine physical environments and fish habitats, and the interactions among the components of ecosystems, into generally complex fish taxonomies to ensure regular catches and, often, longterm resource sustainment. Since it has sustained many societies for many centuries in the Pacific Islands, it can be reasonably assumed that local knowledge is therefore an important cultural resource that guides and sustains the operation of customary management systems: the sets of rules that comprise a fisheries management system derive directly from local knowledge and concepts of the resources on which the fishery is based (Ruddle 2000).

Local knowledge can also be important in development. Yet, it is fallacious to argue that by itself local knowledge could provide a vehicle for developing system indicators of value to adaptive management, let alone planning entire nearshore fisheries management and development schemes. Given the widespread changes in belief systems, commercial activity, introduced gear types and population growth, local knowledge must be evaluated and blended together with scientific knowledge to assist with the adaptation of management systems. In any location there are likely to be several sources of knowledge of use to management, but that the strength, importance, value and relevance of these will co-vary, depending on the purpose for which it is to be used and the role and vested interest of the stake- or knowledge-holders in a given area.

In this context Wilson et al. (2006) reported briefly on the KNOWFISH project, the main object of which was to evaluate the potential use of fishers' local ecological and ecological knowledge for fisheries management. Despite some acknowledged possible methodological limitations, it was concluded that local ecological knowledge "...had a critical role to play in making management effective from the perspective of both content and timeliness of information and increased legitimacy and cooperation" (Wilson et al. 2006: 800).

However, the manner in which some students of local knowledge (including the various near-synonymous terms used), have distorted it is detrimental, and hampers its potential usefulness. In particular there has been considerable intellectual dishonesty and uncritical acceptance of indigenous knowledge. This was clearly noted by Robert E. Johannes, a tireless advocate of its use in Pacific Island and other tropical nearshore fisheries, who observed with respect to the acceptance and romanticization of traditional ecological knowledge (TEK) that "(s)ome claims about the environmental wisdom of traditional peoples have been so overblown that they have provoked a backlash" (Johannes 1994: 87). In particular, he excoriated environmental and social activists who quickly recognized the powerful rhetorical tool that the concept of traditional resource management and TEK researchers provide, but then often selectively use only those facts that accord with their case. An example is the conflating of an imputed sacredness with profound ecological wisdom (e.g., Durning 1992; Suzuki and Knudtson 1992; Berkes 1999). Although nature and religion might be more intimately intertwined in a traditional culture than in Western societies, environmental activists and some scholars have not shrunk from the "convenient but tenuous extrapolation from this by routinely referring to TEK and indigenous attitudes towards nature as 'sacred'", or by employing such phrases and terms as 'sacredness of ecological systems' or 'sacred ecology' of indigenous peoples (Johannes 2003: 120). This is regrettable, for "because of such ploys, the notion of indigenous peoples as environmental paragons living in preternatural harmony with nature has metastasized through the media, and indigenous peoples are now often presented to us as environmentalist role models" (Johannes 2003: 120).

2.3.2 Gendered knowledge

Knowledge is "gendered" because men and women usually have different and often complementary economically productive roles, different resource bases, and face different sets of social constraints (Ruddle 2000). Thus some local fisheries knowledge, particularly for the nearshore reef, for example, is largely exclusive to the female domain. If this is not comprehended and integrated into general local knowledge, then understanding of fisheries management systems will be seriously deficient. Both consideration of logical structures of total systems of local knowledge and an awareness of gender and age roles in rural society makes it self-evident that gender considerations are important in understanding local knowledge in fishing communities.

2.3.3 Inter-generational and adaptive knowledge

Complex and often encyclopaedic bodies of local knowledge have evolved through generations. A local knowledge system might be "traditional" by virtue of its long and deep roots and origin in a specific culture and a local ecological system, but it is not static. Such continuity is a fundamental characteristic of any traditional system, as is its flexibility. In most societies tradition is still usually unwritten and based not only on what each

generation learns from the elders, but also on what it adds to that knowledge. “Modern” influences do not necessarily make contemporary local knowledge less “traditional”, since they are incorporated into a framework of existing knowledge. Inevitably some of the past generations’ knowledge is replaced through the present’s experience, but the knowledge core generally remains intact (exceptions to this often relate to massive depopulation upon European contact). This core derives from the observations and experiences of generations of resource users working in environments with which they are intimately familiar. By virtue of both this continuity and flexibility, contemporary knowledge of the coastal-marine environment retains its local character. Contact with the greater society beyond a small community generally results in the hybridizing of local knowledge with extra-local elements (Ruddle 2000).

2.4 Donor-driven Protected Areas as a global panacea

A seemingly single-minded and universal drive to create Protected Areas (PAs) to conserve natural resources and biodiversity emerged from the Convention on Biological Diversity (CBD 1992), the World Summit on Sustainable Development (UNDESA 2002) and the World Parks Congress (IUCN and UMG 2004). Establishment targets ranging from 10 to 30% of national areas have been promoted. High levels of Global Environment Fund (GEF) support and funding by major foundations fuelled enthusiasm, and large, multi-national NGOs (termed “Bingos” by some indigenous groups) emerged as implementation agencies. With nine-figure budgets, some well-intentioned Bingos launched a global campaign to expand the global network of PAs to protect biodiversity. As a consequence, the approximate global total of 1,000 PAs in the early-1960s has now increased to 108,000 that together cover some 30.5 million km², just slightly larger than the area of Africa, or a little in excess of 20% of the earth’s total land surface.

Increasingly, however, the PA model is seen as culturally and socially flawed (Christie 2004; Dowie 2005), and proliferation of the Western ideal of a ‘protected area’ seems foreign and counter-intuitive to indigenous peoples, who have been providing environmental stewardship and protection of these areas for centuries, if not millennia. This ‘protected area’ mentality is a manifestation of the Western outlook that people are no longer part of nature; worse that they have become so destructive as to threaten nature and biodiversity, and so can no longer be regarded as an integral part of the ecosystem and capable of sustainable stewardship. Ironically, in the interests of biodiversity protection, we now endeavor to lock indigenous people living in equilibrium with their environment out of vast areas, while much larger areas are subject to the effects of global warming, open cast mining, large-scale forest clearing, rapacious industrial overfishing, and a myriad of other destructive but immensely profitable anthropogenic activities.

An unpleasant consequence of these Western-style “no-take, no-go” protected areas is the estimated millions (Dowie 2005) of ‘conservation refugees’ forced off their ancestral lands to support the Western ideal of protecting nature *from* humans. Since they are now denied access to the natural resources that could sustain them, most such refugees end up marginalized in peri-urban shanty-towns, where they now confront “real poverty” that they often attempt to overcome by further degrading themselves. Yet, with now more than 12% of all land protected from its indigenous inhabitants, biodiversity continues to decrease on a daily basis and at an accelerating rate (Dowie 2005), an indication that the wrong prescription is being applied to the issue of biodiversity loss and sustainable resources management.

The goal in promoting biodiversity conservation should be to promote an overall sustainable approach to resource management and development, as has inherently been practiced traditionally by a great many societies, including those in the Pacific Islands Region. This would mean appreciating and incorporating the concepts and methods of indigenous people to sustainably manage resources using a balanced, holistic approach to resource utilization, not locking them out of their ancestral lands and marginalizing them.

For example, such strategies now promoted by Western science to manage marine resources as closed areas, species and seasons, limited access and gear restrictions have been practiced in the Pacific for centuries (Johannes 1978; Hickey 2006, 2007).² Only a decade ago in the Pacific Region increasing recognition and support for pre-existing or traditional marine resource management strategies and tenure systems and their underlying knowledge base had emerged from the work of Johannes (1978), Johannes and McFarlane (1991), Ruddle and Johannes (1985, 1990), Ruddle (1998b), Hviding (1990), and others. Indeed, this had resulted in a renaissance of pre-existing systems and modern management based on them was emerging widely, as in Vanuatu (Johannes and Hickey 2004; Hickey 2006, 2007), Samoa (Fa'asili and Kelokolo 1999), Fiji (Veitayaki 2001) and Cook Islands (Tiraa 2006), among other nations (Johannes 2002). Nevertheless today an increasingly single-minded Western strategy to create more MPAs in the Pacific overshadows support for the broad range of pre-existing resource management strategies available, primarily because of the seductive power of the relatively huge amount of money being expended. Although PAs are but one tool available, they consume the bulk of the funding to support resource management.

The process of establishing PAs in the Pacific is quite different from that in the Western countries that promulgate this approach, where privately owned land is the norm and the state effectively claims the foreshore and nearshore areas. In contrast, in the Pacific most land and nearshore areas are under customary tenure. This forms the foundation of resource management, where local groups restrict access to resources under their tenure and maintain stewardship over the resources and environment by drawing on their local knowledge of them, including local cycles of resource abundance, spawning and tidal cycles. In most countries, creating PAs therefore requires the complete agreement and cooperation of the local communities with which the tenure customarily and legally remains. This has given rise to the use throughout the Pacific of the term 'community-based MPAs'; surely somewhat rhetorical given that communities have been managing their own resources for millennia!

It is important to understand that MPA models originating in Western nations are also regarded locally as threatening among nearshore fishers who regard the unreasonable constraints on their behavior as threats to their livelihood (Bleakey 2004). Pacific communities are beginning to feel the brunt of the global targets to establish PAs that is now the predominant thrust of Western conservation efforts. Pacific Islanders have long relied directly on their resources both as a form of food security and local technology in the form of house, canoe and fishing gear construction, for farming technology, natural medicines,

² This information has elicited disbelief in some quarters, such as: "Johannes (1978) has made the *extraordinary* point that 'almost every basic conservation measure devised in the West was in use in the tropical Pacific centuries ago'" (emphasis added) (Charles 2001: 330). Were more temperate zone fisheries economists familiar with even the easily accessed reports (e.g., Ruddle 1995) and other general literature on the early exploratory voyages in the Pacific, they would realize that the sophistication of Pacific Islanders fisheries had been appreciated by Westerners centuries ago. It certainly was by mid-nineteenth century British and other colonial administrators, who had frequently to wrestle with the intricacies of pre-existing management systems.

as well as having strong cultural and social links with their environment. The sustainable use of resources for these purposes has been successful for centuries without significant losses to biodiversity.³

More recently, resources have been used on a small-scale to provide cash to pay school fees and medical expenses, as well as to purchase basic items like kerosene, soap and sugar. Such small-scale harvests pose a limited threat to global biodiversity relative to industrial country activities like clear-cut logging, urban sprawl, both general and highly concentrated pollution of air, soil and water, destructive industrial fishing methods and even nuclear weapons tests. But it is these industrial country activities that generate the huge profits unimaginable to most tropical communities, some of which, ironically and with a supreme arrogance, are used to fund conservation efforts in the tropics!

Worse is that small Pacific Island communities with a long history of sustainable resource use are now increasingly expected to sacrifice by allowing ever larger areas of their ancestral resource areas to become locked up in Western-style PAs to satisfy the Western concept of protecting biodiversity. This conundrum was expressed recently by a Melanesian delegate to a MPA forum, who pointedly asked “Conservation for whom and who is going to pay for it?”, in response to continuous pressure from Western conservation groups advocating the creation of more PAs to protect the rich biodiversity of his islands in response to global warming and other threats. But his people have been doing that for centuries, whereas the impacts generated by distant industrial countries that are the primary threat to this richness go unchecked. Small wonder that Pacific Islanders are increasingly dismayed by the persistent clamor that they bear the burdens of cleaning up the Westerners’ mess.

The approach of compensating communities for depriving them of their right to access resources has recently been adopted by some Bingos operating in the Pacific. When paid-off either with cash or infrastructure like roads or schools, some Pacific communities agree to accept PAs. But there are other serious problems with this approach. Only the main ones are mentioned here.

2.4.1 Conservation requires payment

Agreements usually have a time limit of about 10 years, because most island communities would be unwilling to suspend their birthright for longer. This then begs the question of sustainability, since communities have no obligations to maintain any form of management when an agreement lapses. Further, it also sets the bad precedent that conservation requires compensation payment, and efforts therefore might not continue in lean periods when a Bingo is unable to raise the funds to renew an agreement.

³ Bad environmental practices were also found in Pacific Islands, where constructive and destructive practices coexisted. Johannes (2003), for example, speculated on why Pacific Islanders developed sound methods of protecting marine resources when their record of exterminating avian species was so bad. He suggested that the answer to the second part was because it is easy for islanders to unwittingly exterminate birds and other island megafauna “because of their very low reproductive output”, together with the profound impact on ground-nesting birds of introduced predators such as dogs and rats (*Ibid.* 114). With the widespread destruction of nests by new predators, “extinctions of such creatures could have happened so fast that the islanders failed to comprehend the need for conservation until it was too late” (*Ibid.* 115). In fact, most extinctions of Remote Oceania occurred within the first 200–300 years of being colonized (Steadman 1995; Kirch 1997), with an ecological equilibrium reached thereafter through the introduction of appropriate management measures.

2.4.2 *Quantitative targets unrelated to actual protection*

Scant interest is paid to the quality of PAs. Rather, emphasis is placed on reaching global targets measured quantitatively. Worse is that since many PAs exist on paper only, the number created globally bears no relationship to actual biodiversity protection.

2.4.3 *External activities undermine the PA concept*

MPAs limit human activities within a specified marine area, but do not address external factors that may have a major deleterious impact within them. In the Asia-Pacific Region the main such external factors that must be accounted for in any MPA design are turbidity and sedimentation resulting from farming, forestry and infrastructural developments in adjacent watersheds and coastal areas; the spread of human settlements and the consequent household and human waste and industrial pollution; and both overfishing and destructive fishing practices. This polarized Western approach of allowing destructive developments and fisheries throughout large areas in the name of development and locking up smaller areas in MPAs is in extreme contrast to the balanced and integrated pre-existing resource management systems found throughout the Pacific Islands Region. It seems a travesty to promote this highly polarized approach to resource management from Western countries to other areas of the world.

2.4.4 *Unrealistic and measurable donor requirements*

Increasingly rigorous donor accounting requirements have been imposed on PA projects. Scientific monitoring of resources, measurable socio-economic benefits, other 'verifiable outputs' are demanded within the short project time frames and are now a standard part of project cycle matrices. Economic development is increasingly integral to the conservation formula, as small nations are prodded by international donors to join the cash economy and increase their GDPs. These donor-driven expectations put additional pressure on communities to fulfill unrealistic obligations, and further contribute to alienating the communities involved.

3 Conclusion

Understanding the problem clearly from his own personal and professional experiences, Pauly (1994) sought to contribute to building a bridge between colleagues in the tropics and temperate zones, as well as to demonstrating the important work had been done by local people in the tropics and of which other scientists were usually unaware. Similarly, we are neither advocating nor seeking a Manichean dichotomy.⁴ Rather, we are pleading for balance, for an end to destructive cultural arrogance (this is far from being an entirely Western fault, as some would assert), and for a greatly increased input of non-Western concepts and models in project design, together with a strong commitment to overcoming all prejudice and to employing or at least evaluating all available knowledge. The world is

⁴ Dualistic; referring specifically to an adherent of the dualistic religious system of Manes, a combination of Gnostic Christianity, Buddhism, Zoroastrianism, and various other elements, with a basic doctrine of a conflict between light and dark.

clearly now in such a parlous condition that we no longer have time to procrastinate and wait until time series data based on conventional research have accumulated.

It is important to interweave new components into time-tested management designs, to adapt the latter to the various conditions that have altered over time. Although it is almost a cliché to argue that development strategies should be based on a thorough understanding of existing conditions, emerging needs and local cultural traditions, this basic principal is often lost in the urgency to activate development plans and programs. But one of the enduring lessons of development experience is that the most pervasive and lasting changes can often be attained by using and transforming existing resources and by promoting institutional change by building on culturally embedded arrangements and practices. Community social and economic institutions, no matter how inadequate they may be for modernization, survive because they perform necessary functions. They are often adapted to cultural peculiarities and satisfy local needs. Understanding their operation is crucial to designing new organizations or strategies for community-centered resources management. The use of existing and culturally embedded arrangements can often be more effective and less costly than introducing new systems from scratch (Rondinelli and Ruddle 1978).

As have discussed, despite the laudable sentiments expressed in *Agenda 21*, which was adopted by the 1992 “World Conference on Development and Environment”, nothing was achieved, as noted by the 2002 “World Summit on Sustainable Development” (WSSD), which then adopted another resounding but platitudinous document, the “Plan of Implementation”. It would be surprising if anything concrete were to emerge from that by the target year of 2012. We therefore contend that there is an urgent and immediate need to devise a radically different approach to fisheries management which should accept:

- (1) that the underlying characteristics of nearshore fisheries in tropical countries are vastly different from those for which the conventional approaches were developed;
- (2) that the various Western approaches to managing fisheries have not been successful in tropical nearshore fisheries; and
- (3) that there exist in many tropical developing countries time-tested systems for managing marine resources that provide proven alternative approaches to management and which provide blue prints for the design of new systems, since they are already pre-adapted to the characteristics of tropical nearshore fisheries and cultural milieux.

We are well aware that (3) will be the least palatable statement to the various vested interests for whom defending and perpetuating the status quo would be a prime objective. Because of this, and since (1) and (2) have received gradual if grudging acceptance, we have focused here on the issue of pre-existing systems of resource management that can provide alternatives.

3.1 Two approaches: a simplified contrast

In any fishery, whether tropical nearshore or temperate industrial, there exist four actual or potential foci of problems that require management (Ruddle 1989; Ruddle 1998a). These are:

- (1) *The flow of the resource* (the continued, regular availability of harvestable fish);
- (2) *Stock externalities* (the economic and therefore social impacts of harvesting interactions among fishers);

- (3) *Technological (gear) externalities* (the mutual incompatibility of various gears on a fishing ground); and
- (4) *Allocation problems* (competition for access to resources distributed unevenly in space and time).

Whereas Western models of fisheries management focus on *fish stocks* and *stock externalities* and *assume an open access* resource regime, systems originating in use in many Pacific Island nations take a different approach to managing marine resources. They focus and base management on the three interrelated factors of *stock externalities*, *gear externalities* and *allocation problems*, and base implementation on *defined geographical areas* to which *access is controlled*.

Western fisheries management has focused on modelling the biological and physical flow of fish resources onto and through fishing grounds, and in implementation on attempting to manage the resultant stock externalities. In other words, it focuses on trying to manage what is *unknown*, and perhaps inherently unknowable, and thus *unmanageable*.

Indigenous Pacific Island management systems, in contrast, make no such attempt. Rather, they focus on the interaction among "stock externalities", "technological externalities" and "allocation problems", human problems which *are* inherently manageable. This implicitly accounts for the complex multi-species and multi-gear nature of the resource, thereby avoiding inherently irresolvable issues.

3.2 On knowledge and systems of knowledge

As a backlash to decades of denigration, there has been a tendency by some Western researchers to idealize, romanticize and attribute superior capacities to alternative traditions. This is unhelpful and misleading. Further, formerly well-adapted and effective knowledge quickly becomes inappropriate when external factors cause massive and rapid change in the local social, biological or physical environments.

Clearly, a rich and varied range of knowledge systems and intellectual traditions exists in coastal-marine societies. Equally clearly, the potential for applying them to coastal-marine resource management is substantial. Alternative systems of knowledge are of great potential value in the modern world, and are valid in their own right with the acceptance that there are "other ways of knowing". Provided with support, elements of these knowledge systems could be adapted to change, enabling them to provide an important information base for resources management, especially where conventionally-used data are usually scarce to non-existent. They could also provide a shortcut to pinpoint essential research needs. But first they must be systematically understood and organized, and then evaluated.

3.3 Rethinking the approach to Protected Areas

A realistic and sustainable approach to resource management as a whole, not just Protected Areas, is required in the Asia-Pacific Region, as elsewhere. This should be a broader more holistic approach that promotes overall and integrated sustainable resources management and which encompasses community socio-economic and cultural norms. In other words, it should become mandatory to positively consider and objectively evaluate all the other tools locally available to assist in stemming resource decline and for promoting the conservation of biodiversity. Merely establishing PAs to satisfy international convention targets is derisory. This is well-understood by local communities, and serves only to make their Western advocates look simple.

As a first step in the process, for example, overfishing and the use of destructive fishing practices and ecologically disruptive activities in adjacent uplands should be quickly assessed using data-less management approaches (Johannes 1998). Next, the wealth of tools found in pre-existing or traditional management approaches in the Pacific should be drawn on. That includes the use of local knowledge and a combination of closed seasons, species, gears and areas that are linked with resource abundance cycles, island cosmologies and socio-economic needs (Johannes and Hickey 2004; Hickey 2006; Hickey 2007). Using local knowledge in management regimes is known to empower communities with the use of their own knowledge while fostering a greater sense of ownership over resource management initiatives. Both result in greater sustainability.

An essential prerequisite for this is the need to appreciate and acknowledge that Pacific peoples continue to be integral to the island ecosystems, physically, culturally and spiritually, and that they will not continue to make sacrifices to establish large 'no-take, no-go' PAs if industrialized nations will not play their part in addressing the global threats to resources. Models like the 'no-take, no go' PA approach not only ignore the local cultural acceptance and value and efficacy of pre-existing management systems, but also are insensitive of the strong cultural links to resources, as well as the flexibility to absorb changing socio-economic conditions, as occurs in pre-existing or traditional systems.

3.4 Some caveats

There are risks that with the great reduction in the donor driven approaches we advocate here that local elites and others will naturally attempt to maximize the profit from development (not that the don't already, of course), by citing buzzwords and the rhetoric donors need to hear, and exploiting the naïveté and taboos of Western agents of development. As Johannes succinctly observed: "Observing the resonance of ... environmental rhetoric among Westerners, some indigenous people have adopted it. And this has brought the inevitable temptation to use it to influence the outcomes of resource management or development initiatives in favor of islanders. For example they may exaggerate the environmental significance of an area being considered for development to extract greater concessions from the government or developers" (Johannes 2003: 121).

Worse than mere naïveté is that with its own taboos Western social science is replete with intellectual dishonesty. In particular, Johannes condemned the taboo that "... prohibits many from acknowledging that there are traditional maladaptations in non-Western cultures.... (and) many anthropologists, for example, maintain the fiction that all cultural practices are beyond censure" Such naïveté has led to severe and perhaps unanticipated problems in Pacific Island nations, where "some island elites have been quick to exploit the cultural relativist stance.... Elites use this position not only to warn off outside critics but also to justify their exploitation to their own people. Serious environmental harm is being done in Oceania... by island leaders who take advantage of their traditional environmental stewardship responsibilities and allow multinationals in to rip off the people's natural resources" (Johannes 2003: 121; Lawson 1996).

Perhaps the final irony is that "emboldened indigenous politicians who despoil their islands' natural resources tell critics, 'stay out of this. You don't understand our culture. These actions are in accord with our traditional customs.' Yet, as Lawson (1996) points out, members of Pacific islands elites are often among those islanders most out of touch with their traditions" (Johannes, 2003: 123). Indeed, such people are those best positioned to clear and maintain the path down which the Western donors and others have traveled so expeditiously.

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