

## Tropical small-scale fisheries — some interwoven issues

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### Introduction

Managing and working with tropical small-scale fisheries is complicated because even less is known about them than their temperate counterparts. The science-based models used for their management reflect this; in tropical regions management is conducted through almost direct application of models designed for temperate waters, and relatively few specific attempts have been made to address the so-called “fisheries problem” in the global South. Rather, fisheries scientists have generally simply extended standard fisheries science as developed in Western societies to embrace tropical fish stocks. The situation is reinforced by cultural, economic and political hegemony.

In Western societies, fisheries science and fisheries management have been intimately linked from the early 20<sup>th</sup> century. Their co-evolution has paralleled approximately the stages in the development of the world’s fisheries resources, from “developing” (when management focused on identifying stocks and expanding production), through “mature” or “fully exploited” (when management focused on yield maximization), to “overexploited” (when sustainability was emphasised as a main goal of management). With the advent of the Code of Conduct for Responsible Fisheries (CCRF) (FAO 1995a), the term “sustainability” began to also include ecological sustainability and, to a far lesser extent, social sustainability. That was brought comprehensively front and centre in 2002, when the World Summit on Sustainable Development ordained an ecosystem approach to fisheries management.

Further, in Western societies, the development of resource management, including fisheries, has long been based on the assumption that relationships between society and nature can be managed rationally by a dedicated bureaucracy that reduces all issues to value-free technical problems scientifically resolvable to achieve specific objectives. Although such an approach underwrote the core of Western fisheries science and management for the last century, such rationality is undermined by

the issues of social and cultural “values”, and biological or economic “uncertainty”. “Values” legitimise management by providing its basis within a given cultural and social context, something that cannot emerge from science-based management itself. Hence, for example, when the scientific basis for a given management decision conflicts with fishermen’s cherished beliefs based on their own empirical knowledge, the former may become delegitimised in their eyes. Delegitimation can also result when uncertainty undermines science-based management decisions. Uncertainty, an inherent problem in estimating and forecasting focused on natural sciences, is conventionally countered in Western resources science by using ever more data to refine measurements and elaborate models. This approach has morphed into “risk management”, as exemplified in fisheries by the “precautionary principle” that underlies the CCRF (FAO 1995a), and associated stochastic models that seek to quantify it (e.g. FAO 1995b).

Even when attempts are made to adapt the main fisheries biology models to the realities of tropical situations, only the biological and general environmental factors are adapted, and not the social and cultural context of a given locality. The main aspects of the tropical small-scale fisheries context are not usually understood well — if at all — by many (and possibly most) Western fisheries and social scientists (Ruddle 2007; Ruddle and Hickey 2008; Ruddle and Satria 2010).

### Selected problems and issues in tropical small-scale fisheries

#### 1. Some sources of confusion with definitions

A major inconsistency is that the terms “artisanal”, “inshore”, “subsistence” and “traditional” fisheries are sometimes regarded as being either synonymous with, or as subsets of, “small-scale” fisheries (e.g. Berkes et al. 2001). Synonyms, as well as the term “small-scale fisheries”, are widely used by policy makers and planners, and sprinkled liberally throughout the fisheries social science and scientific literature. However, a focused justification is rarely

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made for using a particular term. This is unfortunate because it assumes that small-scale fisheries are clearly bounded conceptually, which is manifestly not the case, and because the term and its various elements take on different characteristics depending on the fishery being described. Moreover, the term “small-scale fisheries” is a relative category, because what is small in scale in one place may be quite different elsewhere.

Moreover, terms other than “small-scale” generally have either a more specific meaning or more complex implications. For example, given its various meanings and nuances, the term “traditional” is particularly problematical in legislative and policy contexts. Above all, it conveys a sense of time, so that a phenomenon is “traditional” only if it has a demonstrably long history of both usage and inter-generational transmission. This temporal sense has frequently been extended, and “traditional” is often used to identify pre-modern cultures. This introduces confusion, because different societies apply different criteria to resource use activities and associated behaviours. Cultural behaviours and activities that are routine to members of a non-mainstream group are classified and viewed as “traditional” by the larger society. There is much confusion and conflation of the concept “traditional” with a fishery type, and usually with subsistence fishing, as Davis and Ruddle (2009) explain.

## 2. *Unhelpful notions about commonality*

Embedded in much of the Western fisheries management literature, and concisely expressed by McConney and Charles (2010:533), is the notion that there exists “...an important pattern of commonality amongst small-scale fisheries worldwide that may allow them to be distinguished from other scales of fishery”. However, without a more thoroughly documented analysis and comparative study it is not immediately obvious that

“... this pattern is important as it allows us to share experiences, lessons and policy or management interventions across diverse settings. Although small-scale fisheries are more deeply embedded in distinct socio-cultural conditions than are larger scale fisheries... there is *no reason to consider them so unique as to be intractable for governance and management*” (emphasis added) (McConney and Charles 2010:533).

Such a statement is facile, and not supported by *in situ* research.

Johnson (2006:748) observes that “...governance requires striving for clarity of the principles by which it is guided. Principles of the ethical and of

the normative guidelines that define what is right, just, or should be done”. All well and good, but on what and whose cultural and social perspective would these principles themselves be based? Johnson emphasises biodiversity, complexity and the local relevance of designing systems. These, of course, should be also guiding principles on which to base ethical and normative guidelines, not on some preconceived Western notions.

The Food and Agriculture Organization of the United Nations elaborated on ethics in fisheries, observing that:

... [a]s fisheries represent an interaction between humans and the aquatic ecosystem, fisheries ethics deals with the values, rules, duties and virtues of relevance to both human and ecosystem well-being, providing a critical normative analysis of the moral issues at stake in that sector of human activities. When actual moral values, rules and duties are subjected to ethical analysis, their relation to basic human interests shared by people, regardless of their cultural setting, is particularly important... A more recent task of ethics is to resist those tendencies of globalization, marketization and technologization that erode both biodiversity and valuable aspects of cultural identity – and may even have effects that threaten human rights. Although these tendencies are often presented as value-neutral, they carry with them hidden assumptions that are potential sources of inequity and abuse (FAO 2005:3).

This brief statement conveys interesting potential contradictions. For example, the notion that “shared basic human interests, regardless of their cultural setting” jars when set against the call to “resist those tendencies of globalization, marketization and technologization that erode both biodiversity and valuable aspects of cultural identity”. It would be well to remember that “[a]lthough these tendencies are often presented as value-neutral, they carry with them hidden assumptions that are potential sources of inequity and abuse” (FAO 2005:3).

A universal definition of small-scale fisheries and its subsets, like artisanal fisheries, is so full of exceptions that it is not desirable to develop one with global applicability. In contrast, agreeing on a narrow definition for specifically limited purposes is often desirable. In that process, the policy objectives of governments are of particular importance. These would include a central focus on poverty alleviation, food security, and resource development and management. Such closely related topics would

need to be key elements of definitions formulated for practical purposes.

Apart from either satisfying a bureaucratic sense of aesthetics, fulfilling the requirements of donor conditionalities, or both, it is not always immediately obvious why a generic definition should be deemed either necessary or practical. After all, small-scale fisheries were formed and developed in each locality or country, as humans accumulated knowhow and responded gradually to specific biological habitats, target species behaviour, and cultural, economic and social conditions. Rather than attempting to “straitjacket” small-scale fisheries into an administratively convenient, standardised definition, their diversity should be regarded as a great strength that provides practical models of likely value during present and future crises. Loss of this essential quality should be resisted with the same vigour as the loss of biodiversity, particularly because cultural heritages are now being deliberately extinguished by neoliberalism. Small-scale fisheries embody and represent much more than catching fish and making fishery products to be measured in biological and economic terms. Their multi-functionality represents alternative lifestyles in the coastal and inland aquatic areas that could undoubtedly provide valuable practical lessons (Ruddle and Satria 2010).

### **3. Marginality and marginalisation**

Small-scale fisheries are (or are perceived to be) marginal in a number of ways, some of which are not readily apparent and, therefore, not usually considered in the literature. Despite the now familiar importance of small-scale fisheries, they continue to be a marginal topic for fisheries science and social science. For example, the economic, geographical, political, and social remoteness of small-scale fisheries from national decision-making centres is intensified by perceptions of remoteness. It is well known that in tropical coastal zones the hamlet and village landing points of small-scale fishers are widely dispersed geographically along isolated coastlines; despite decades of development, they remain marginal, isolated by a lack of physical access and infrastructure. Isolation is also heightened by a lack of alternative economic opportunities and employment, and by localised resource depletion. This may force people to migrate — either permanently or seasonally — in search of alternative employment, or to access fisheries that remain productive. But migrants are handicapped in finding jobs by being socially and economically remote, which often results from their being a member of a minority ethnic or social group and generally of low social status, with limited formal education. Elites, including decision-makers, have negative perceptions of these characteristics of small-scale fishers

and their families, thereby reinforcing their already low social status.

Marginalisation is also reinforced at the political level by the commonly low status accorded to fisheries within national administrative structures. Apart from the major fishing nations and those archipelagic nations composed mostly of atolls, such as Kiribati or the Maldives, where fish are the principal natural resource and terrestrial resources are extremely limited, in most countries fisheries departments are relatively small, recently established entities, reflecting the comparative lack of importance associated with fisheries in national economies (Marriott 1990). Further, because they generally lack political clout, their interests are usually subordinated to those of other economic sectors. Thus, fisheries departments are commonly linked with agricultural, forestry and other natural resources within a single ministry. Little has changed since the observation in the 1980s by Everett (1983) of the low overall status of most national fisheries departments, where administration is often not of a high standard, staff morale is low, and turnover rates relatively high. Further, fisheries departments do not generally attract the ablest recruits to administration, whose career aspirations are better served in more important ministries. Fisheries marginalisation is reinforced by the marginalisation of the science and scientists studying them, and fisheries are not generally perceived of as a prestigious field by and for the elite.

### **4. Issues with data**

In general, small-scale fisheries are characterised by data problems, such that precise and reliable quantitative data are lacking (FAO 2010; Kato 2003). This is partly because the collection of reliable statistics is physically and logistically difficult in most countries, where catches are unloaded at a myriad of points scattered along vast, remote coastlines. Geographical remoteness is a principal reason for the absence of comprehensive fisheries statistical systems in many countries (Saila 1988; Johannes 1998; King and Lambeth 2000; FAO 2002; Lunn and Dearden 2006). This, of course, precludes conventional Western fisheries management, based on standard data-demanding criteria. Further, because many small-scale fishers both sell their products locally and consume their catches in their own households, their landings are usually under-represented in statistics (Seilert and Sangchan 2001). The result is that in developing countries, and consequently in FAO and other global estimates, official statistics, national accounts, and economic development initiatives generally focus on commercial, often export-oriented fisheries, which are commonly perceived to be the major economic contribution of fisheries. For example, a study of

American Samoa and the Commonwealth of the Northern Mariana Islands by Zeller and colleagues (2007) found that the contributions of small-scale fisheries to gross domestic product may have been underestimated by more than five-fold.

Further, fisheries administrations often lack a clear objective for collecting conventional statistics. They formerly focused on production data, mainly for recording purposes, but have not recognised that an appropriate statistical system is necessary for aspects of conventional fisheries management, such as entry control and policy-making (Kato 2003). Especially troublesome is the reporting of species composition — increasing quantities of a category termed “not elsewhere included” amounted to 30% of capture production in the Asia-Pacific region in 2008. This may reflect the increasing capture of smaller species, including low-value and so-called “trash” species, and of juveniles of higher-value species, which together are regarded as not worth detailed reporting. On the other hand, it could represent a general decline in the quality of catch landing data. An additional problem is that in Southeast Asia reported increases in landings may mask a serial depletion of large demersal and pelagic species, as well as sharks and rays, and a simultaneous increased harvest of faster recruiting species from a lower trophic level. Interpretation is hampered by poor and highly imprecise landing data by area, as well as by a lack of determination of the status of specific marine stocks (FAO 2010).

A further source of incompleteness is that statistical data on economically important and major employment-generating components of the production system are invariably lacking for small-scale fisheries. These include data on upstream industries for inputs such as boats, gear, and fishing trip supplies, as well as downstream post-harvest components, such as processing, distribution and marketing of marine resources. Although occasionally some of the upstream inputs might be gleaned from censuses of manufacturing industries, data on downstream activities are usually harder to come by. Often this is because they are performed frequently as part-time or seasonal activities, and usually by women or dependent children of fishers' families; therefore, they would not generally be captured where censuses or other routine data collection categorises individuals only by primary or full-time occupation.

Another huge source of data collection and management problems in tropical developing countries is the fragmentation and lack of coordination among the many agencies responsible for different aspects of the fishing and related industries and administrative sectors. One result is that roles and responsibilities are unclear, with officials in one branch of

administration unaware of what their counterparts elsewhere are doing (WWF 2008).

For example, the administration of capture fisheries in Vietnam is complex and fragmented among government departments. Decentralisation has been limited. The Ministry of Agriculture and Rural Development (MARD) is responsible for national fisheries governance. Within it, the Department of Capture Fisheries and Resources Protection (DECAFIREP) handles resources management, including control and monitoring, and fishing boat registration. The Department of Science, Technology and Environment collaborates with DECAFIREP. In principle, the Informatics Centre for Agriculture and Rural Development services the information needs of MARD decision-makers. Under MARD, the Research Institute for Marine Fisheries (RIMF) performs marine resources assessment, fishing ground identification and related tasks. The Vietnam Institute of Fisheries Economics and Planning (VIFEP) advises MARD on fisheries policy, planning and general development. The Department of Agriculture, Forestry, Fisheries, Salt Processing and Trade administers seafood processing and export, while the National Agro-forestry and Fisheries Quality Assurance Department (NAFIQAVED) handles quality control, seafood inspection and food safety. The Department of Seas and Islands, of the Ministry of Environment and Natural Resources (MONRE), is responsible for governance of the marine environment, policy making and planning for integrated coastal zone management. At the provincial level, the Department of Agriculture and Rural Development (DARD) replicates the national functions of MARD.

Management of the seafood trade is even more complicated. Nationally, the Ministry of Commerce and Industry (MOIT) is responsible for all trade management. However, as the sector management agency under MARD, the newly formed Department of Agriculture, Forestry and Fisheries Processing and Trade focuses on State management of seafood trade and processing. NAFIQAVED is responsible for food safety issues, whereas data on imports and exports is managed by the Customs Office. WTO matters are handled by the Department of Commerce and Industry Policies for Multiple Boundaries, under MOIT. However, the non-profit civil societies VCCI and VASEP play a strong role in the seafood trade. Although it is becoming of urgent concern, no central government organisation actively engages in eco-labelling for capture fisheries, although NAFIQAVED undertakes seafood safety and hygiene certification. At the national level, the Vietnam Association of Seafood Exporters and Processors (VASEP) plays a major role in seafood export and processing. Also, the Vietnam Chambers for Commerce

and Industry (VCCI) is a professional organisation responsible for the private sector-related to trade and industry in general, including seafood enterprises. However, VASEP and VCCI focus more on processing and exporting companies, rather than on small-scale marine resource harvesters. Also, relations between VASEP and the Vietnam National Association of Fisheries (VINAFISH) are limited in terms of linking fishermen to processing plants. Controlled by MARD, DECAFIREP is the central agency responsible for capture fisheries management. Other institutions under MARD have joint management with DECAFIREP in related issues. For example, seafood safety is controlled by NAFIQAVED, and seafood processing and trade is under the Directorate of Trade and Processing for Agriculture, Forestry, Fisheries and Salt (DAFFS). However, cooperation and communication is limited among DECAFIREP, VASEP and VINAFIS regarding resources management, fisheries production and processing, and exports. VINAFISH is relatively weak in resource management, and VASEP is focused only on processing and export. At the provincial level DECAFIREP is responsible for fisheries management, and, as a local fisheries management institution at the field level, it collaborates with the Coast Guard and Marine Police to control illegal fishing and foreign vessels operating in territorial waters. Under the Provincial People's Committee, the Department of Industry and Trade (DOIT) is responsible for trade and industry management at the provincial level. However, no organisation at DARD focuses on seafood trade. Only VCCI and VASEP have branches in the ecological-economic regions (e.g. the Mekong), but not at the provincial level. Also, the Small-Medium Enterprises Association has many seafood companies as members. Depending on the province, cooperation among those institutions related to trade and processing at the central and local levels is limited and informal. This is but one example of administrative complexity, redundancies and management system confusion evident throughout the tropics.

### 5. The "greening" of small-scale fisheries

The wholesale depletion of many of the world's major fisheries is almost always ascribed to industrialised fleets. As a consequence, in Senegal, India and the Philippines, for example, small-scale fisheries have changed from being protected by legislation to being promoted by both national and provincial governments at the expense of industrial fisheries. This occurred partly from a sense that small-scale fisheries provide more economic, social and ecological benefits than do large-scale, industrial fisheries, and partly in acknowledgement of the failure of an earlier model based on investment in the latter (Tvedten and Hersoug 1992). This perception is

shared by donors, aid agencies, and diverse advocates of "green fisheries". Policies for the two fisheries sectors are sometimes linked, as in Southeast Asia, where the promotion of offshore fishing is common, the principal linked motives being a transfer of effort out of overexploited inshore areas to improve conditions for fishers working them, and the realisation of the potential of supposedly underexploited offshore areas. However, the limited data available give no reason for optimism regarding the benefits of such a policy (FAO 2010).

Although small-scale fisheries are generally regarded as being "greener" than the industrial sub-sector, they often threaten their own sustainability. For example, they are often associated with highly destructive fishing techniques, particularly poisoning and "bombing", especially in Indonesia (Satria and Adhuri 2010) and the Philippines (Pauly et al. 1989). In Indonesia, more than half the coral reefs are estimated to have been damaged by destructive fishing, including blast fishing. In the Spermonde Archipelago of South Sulawesi, for example, more than 75% of small-scale fishers use blast fishing with "bombs" made from diesel fuel mixed with ammonium nitrate fertiliser. Motivated to increase income to "modernise" their lifestyle in a situation where alternative income sources are not available, a high global demand for fish encourages fishermen to take shortcuts to raise income from fishing, despite being aware of the long-term negative impact of destructive and unsustainable techniques (Chozin 2008).

A key argument found in the social science and human ecological literature on small-scale fisheries is their ecological sustainability, and particularly the contrast they may provide to industrial fisheries, when embedded within pre-existing management systems. The implication that small-scale fisheries have something to teach us is not valid universally, and needs case-by-case verification. This aspect of valuable lessons was embedded in the CCRF. Although small-scale fisheries receive but scant mention in the CCRF, it emphasises their role in employment, food security, livelihood importance, fisheries conservation, management, and development (FAO 1995a:7 and 1995a:33). This may be true at a global comparative level, but each fishery needs to be investigated at the local level to verify those assertions. In particular, social relationships are sometimes far from being fair and just, although often they are automatically perceived to be just (Ruddle 2011). Despite a wealth of literature beginning in the 1970s extolling the virtues of local management systems and access restrictions, it should be noted that not all of these function well, and that many are instituted to reduce conflict, among other desired outcomes (Polunin 1984; Ruddle and Satria 2010), rather than to manage resources.

It is generally assumed that the catch of an individual small-scale fishing unit is much less than that of a large-scale commercial counterpart. Although precise data on the number of small-scale fishers is lacking, FAO estimated that there are some 34 million worldwide.<sup>2</sup> Assuming that one small-scale fisher catches a tonne of fish per year, fish production by small-scale fishers as a whole could be on the order of 34 million tonnes, or about 40% of the global catch. One small-scale fisher catching 10 kg per day for 100 days per year has a total annual catch of 1 tonne. From that, it can be estimated that globally, small-scale fishers produce 34 million tonnes of fish per year, or 38% of total fisheries global production. That is not negligible (Kato 2004).

Kato (2004) provided a straightforward model of the relationship between incomes and operating costs changing in line with the level of resource exploitation, for both industrial and small-scale fisheries. The operational costs for commercial fisheries increase with travel to distant fishing grounds, which extends their operating time and investment in gear or equipment required to increase or maintain their catch, especially when resources are declining. Despite such efforts, their long-term operations will no longer be financially viable when the resource condition deteriorates. At that point, industrial fishers will cease operating — “profitability” thus functions as a built-in management and self-regulating mechanism. However, such a self-regulatory management mechanism is less obvious in small-scale fisheries. Because their operating costs are much lower than those of industrial fishers, small-scale fishers can continue to operate at resource levels where industrial fisheries could not make a profit. By continuing operations in such circumstances, they would have a more negative impact on coastal resources than industrial fisheries, with the latter’s effort reduced or abandoned owing to unprofitability. When incomes cannot meet needs, small-scale fishers resort to using destructive fishing gear such as fine-mesh nets (even mosquito nets), blast fishing and poisoning. Undertaken in areas normally worked by small-scale fishers, which include inshore spawning and nursery grounds for commercially important species, unregulated small-scale fishing can destroy both coastal resources and those on which industrial offshore fisheries depend.

A tabulated dichotomy between the attributes of large-scale industrial fisheries and those of small-scale fisheries is a widely used device that attempts to show the relative global advantages of small-scale fisheries, in terms of their relative economic efficiency, ecological sustainability, and their support

of much greater populations for less resources per capita than other fisheries (Smith 1979; Berkes et al. 2001; Charles 2001; Thomson 1980; Johnson 2006; Pauly 2006). As rhetorical devices, “... the tables are strikingly effective [but] it is impossible to know whether they are anything more than just rhetorical devices for the value of small-scale fisheries” (Johnson 2006:753). A conceptual difficulty in this approach is that the compilers of these tables do not define the boundaries between the categories of small- and large-scale fisheries. Also, with the exception of Pauly (2006), they fail to mention either the data sources for the tables, or the data gathering methodologies. These are serious flaws in light of the diversity, complexity and dynamism of both small- and large-scale fisheries. This contrasts markedly to the uniform neoliberal perspective and incessant drive towards individual-based, industrial fisheries, which impose the regulatory outcomes of market-imposed discipline on harvesting intensities and practices.

These rhetorical tables, therefore, present a valiant alternative image. Provided that users do not fall prey to unsubstantiated romanticism and the false perception of homogeneity, it is well demonstrated that small-scale fisheries provide a very valuable example of a realistic alternative approach in a time of massive and variegated change. At the global level, promotion of small-scale fisheries is largely an activity of political advocacy, which is important in challenging the prevailing approaches of modernisation, neo-colonialism and neoliberalism. However, such rhetorical tables are of no practical value at the local level, which requires full appreciation of diversity, complexity and dynamics.

Beyond that, because the only worldwide generic characteristic of small-scale fisheries is that they are not industrial in scale, tables based on such a dichotomy are neither useful or substantive, because all that such listings of attributes do is demonstrate how large-scale and small-scale fisheries are dissimilar. In fact, “the examination of small-scale fisheries as a category reveals that they can only be identified in relational terms, which creates a constant impression of elusiveness and categorical imprecision” (Johnson 2006:751). The basic conceptual problems are that the criteria for and importance of the selected characteristics are neither explained nor ranked in terms of importance. Further, varying characteristics would be required for different purposes. Also, the romantic yet delusional notion that small-scale fisheries are ecologically sustainable, socially just, or both, obscures that as a category, small-scale fisheries exhibit highly diverse social and ecological impacts. Their usefulness is

<sup>2</sup> It was estimated roughly by FAO that the total number of people involved in fisheries is 38 million, and that 90% of these (34 million) are small-scale fishers, of whom 90% are from Asia (31 million) (Kato 2004).

diminished because the compilers have conflated tropical and extra-tropical fisheries. In fact, “tropical” makes little sense as a (sub)category because every tropical region is different, based on biological, physical, and particularly historical and socio-cultural aspects of resource use. Depending on the use to which such an array of characteristics is intended, at a minimum Southeast Asia, South Asia, Pacific Islands, Africa, Latin America, and Caribbean regions need to be distinguished. However, even these regional categories are too coarse to be meaningful for practical uses.

### 6. *Hegemonism and its impact*

An underlying cause of problems facing small-scale fisheries in tropical countries is the hegemonic behaviour of the core nations of the “global North”. Hegemonism is manifestly at work when the approaches to the administration and management of fisheries applied in Western countries are advocated for use in the vastly different and highly varied ecological, cultural, social, and economic conditions of the tropical world, where, in contrast, there are many examples of pre-existing systems that have long worked well. Either directly through development assistance, or indirectly through international organisations or increasingly through commercial means, Western nations continue to promote Western systems while denying the usefulness of proven non-Western systems. The reasons that could underlie and account for such a situation need to be uncovered. Nor is it unreasonable to advocate an end to that approach, and seek to replace Western approaches with pre-existing, non-Western systems that are updated to address modern conditions.

During the colonial era, non-Western models were openly disparaged, whereas now they are commonly dismissively labelled as “traditional” or “special” cases. During the 1950s and 1960s, a massive and experimental packaged transfer of social, economic, financial, educational, and legal systems (that were often predicated on misguided theories), together with their underlying cultural values and aspirations regarded pre-existing economies, management systems, and often social and cultural systems as obstacles to modernisation (Ruddle and Satria 2010). Modernisation provided the justification for the foreign designers of fisheries management schemes to claim that pre-existing systems were primitive, unsustainable or often “non-existent”. This was reinforced by a general ignorance of the tropics and prejudice on the part of scientists and educators, whose careers were enhanced by work in temperate regions.

In addition to the erroneous assumption that tropical fisheries are “open access” and not managed by pre-existing systems, and therefore, require

externally imposed management systems to protect resources from collapse and lift fishing communities out of poverty, the Western approach to fisheries “development” and management also fails to recognise that (Ruddle and Satria 2010):

- 1) pre-existing systems are as much, if not more, concerned with the community of fishers and their families, not just fisheries, and their principal role is ensuring community harmony and continuity;
- 2) pre-existing systems can involve multiple and overlapping rights that are flexible and adapted to changing needs and circumstances (Khumsri et al. 2008);
- 3) fisheries are just one component of a community resource assemblage, with fisheries managed in their ecological context — dependent on the good management of linked upstream ecosystems, and risk management — thereby maintaining the balance of the community’s nutritional resources; and
- 4) pre-existing systems are greatly affected by interacting external pressures for change. If these cultural, ecological, economic, political and social context factors are not appreciated, any “imposed management system” would likely fail from the outset to achieve its goals.

That is exacerbated because Western fisheries biologists and social scientists often fail to appreciate differences between temperate-zone industrial fisheries, which are familiar from their own training and research, and tropical small-scale fisheries. Their interpretations are passed on to donors and international assistance personnel. Further, there is an extremely negative connotation to the term “tropics” among fisheries scientists based in temperate latitudes (Pauly 1994). For example, it is not widely appreciated that in tropical small-scale fisheries harvesting is limited mainly to nearshore areas and local resources that are defined socially. Such geographical and social territoriality is widespread, which, in addition to its positive aspects in terms of resource management, limits the mobility of small-scale fishers geographically and socially, and prevents access to fishing communities by outsiders. It is also not commonly appreciated that tropical nearshore fisheries are biologically and technically complex compared with those in temperate areas, and are typically far more varied in terms of catch composition or areas fished and gear types employed. Hence, they have a complexity that is unfamiliar to temperate region scientists and planners, who typically deal with single-species fisheries. As in small-scale fishing regions in temperate countries, employment options in the tropics are limited and alternative jobs scarce at best. It needs to be more widely appreciated that

these factors combine to create market imperfections such that tropical small-scale fishers may 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, customary communities and among kin, as well as by other customary practises, such as ritual performance and donation (Ruddle 2007; Ruddle and Hickey 2008; Ruddle and Satria 2010).

### Concluding remarks

There is a general agreement that tropical small-scale fishing societies are marginalised by their position in the economic, political and administrative structure of most nations. There is also general agreement that the data on all aspects of small-scale tropical fisheries are incomplete, imprecise and unreliable, and therefore, of little or no value in any Western scientific approach to fisheries management. Nevertheless, there has been no shortage of unsubstantiated and misplaced optimism, as exemplified by the “greening” of small-scale fisheries, when contrasted with industrial fisheries. Such romanticism is unhelpful.

Similarly, based in large part on the repetition of unsubstantiated assertions that small-scale fishers in the tropics are among the poorest of the poor, since the mid-1990s a focus on poverty and vulnerability has emerged. Apart from clearly having advanced certain academic careers and imbuing “development practitioners” with a sense of doing something particularly humane and worthwhile, there is little evidence that the poverty focus has achieved any concrete results. To achieve such results, it is necessary to document and account for a political economic context wherein small-scale marine harvesters are subject to exploitation and structured inequities that deny them, their families and communities a fair share of economic values.

Confused thinking and conflicted approaches characterise Western dealings with small-scale fisheries. The advocates are in full-cry, but precisely over what has so far defied consensus. Quite likely the situation is grounded in confused and contradictory Western approaches to and models for fisheries development. Far more systematic and controlled comparative research is needed to assemble the evidence required to value and document the diversity of small-scale fisheries as a means of addressing these deficiencies.

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