

# Reconsidering the Contribution of Fisheries to Society and Millennium Development Goals

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The assertion that fisheries in developing countries can contribute to society and the Millennium Development Goals (MDGs), principally through jobs, income and human nutrition, needs reassessment. Two aspects of a reassessment are examined here, the globalized and integrated seafood business, together with the resultant north–south relationships, and better models for managing tropical nearshore fisheries. Fisheries can make simultaneous contributions to both societies in developing countries and directly to MDGs 7 and 8, provided that (1) models for tropical nearshore fisheries include simultaneously managed linked ecosystems, and (2) developed and developing countries collaborate to better manage the global fish trade and industrial fisheries.

**KEYWORDS** fish trade; globalization; industrial fisheries; linked ecosystems; alternative management models; North–South relations; small-scale fisheries; tropical countries

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## 1. Introduction

Fisheries in developing countries have long been assumed to create employment and generate income, thereby contributing to society through poverty alleviation, as well as playing an important role in human nutrition (e.g., FAO 1997; Thilsted *et al.* 1997). In the same ways they might also contribute to at-

taining the eight Millennium Development Goals (MDGs, Table 1), both directly, via specific goals, and indirectly to all the goals, through enhanced livelihoods (World Fish Center 2005, Table 2).

However, those assumptions about income, employment and nutrition might be inaccurate. Based on a study of some 300 documents on various aspects of poverty in fisheries, Macfadyen and Corcoran (2002)

**Table 1.** The Millennium Development Goals.

| MDG Goal Number | Objective   |
|-----------------|---|
| 1               | Eradicate Extreme Hunger and Poverty                                    |
| 2               | Achieve Universal Primary Education                                     |
| 3               | Promote Gender Equality and Empower Women                               |
| 4               | Reduce Child Mortality  |
| 5               | Improve Maternal Health   |
| 6               | Combat HIV/AIDS, malaria, and other diseases                            |
| 7               | Ensure Environmental Sustainability                                     |
| 8               | Develop a Global Partnership for Development with developing countries. |

**Table 2.** Hypothesized indirect ways in which small-scale fisheries could contribute to the Millennium Development Goals (The World Fish Center 2005).

| MDG Goal Number | Activity   |
|-----------------|--|
| (Goal 2)        | If through fishery activities incomes increase, then school attendance is likely to improve.   |
| (Goal 3)        | Women are further empowered through trading in fish (which is very often already in their hands!), and by facilitating various kinds of enterprise (many of which are already operated by women!). |
| (Goals 4 & 5)   | Child and maternal health conditions would improve if fisheries can contribute either directly or indirectly to reducing hunger and improving nutritional levels.                                  |
| (Goal 7)        | Properly managed fisheries ensure that environmental capital and services are preserved for future generations.  |

concluded that there is nothing to substantiate the abundance of largely unsupported statements that fishing communities are either poor or the poorest level of society. More than the harvest of fish or other resources, local institutions and power structure that control access to resources might be the major determinants of levels of poverty (Ruddle 1987, 1989, 1994a, 1998; Ruddle *et al.* 1992; Béné 2003).

Like any other sector of rural development, small-scale fisheries could provide the opportunity for more people to participate in the supply and demand chains of regional and local economies. However, alleviation of poverty, improvement of nutrition levels

and provision of food are not straightforward tasks. Further, because capture fisheries and aquaculture communities have had little examination of either nutritional status or of the characteristics, causes and dynamics of poverty, claims about the actual or potential contribution to both societies and fulfillment of MDGs remain assertions in need of verification.

In order for fisheries to make a contribution to both societies, especially in developing countries, and to the attainment of the MDGs, a major rethinking of the concepts applied to fisheries management is required. In addition, re-arrangement of priorities among the MDGs should be considered.

Two major issues complicate any analysis of the contributions of fisheries to societies and the MDGs. The first concerns the numbers and economic condition of the people involved, and levels of fish production. The second is the complex linkages that characterize both capture fisheries and aquaculture. These are dealt with in the following section of this article. The old assumptions about the potential contribution of fisheries to societies in developing countries and to the attainment of the MDGs must now be viewed against the globalization of the fish trade and the resultant North–South relationships. That is addressed in Section 3. The assumptions also need to be reviewed in terms of alternative approaches for small-scale tropical fisheries in rural development. In Section 5 first I suggest a re-arrangement of the priorities of the MDGs. Then the contribution of fisheries to the MDGs and societies is re-considered in terms of (1) near-shore tropical fisheries and the attainment of MDG 7, and (2) the management of the globalized fish trade and the attainment of MDG 8.

## 2. Two Major Difficulties

Because data on all national fisheries are based on a compilation of estimates provided by national governments, measurement of the amount of global employment and income generated by fisheries is difficult. Those estimates suggest that employment in fisheries doubled from 1970 to 1990, when they provided the primary income of some 28.5 million persons (FAO 1997). That figure balloons to an estimated 60 to 100 million when employment in upstream (e.g., boat-building) and downstream (e.g., processing) activities and those based on the local expenditure of fishers and their families are included (Delgado *et al.* 2003), and to over 200 million people when dependents are considered. Similarly, global fish consumption is thought to have approximately

doubled in the last 35 years (Delgado *et al.* 2003). Further estimates conclude that fish now provide some 2.8 billion people around the world with nearly 20% of their protein requirements, and in many tropical countries are the sole source of animal protein available to the poor (Delgado *et al.* 2003). The annual average per capita global consumption rate of fish in 2005 was thought to be about 16.6 kg. Regardless of accuracy, it is these estimates that shape international assistance programs.

A second difficulty arises from the ramified upstream and downstream linkages that characterize capture fisheries and aquaculture, and which might also be important to regional economies and household incomes. However, in general, little is known of the role of the various linkages, despite a few case studies in limited areas, or how these linkages change, often quite rapidly, in response to alterations in general economic, social and technological conditions. For example, a case study done 20 years ago in Guangdong Province, South China, demonstrated that changing rates of inputs to integrated farming systems that included a large aquaculture component are reflected in altered labor demand and household income (Ruddle, 1985, 1986; Ruddle *et al.* 1986; Ruddle and Zhong 1988). The contribution of upstream and downstream activities to poverty alleviation and food security, and the impact on poverty of technological change, community and fishers' organizations, and management systems, remain to be systematically studied by both specific case studies and comparative research.

Linkages at the global scale are also problematical. For example, assigning the benefits of a large, international industrial fishery and its downstream employment has become extremely complicated, in large part owing to consolidation and vertical integration of the international fishing business during the last two decades. Several large companies control much of the world fish trade,

and the resultant patterns of benefit from the fishery are complex and fragmented. For example, it becomes difficult to track resource benefits when a Korean company catches Pollack in Russian waters, processes it in low-wage China, and sells the *surimi* products largely to Europe and North America (Won 2003).

### 3. The Old Assumptions in New Contexts

Continued repetition of old and unproven assumptions about employment, poverty alleviation and human nutrition based on fisheries, as sustainable contributions to either society or to attaining the Millennium Development Goals (MDGs), or both, is particularly pointless when viewed against contexts that have changed drastically in recent decades. This is now considered briefly in terms of globalized trade links and approaches to development.

#### 3.1. The context of a globalized fish trade

Fish production—or, rather, extraction—has metamorphosed during the last three decades from what was essentially a local industry into the present globalized, high-value, corporate activity, in which developed and developing countries are now inextricably linked. As a result, industrial fisheries within the waters of developing countries are now more an aspect of national policy and foreign affairs than a fisheries issue. This has been examined in detail for the Pacific Island nations (Hunt 2003; Petersen 2003) and Sénégal, among other Western Africa cases in which EU nations are heavily involved (UNEP 2002).

An estimated 40% of world fish production enters international trade, with 2005 exports of US\$ 77 billion representing a 40% increase over those of 2000 (FAO 2001). The main flow is from developing countries to the developed nations, the former having

57% of the trade volume and 77% of its value (FAO 2001). However, the trade has led to some serious problems. Particularly deplorable is that potential benefits for developing countries have not always been realized. On the contrary, some results have been perverse.

For example, the fish exported by developing countries are obtained mainly by their domestic fleets operating within their own EEZs, and by selling EEZ access rights to foreign fleets. With donor assistance and foreign advice, many domestic fleets of small craft were expanded to profit from the growth of international trade (FAO 1998; Alder *et al.* 2006). Rather than profit, however, over-exploitation of nearshore fisheries, owing to poor management advice and to excess capacity stemming from subsidies, has been a common result (Porter 1997, 2001).

Potential benefits to developing countries have been further diluted by a great expansion of developed country fleets operating in developing country waters. Scrapping their large domestic fishing fleets would have entailed major economic and social woes for the developed countries, whose governments were unwilling to pay the heavy political price that would naturally have ensued (Kurien 1998). Since their domestic waters were already overfished and unable to sustain increased effort, they usually elected to negotiate access agreements to the EEZs of developing countries, rather than work out joint ventures and involve themselves in the troublesome development of local fishing industries. As a consequence, despite some local crewing and processing, a major source of fisheries and fisheries-related employment is usually lost to the developing countries. The “fleets to the South and fish to the North” policy, based on large fleets subsidized, yet barely regulated, by developed country governments (Dommen 1999) has often led to overexploitation of fish resources in the developing countries (Kurien 1998), and is a lost opportunity to create local skills and jobs.

Selling access rights and servicing foreign fleets are not always valuable sources of foreign exchange for developing countries. Although in a country like Tuvalu, with few other sources of income, 50% (1991) of the government revenue was generated by selling fishing rights (Hunt 2003), in other cases the amount paid does not necessarily reflect the real resource rent of the fish caught (Petersen 2003). Although developing country foreign exchange revenues from fish exports increased from about US\$ 5.1 billion (1985) (Delgado *et al.* 2003) to 16 billion (2002) (FAO/GIEWS 2002), sometimes that growth was obtained by increasing exploitation of fish, as in Ghana (Atta-Mills *et al.* 2004), or by reducing domestic fish supply, as in Sénégal (UNEP 2002). Further, in some instances, as in the Pacific Islands, the heavy dependency on foreign aid has resulted in their governments giving sharply discounted access rights in exchange for aid flows (Petersen 2003). The aid and monies generated by access rights are often poorly invested—commonly in domestic fisheries, which have mostly given poor results (Petersen 2003).

Illegal, unreported and unregulated fishing (IUU) is an integral part of the global trade in fish and fish products, but one that severely undermines fisheries management, as has been noted recently for Pacific Island nations (FFA, 2000; Hunt 2003). Worldwide, an estimated annual total of at least US\$ 4 billion of fish are caught illegally (WWF 2006). Developing countries suffer the most; for example, Africa south of the Sahara is estimated to lose annually US\$ 1 billion, or the equivalent of 25% of the total annual legitimate fishery exports from all of Africa (WWF 2006). Additional revenue is lost when various fees and taxes are avoided by illegal operators. Illegal fishing also affects livelihoods directly, as when potential employment and income in upstream and downstream activities is foregone. Small-scale fishing communities also suffer further as

their catches are reduced by the combined impact of IUU, weak surveillance, and competition from unsustainable industrial fishing. In the Pacific Basin the Forum Fisheries Agency (2000) stated that the most urgent fisheries management tasks are (1) combating IUU, and (2) reducing the widespread under-reporting of catches by licensed fleets.

A principal driver of IUU is the global overcapacity of developed country fishing fleets, mainly as a result of subsidies (Sumaila 2001). Earlier worldwide estimates of US\$ 10–20 billion for the value of IUU (World Bank 1998) were recently re-estimated at US\$ 30–34 (Sumaila and Pauly 2006). That is equivalent to about one-third of global fisheries sector revenues.

By 2010 it is estimated that the developed countries will import 10 million tons of fish (Delgado *et al.* 2003). On the other side of the equation this means that poor developing countries with food deficits and undernourished populations must seek to supply rich developed countries under both increasingly stringent access conditions and without depleting their fish stocks, and thereby compromising domestic food supplies. In other words, developing countries must try to earn the much needed foreign exchange without further impoverishing their own people's food supply; an almost impossible task when the scenario is unfolding within the massive constraint that further expansion in global marine capture fisheries is unlikely.

A closely related and inseparable part of the global industrialization process is that the potential contribution of fisheries to society and development is now severely constrained by the existing and likely future realities of the global environmental condition and the state of fisheries resources. Although now largely obscured in the public consciousness by the mass media emphasis on global warming and related environmental catastrophes, nevertheless crises in fisheries have been well documented (e.g., FAO 1995, 1998, 2000;

Myers and Worm 2003). Around the world, marine capture fisheries are in a critical condition, and probably have now exceeded their capacity to fulfill the demand for fish. This is exacerbated because fishing activities, particularly industrial fisheries, have major negative impacts on the marine ecosystems (Watling and Norse 1998). That, in turn, can eventually be expected to have negative repercussions for societies in developing countries.

### 3.2. The context of unsuitable approaches and models

Small-scale, nearshore marine fisheries, together with most inland fisheries, are best understood as an integral part of domestic rural development (Ruddle 2006). As such, an emphasis placed solely on nearshore small-scale fisheries and their management as a distinct sector is clearly misplaced; fisheries cannot be managed independently of other resource uses and their environmental impacts (Ruddle and Hickey 2008). During the last 60 years, when rural development was led by agricultural policies, it was amply demonstrated that reducing poverty had little to do with resource management *per se*. Rather, poverty reduction is intimately associated with access to resources and the alternative employment opportunities provided by widened rural economic bases, which occur as an integral part of an expanded national economy (World Bank 2000; Dixon *et al.* 2001).

Industrial fisheries have been the long-standing policy emphasis of all international agencies and most national fisheries services. In contrast, small-scale fisheries, particularly those in tropical developing countries, are still not well understood, despite increased study since the mid-1970s. Policy, administration and management have usually been based on sectoral development programs focused on making small-scale fisheries more efficient economically while conserv-

ing fish stocks. Further to their detriment is that during the last 60 years small-scale fisheries have not usually been included within comprehensive rural development programs, when activities focused on small farms and related infrastructure and institutions (Ruddle and Hickey 2008).

However, a fundamental and largely unacknowledged reason for management failure in tropical small-scale fisheries is the implementation of policies and programs based on Western developed country models and approaches, coupled with an inability and/or unwillingness to consider non-Western alternatives of empirically proven value, such as those epitomized by many pre-existing management systems in the Asia-Pacific Region, and elsewhere (Ruddle 2007a). This inability or unwillingness is embedded in the behavior of many donors and development agencies, and is manifested in a relative lack of understanding of tropical milieux and a persistence of various prejudices, in particular a temperate bias in conventional approaches to fisheries education and management (Johannes 1994; Pauly 1994; Ruddle 2007a). Further, there is an extremely negative connotation to the term "tropics" among fisheries scientists based in temperate latitudes (Pauly 1994). Not surprisingly, 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 small-scale fisheries (Johannes 1981, 1994; Pauly 1994; Ruddle 2007a, 2007b; Ruddle and Hickey 2008). As a consequence, during education, via the literature and through consultation, erroneous interpretations are passed to those who fund and make development policies and design development programs (Ruddle 2007b; Ruddle and Hickey 2008). Nor has the situation been helped by fragmentation and insularity within fisheries and allied sciences (Pontecorvo 2003).

#### 4. Reconsidering Contributions

In addition to major reforms in the management and exploitation of both industrial and small-scale fisheries, realizing the potential contribution of fisheries to both societies and the MDGs requires that national governments also have some vision of the potential. However, it is not easy to be optimistic that such a realization is widespread, based on an examination of the Poverty Reduction Strategy Papers (PRSPs), organized by the IMF and produced by national governments to orient comprehensive national policy, planning and investment.

Only exceptionally do the national PRSPs identify fisheries as even a rather narrow investment sector with some potential contribution to attaining the MDGs. Most, such as that of Cameroon, for example, give no indication of plans for including fisheries within the MDGs of the nation (IMF 2006a). Further, in some cases where a narrow sector is identified, as in Nicaragua, for example, “prioritized strategic guidelines” for fisheries development under MDGs seem to concentrate on activities that would benefit just a small and already comparatively well-off minority of the population. In Nicaragua, fisheries development proposed to meet MDGs is focused narrowly on improving “shrimp farming” “...via a better regulatory framework and improved electricity and water services, and with government aid to lower private sector production costs through research, the dissemination and adoption of better practices for larvae quality, growth diet, pond water quality and the implementation of good crop management practices” [*sic*] (IMF 2005a:38).

However, some countries, among them Bangladesh, Cambodia and Guinea, for example, appreciate the need for wider approaches. The PRSP of Bangladesh, where fisheries provide an estimated 6% of the GDP and employ 10% of the total labor force

(IMF 2005b), specifies a mix of both detailed technological approaches combined with strategies for tackling underlying social issues of land ownership for fishing communities on floodplains (IMF 2005b). Similarly, in Cambodia, where crucially important fisheries provided an estimated 9% of the GDP in 2005, the goal is to ensure sustainable access to fisheries resources for the poor, and empower communities to participate directly in fisheries planning and management (IMF 2006b).

The PRSP of the West African nation of Guinea places fisheries development squarely within the context of rural development (IMF 2006c:40): “Since over 80 percent of the poor are living in rural areas in the interior of the country or on the coast, any investment in the rural economy can have a major impact on poverty by creating jobs and increasing incomes.” Were major constraints removed, it is claimed that fisheries development could improve food security, increase per capita fish consumption from 13 to 17 kg/yr by 2010, and play a role in poverty reduction (IMF 2006c).

#### 5. Reconsidering the MDGs

Prior to discussing the potential contribution of fisheries to fulfilling the MDGs, a reconsideration of the eight MDGs is important, because their present order is misleading. Were there only two main goals—(1) environmental sustainability and (2) development of a global partnership—underlying issues would be better emphasized. All MDGs depend on these two critical goals, without which none of the others now listed as 1–6 could be achieved. These two goals need to be at the top of the agenda, and not in the lowest positions, as at present.

Although the goals as stated at present recognize that human well-being depends basically on environmental sustainability, as is explicitly covered by MDG 7, a greater emphasis is required. Further, MDG 7 needs

urgent re-consideration because it is the only goal for which the global situation is worsening (WWF 2007). That puts all the others at risk. This is discussed briefly below with reference to the use of pre-existing models of tropical resource management for both managing fisheries and implementing “The Ecosystem Approach” to attain MDG 7.

Since nothing will be achieved toward any of the MDGs unless there is a meaningful partnership between the developed and the developing countries, a much greater emphasis must also be placed on MDG 8. This is discussed below, with particular reference to the globalization of fisheries.

### **5.1. Nearshore tropical fisheries and MDG 7, ensuring environmental sustainability**

Although much environmental damage in the marine environment can be pinned on the global reach of industrial fisheries, in contrast a reconsideration of the environmental context of some tropical small-scale fisheries may provide concepts for reconfiguring aspects of MDG 7. Policy solutions to global problems must be complemented by local actions, for which concrete plans can be drawn up and implemented, and local benefits quickly appreciated. Such local level efforts, especially for small-scale tropical fisheries, require a different level of understanding and skills than are demanded at the policy level. Local efforts also demand a reconsideration of the approaches and models designed by Western scientists, practitioners and donors, including the now popular community-based and co-management models in fisheries, which were designed to overcome the weaknesses of centralized governance (Ruddle and Hickey 2008). An unbiased evaluation of pre-existing and alternative models for resources management in nearshore marine environments and linked ecosystems is also required (Ruddle and Hickey 2008).

#### **5.1.1. Pre-existing alternative models of fisheries management**

An enormous gap separates the concepts that underlie many pre-existing marine resource management systems from the predominant Western thought on the subject. Whereas Western models of fisheries management focus on fish stocks and stock externalities and assume an open access resource regime, pre-existing systems in many tropical regions, as has been well-documented in the Pacific Islands, for example, take a different approach (Ruddle 1994a, 2007b). In pre-existing systems management is based on the three interrelated factors of stock externalities, gear externalities and allocation problems, and implementation is based on defined geographical areas to which access is controlled (Ruddle 1994a, 2007b).

The core difference, which has generally never been widely appreciated (Ruddle 1994a, 2007; Ruddle and Hickey 2008), is that 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 (cf. Larkin 1977, 1978; Ruddle 1994a, 2007b). In striking contrast, pre-existing Pacific Island management systems, for example, make no such attempt. Rather, they focus on the interaction among “stock externalities,” “technological externalities” and “allocation problems,” human problems which are inherently manageable, although still not without their particular complexities, depending on economic, political, social and cultural conditions and changes within them (Ruddle 1994b). This implicitly accounts for the complex multi-species and multi-gear nature of the resource, thereby avoiding inherently irresolvable issues.

### 5.1.2. The pre-existing tropical resource estate and “The Ecosystem Approach”

In many tropical regions there exists the concept of a “resource estate”, a territory held jointly by a kinship-based group (Ruddle 1994a). These are particularly evident on high islands in the Pacific, where such “resource estates” usually extend (or extended) in a wedge-shape from a central watershed along lateral ridges into inshore marine waters, and formed self-contained units with the complete set of the resource areas and habitats required to provision local communities (Ruddle 1994a). Until the advent of monocultural agriculture and plantation systems, rural economies in the tropics were never about just fishing or farming. Rather, a non-specialized approach that included farming, fishing and exchange systems was traditionally adopted to spread risk and provide a balance of subsistence goods in uncertain environments with limited resources (Ruddle 1991, 2006).

A further important attribute of the “estate concept” of management is that it brings fishing communities into an intimate relationship with upstream and *in situ* users of other resources (e.g., farmers and foresters), and with the impacts that those resource users have on the aquatic environments on which nearshore fisheries depend (e.g., coastal turbidity levels) (Ruddle 2006). This attribute is important because resource enhancement and habitat protection are two inter-related management functions; stock enhancement being pointless if the habitat(s) on which it depends cannot simultaneously be protected. The attribute is also important because it can be applied locally in support of MDG 7, “Ensuring Environmental Sustainability.”

It is noteworthy that some of the concepts manifested in such pre-existing resource management systems, which can also be regarded as alternative ecosystem ap-

proaches, have recently been re-packaged by Western donors and academics as “The Ecosystem Approach,” but without recognizing the practical examples of the tropical antecedents (Ruddle and Hickey 2008). The Ecosystem Approach to Fisheries (EAF), for example, is basically an extension of the conventional principles for sustainable fisheries development and management to deal explicitly with such ecosystem issues as resources conservation, habitat protection, and fishery and non-fishery impacts, among other things (Garcia *et al.* 2003). However, it is far less comprehensive in formulation than the concepts embodied in pre-existing tropical resource estates (Ruddle and Hickey 2008).

Programs to attain MDG 7 that involve fishing communities would have to adopt an ecosystems approach, whether it be EAF directly, or a more sophisticated variant developed from the concepts of pre-existing systems. Doing so would constitute a major paradigm shift that would demand a fundamental change of the Western-style fisheries management institutions. It would require the phasing out of sectoral policies for the marine environment and resources. Fisheries management would then become part of a broader ecosystem management strategy, with new and longer time horizons.

### 5.2. Present MDG 8: The globalized fish trade and industrial fisheries

Finding solutions to problems that have arisen for both developing and developed countries from the now globalized fish trade and industrial fisheries that sustain it is central to the scope of MDG 8, i.e., to establish a global partnership for development between the developed countries and developing countries (Table 1). Developed countries are a principal driver of natural resource loss and climate change, through their production and consumption patterns (WWF 2006).

Therefore developed countries, and particularly the EU, Japan and the USA, as the world's largest seafood markets and importers, together with China, now a major importer, must coordinate efforts among themselves and in concert with the developing countries, to ensure: (1) that their agents (corporations, businesses and governments) cease exploitative activities; (2) that international trade and investment structures do not prey on weak governance; (3) that they assist in developing the capacity and resources to implement the international agreements to which they are party; (4) that they take action to reduce the negative impacts of their fleet subsidies; and (5) that they ensure their markets do not launder illegal catches. Realistically, these tasks must be shared between the developed and the developing countries, as envisaged in MDG 8, if anything concrete is to be achieved.

For example, developed countries should consider assisting developing country governments to take military policing and enforcement actions for their fisheries. In the worst cases that might have to occur within a broader framework, whereby general security and then comprehensive governance are re-established as pre-requisites to securing marine waters. A test case could well be in East Africa, off Kenya, Somalia and Tanzania, where rewarding fisheries attract heavily armed illegal foreign fishers. Off Somalia, for example, unmarked foreign boats have been poaching for many years; "Once, they [local fishermen] could scare them off with a shout and a rocket-propelled grenade-launcher. ....These days, the fishermen say, the unmarked vessels carry 23 mm anti-aircraft guns" (Anon 2006:44). The problems of IUU are compounded in failed states, where foreign vessels are captured and massively "fined" by local "coastal patrols"; "Some longliners used to buy fishing licenses in the past, but invariably from the wrong warlord" (*ibid.*). Clearly, under such conditions, something more than negotiated deals

to buy a share of fishing rights are required to regulate the industry!

The complex issues raised by the globalization of the fish trade have major implications for the redesign of national fisheries administration. International fisheries relationships and general affairs is now a highly important aspect of the work of many fisheries departments, regardless of their perceived status within a nation's administrative framework. Such work is usually highly political in nature, and generally beyond the competence of fisheries technical specialists, since it involves diplomacy, international law and treaties, and financing. As such, it is best left to ministries of foreign affairs, to which deep and distant water fisheries personnel should be re-assigned as technical specialists.

## 6. Conclusions

Fisheries do make a contribution to employment, income and nutrition, but, in the absence of rigorous study and more precise databases, nothing useful can be said beyond the usual unsubstantiated assertions. In order for them to make a contribution to both societies in developing countries and the MDGs, two main issues must be addressed.

The first is that the globalized fish trade which has emerged over the last three decades, together with the often acrimonious relationships that have resulted between developed and developing countries, must be addressed as a central issue. In particular, it must be accepted that serious impediments and inequities imposed on poor developing countries by an international fish trade that is controlled by terms dictated largely by the richer developed countries, and that the worsening condition of the global environment and the parlous state of resources, which also have serious impacts on fisheries resources, are in large part the result of overconsumption in developed countries. However, assigning blame is counter-productive and

detracts from the urgency of the need to achieve a meaningful and equitable partnership between the developed and the developing countries, which will focus on solving the problems within the framework of MDG 8.

The second main issue is that for small-scale, nearshore tropical fisheries to make greater contributions to societies and the MDGs in developing countries, unsuitable management systems, introduced mostly as a result of their imposition through inappropriate fisheries education and aid conditionalities, should be replaced with those that are more appropriate to the task of fisheries management, within the broader

framework of rural development. Greater contributions to society can be attained simultaneously with contributions to MDG 7, provided that the inappropriate models can be replaced with pre-existing alternative models long used by tropical societies, many of which are (or were) also used simultaneously to manage linked inshore marine and terrestrial ecosystems.

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