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FISHERIES RESOURCES AND SUSTAINABILITY: THE NEED FOR A HOLISTIC APPROACH TO MANAGEMENT

by

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Background Paper:

Fisheries Resources and Sustainability: The Need for a Holistic Approach to Management.

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ABSTRACT:

This paper addresses the appropriate scope of fisheries management in regard to the achievement of sustainability goals. It aims to re-iterate debate regarding such issues as an awareness-raising exercise. A redefinition and cursory breakdown of 'fisheries resources' are provided, as well as a brief examination of associated issues which need to be considered for their sustainable management. It is suggested that, while the scope of sustainability considerations is too broad to ever achieve guaranteed sustainability, management should take into account as many relevant factors as is realistically possible. In recognition that fisheries consist of both biological and industry-related components, it is also suggested that supplementation of what is traditionally held to be core fisheries expertise may be required to seriously attempt sustainable management.

1.0 Introduction

There has been much discussion over recent years regarding the 'sustainable management' of natural resources (see, for example: Brown et al., 1987; O'Riordon, 1988; Pearce et al., 1989; Pearce et al., 1990; Tisdell, 1990; WCED, 1990; IUCN/UNEP/WWF, 1991; IUCN, 1992; Jonson et al., 1993; Callister & Williams, 1994; Hale, 1994; Hunt, 1994). These discussions are especially pertinent to wild resources, such as reef or pelagic fish stocks. While many management and funding agencies readily incorporate sustainability concepts into their strategy documents, it is questionable how well they are translated into on-the-ground management.

There is no question that 'sustainability' is a desirable outcome of management, and it is not the intention of this paper to dispute this assertion. Rather, an examination of the appropriate scope of sustainability considerations is undertaken in an effort to better define the problems faced by managers. It will be suggested that the scope of sustainability considerations is unavoidably broad, to the extent that no management regime can realistically guarantee sustainability.

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The basic premise of this paper is, therefore, that the role and responsibility of managers is to ensure that the closest available approximation of sustainable management is undertaken, by taking into account as many of the relevant components of sustainability as is realistically feasible.

This is not a technical paper. It provides only a very cursory assessment of the sustainability issues involved in the management of fisheries resources, and is aimed more at raising the general level of awareness regarding such issues, than comprehensively addressing them.

2.0 Fisheries Resources -What are They?

The *Concise Oxford Dictionary* provides the following relevant definition of 'resource':

> "**2** (Usu. In *pl.*) **a** the means available to achieve an end, fulfil a function, etc. **b** a stock or supply that can be drawn on. **c** *US* available assets."

While many managers limit their consideration to the "**b**" variation, it is clear that resources are much more than simply physical commodities.

A resource might be more widely defined as anything which may positively contribute to the conducting of an activity. Thus, a fisheries resource is anything that may assist in the development and maintenance of a fishery.

Any particular fishery, must be thought of as being composed of two essential parts. The first being its biological resources, and the second, those resources which constitute the fishing industry. To be fully sustainable, both parts of a fishery must be subject to sustainable management.

Resources might be further separated into essential and non-essential resources. Clearly, it is the former of these categories which deserves most attention. In regard to sustainable fisheries management, essential resources are those things which are necessarily required, if a fishery is to be successfully established and maintained.

What is the first thing necessarily required to establish and maintain a fishery? Very few would argue that the answer to this question is other than the initial and continuing presence of one or more exploitable species (for convenience, these will be referred to as "fish"). It is not without reason, therefore, that the ecological sustainability of a fish stock resource is the main focus of many agencies concerned with fisheries management. Yet, the question posed at the beginning of this paragraph begs further queries. Namely, what are the second, third, fourth, and so on, necessary requirements to the establishment and maintenance of a fishery.

The nature of these additional, yet equally necessary, requirements will obviously vary greatly, depending on the types of the stocks involved and where the fishery sits on the subsistence-commercial exploitation spectrum. It would be very naive, however, to assert that the presence of fish is the sole necessary requirement to the development of a sustainable fishery.

A more comprehensive list of such essential resources for a fishery might therefore include:

i. An ecologically viable fish stock.

The stock must be of an appropriate size and genetic make-up to support the intended level of exploitation, given all other factors concurrently influencing the stock. Such other factors include all human-related or natural processes, whether of a short or long-term nature. This is especially relevant to those processes inducing habitat change

ii. Sufficient expertise, motivation and control to design, implement and enforce ecologically sustainable use strategies for the fish stock.

These are the resources which fisheries agencies are traditionally expected to supply. While a government (or multi-government) fisheries body might reasonably be expected to take the lead agency role, they should not be regarded as the sole institution involved in sustainable fisheries management. The wide range of human-related influences acting upon fish stocks means that any government or non-government institution able to effect any form of control over such influences may have a part to play in sustainable "co-management" of a fishery. It would be an appropriate role for a fisheries agency to encourage them to do so.

There is no question as to the paramount importance of attempting to implement a sustainable management regime in respect to biological/ecological resources. Although the purpose of this paper is to point out the need to consider a wider range of fisheries resources, it does not dispute that "ecologically sustainable management" objectives should take precedence. The ramifications of failure in this regard, on both regional and global scales, are well documented (see, for example: Hardin, 1968; Meadows et al., 1972; Pearce et al., 1990; WCMC, 1992; Prescott-Allen & Prescott-Allen, 1986; Cherfas, 1994; Naeem et al., 1994; Pimm, 1994).

iii. A cost-effective technology for catching the fish.

Cost-effectiveness may be measured in terms of monetary or other effort costs, and it should be noted that and any necessary requirements relevant to sustaining the availability of such technology is consequently also an essential resource to the fishery. Thus, considerations such as maintaining the availability of appropriate trees from which canoes can be fashioned, or reasonably priced spare parts for outboards, are as much within the domain of fisheries management as ensuring the prevention of overfishing.

iv. Sufficient demand for catches

A species may be in great abundance and easily caught, but if no-one wants to eat or buy what is collected, then the fishery will be abandoned.

In the case of more commercial fisheries, demand can roughly be translated into the existence of, and access to, markets for catches. The picture is also complicated by the linkages between the cost effectiveness of fishing technologies and the markets targeted. Being able to access a high-return market, such as the Japanese 'sashimi' market for yellowfin tuna, may render more expensive fishing methods viable. Such markets may also have quality standards which add new necessary requirements to a fishery in the form of fish-handling and transport infrastructure, such as ice-makers, freezers, or reliable and regular international flights.

v. Sufficient expertise and motivation to implement fishing technologies.

The availability of a required technology means little if fishers are not familiar enough with it to successfully put it to use. Recognition of this fact forms the basis of many fisheries training and extension projects. The availability of a technology also has questionable relevance, if its use does not provide returns on investments and effort which are adequate to foster interest. This is particularly relevant when a fisher faces a number of possible "opportunity costs" when dedicating effort to an encouraged fishing activity. An activity may well be cost effective, but if it fails to match the potential returns of other activities which are available (whether legal or illegal), it may still not be undertaken to the desired extent.

vi. Sufficient expertise and motivation to identify and facilitate access to markets.

Whether supplied by government, or dependent on private entrepreneurship, any deficiency in the infrastructural or managerial connections between producers and consumers will lead to problems for a fishery. In the case of these connections

being provided by the private sector, cost effectiveness and adequate returns to investments will again be an important determinant of sustainability of the fishery.

It should be clear from the above discussion that fisheries resources are far more than simply the biological resources upon which the fishery is based. Even if only essential resources are considered, they cover a broad range of items, including available fishing technologies, technical/logistical support for such technology, available markets, institutional support for fishery activities, fish handling infrastructure, transportation infrastructure, local/international entrepreneurship, and the full spectrum of related expertise.

3.0 Subsistence and Commercial Fishing Industries

Any activity which provides some kind of tangible benefits to those who undertake it may be thought of as an industry, regardless of whether any form of monetary exchange takes place, or not. Thus, even a purely subsistence fishery has an industry component which must be addressed by attempts at sustainable management.

The main differences between subsistence and commercial industries are found in the institutions associated with exploitation, and the driving forces which have lead to the establishment of these institutions.

In the case of subsistence fisheries, institutions concerned with the fishing and the distribution of catches are primarily driven by social factors. Such institutions may include the extended family, the village unit, or specifically formed village councils. How these institutions influence fishing and the consumption of catches is dependent on social factors which will vary greatly from culture to culture. To achieve a desired outcome in a subsistence fishery, the operation of such local institutions and the social/cultural forces supporting them must be well understood. Attempts at management which unintentionally (or intentionally) conflict with existing subsistence institutions or social forces are much less likely to succeed.

In the case of commercial fisheries, associated non-government institutions are usually financially-driven. This has the advantage of rendering them much more predictable at local scale. If, however, large-scale or international markets are involved, the complexity of the economic forces acting upon a fishery may be beyond the ability of most fisheries managers to incorporate into planning decisions.

In both instances, specialist knowledge, often considered beyond the normal field of fisheries managers, is indicated as necessary. The importance of such information in designing sustainable fisheries management therefore needs to be greater emphasised, both in terms of fishery agency staffing policies and fishery project design. Many larger, more affluent, agencies have already recognised the necessity of acquiring specialist expertise,

but it is still too often regarded merely as a peripheral source of management input and relegated to centralised positions.

It should also be noted that the great majority of fisheries, particularly in developing countries, consist of a poorly-defined mix of subsistence and commercial industries. This serves only to further complicate management efforts.

4.0 Benefits of Broader Management

It is not the intention of this paper to suggest that existing management practices are grossly inadequate, only that there is a potential to improve management and realise a broader range of potentials relating to fish stock resources.

From the perspective of commercial fisheries, industry-related expertise may be able to assist in identifying and accessing new, under-utilised, or high return markets. If new markets are involved, access might require appropriate 'product recognition' (ie. in by-catch or off-cuts) or 'product differentiation' (ie. through new or novel processing options). Such expertise may also promote efforts aimed at stimulating interest in, and consequent demand for, new products derived from a fishery.

Apart from providing added incentives to fishers to maintain their involvement in a fishery, the above measures are also valuable in that they may provide the basis for diversification of the industry, thereby increasing the likelihood of long-term sustainability.

Another important function of such expertise is to recognise the limitations of current activities in respect to market capacities and possible price fluctuations which may result from varying levels of market saturation. More generally, they may also assist in the determination of likely market trends, such as those flowing from changes to international trade agreements.

All of these functions serve to increase the degree of predictability in strategic planning. Thus, they all have benefits in respect of sustainability goals.

5.0 Holistic Management for More Sustainable Fisheries Development

As asserted earlier, any particular fishery must be thought of as being composed of two essential parts, namely, the biological resources, and those resources which constitute the fishing industry. To be fully sustainable, both parts of a fishery must be subject to sustainable management. Neglect of either part, or any essential sub-component thereof, will negate sustainability, regardless of how well the remainder of the fishery is managed.

What, then, is the appropriate scope for fisheries management? Clearly, certain factors are often beyond the ability of most agencies to manage. The long-term effects of processes such as global warming may, for example, be difficult to predict. Similarly, it may be virtually impossible to exercise any real control over trends in international demand for fisheries commodities. There may also be times at which active controls on certain factors, such as the activities of private enterprise, may be unwarranted, or politically undesirable.

This is not to say that any of these considerations are beyond the scope of fisheries management. Best management can only arise from consideration of as many of the variables involved in a task as is possible. Even those factors which are unpredictable or beyond a manager's direct control must be incorporated into long-term sustainability strategies. Uncertainty and lack of control . For instances in which important management variables are subject to high degrees of uncertainty, or inability to control, appropriate contingency plans or other adaptive management measures may be indicated to be necessary.

Recent initiatives, such as Integrated Catchment Management (ICM) and Integrated Coastal Zone Management (ICZM), have sought to bring together cross-sectorial groups of government agencies, industry bodies and other non-government organisations to address co-ordination of management efforts in regard to broader sustainability objectives. Such fora are certainly a move in the right direction and fisheries agencies should make every effort to encourage and facilitate them. More focussed institutional co-ordination should also be attempted amongst bodies, such as fisher associations, fish marketing bodies, or transportation agents.

Agencies charged with the responsibility of managing a fishery must manage the whole fishery. While many unsuccessful attempts at developing new fisheries may be attributed to a lack of biological/ecological knowledge about the species targeted, a great deal of others have failed for different reasons. When such reasons may be directly associated with a lack of understanding of fishing industry-related resources, and a consequent lack of associated management ability, the need to obtain input from a broader range of expertise is indicated.

6.0 Conclusion: The Appropriate Limits of Fisheries Management.

In summary, essential fisheries resources may span the entire gamut of both ecological and industry-related facets of a fishery. Any sincere attempt at sustainable management of the fishery as a whole must consider the sustainable management of as many of these resources as possible. The interdisciplinary nature of fisheries demands a co-ordinated, interdisciplinary approach to management. Such interdisciplinary approaches may involve the acquisition of expertise traditionally assumed to be external to the

requirements of "core fisheries management". Such traditional assumptions simply reveal a serious misunderstanding of the real nature of fisheries.

There may, of course, be times when it is decided that an existing fishing industry is to be discouraged, in favour of alternate uses of shared resources, such as tourism. In such cases, sustainable management is clearly not the desired goal and they are therefore beyond the scope of this paper.

Other, concurrent, approaches to more complete sustainable fisheries management should include the facilitation and active encouragement of co-ordination between all agencies which have the potential to influence or predict on-going or periodic factors which may have an effect on any fisheries resource.

Fisheries are complex. The management of any natural ecosystem is a very difficult undertaking, as is the management of any significant subsistence or commercial industry. Uncertainty and lack of control in regard to important variables render any guarantees of sustainability very questionable. Yet, this apparent unattainability of assured sustainable management should not be discouraging.

Although the prospect of attempting to control a wide range of variables and activities may seem daunting, if not impossible, the fact that we cannot ensure or guarantee sustainability should never be used as an excuse to ignore important and easily recognised components of a management task. Managers should attempt to implement the closest feasible approximation to sustainable management. The closest approximation we can achieve to sustainable management will be that strategy which has been developed on the basis of the best understanding of the fishery as a whole.

Finally, it must be noted that not being able to guarantee sustainability does not necessarily mean sustainability cannot be achieved. By attempting the closest feasible approximation of ensured sustainable management, the approach *most likely* to be sustainable is effected.

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