REVIEW OF COASTAL AND MARINE LIVELIHOODS AND FOOD SECURITY IN THE BAY OF BENGAL LARGE MARINE ECOSYSTEM REGION

REPORT PREPARED FOR THE

BAY OF BENGAL LARGE MARINE ECOSYSTEM PROGRAMME

by

PHILIP TOWNSLEY

IMM Ltd

The Innovation Centre

University of Exeter

Rennes Drive

Exeter EX4 4RN

U.K.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

COASTAL AND MARINE LIVELIHOODS IN THE BAY OF BENGAL REGION

In order to understand the complexities of coastal and marine livelihoods, particularly in the Bay of Bengal region where there are marked contrasts in livelihood conditions around the region and even from area to area within countries, a holistic understanding of livelihoods is necessary. A framework for understanding livelihoods is proposed that helps to relate the diverse elements that contribute to and influence the livelihoods of people in coastal areas.

This framework includes the following key elements:

- The basic gender, age, caste and ethnic characteristics of different groups;
- The human, social, natural, financial, physical and political assets to which different coastal and marine dwellers have access;
- Factors that directly influence the capacity of people to make use of those different assets, such as the legal and institutional environment surrounding them, and the markets to which they have access;
- Factors that influence their access more indirectly, such as policies and the processes by which those policies are generated;
- The vulnerability context with which they have to deal;
- The strategies they adopt to combine these different elements to achieve more or less viable and sustainable livelihoods for themselves and their households.

A potentially wide range of stakeholders are involved in coastal and marine livelihoods. These include not only those who depend completely or partially on the direct use of coastal and marine resources, but also those whose livelihoods make some use of the goods and services generated from coastal and marine ecosystems and who therefore constitute more indirect users. Use of coastal and marine ecosystems makes important contributions to “subsistence” but is more often market oriented and, in many areas of the region, the entire economy of coastal areas is intimately linked to the earnings generated from the use of those resources.

Bengal

Key characteristics of coastal and marine livelihoods in the region include the following points.

- Poverty is prevalent among those involved in coastal and marine livelihoods, particularly on the western side of the Bay of Bengal but also in Thailand and Indonesia, and in spite of progress in poverty eradication over the last decades. Recent data indicates a slowing down in the rates of poverty reduction throughout the region.
- The distribution of poverty through coastal and marine areas of the region is uneven. Some coastal areas are among the most developed while remote, inaccessible and risk-prone areas are among some of the poorest. Even in more developed areas, particularly on the western ad northern sides of the Bay of Bengal, significant pockets of "hidden" poverty remain.
- Dependence on coastal or marine livelihoods is frequently identified with particular social or ethnic groups – caste groups on the western and northern sides of the Bay of Bengal and some ethnic groups along the shores of the Andaman Sea and the Straits of Malacca. These patterns are increasingly breaking down as populations become more mobile and are often forced to seek out alternatives to their traditional occupations.
- With increasing mechanisation and intensification of patterns of resource exploitation, the specific skills and local resource knowledge often associated in the past with coastal and marine resource users are being displaced. For none transferable skills, such as those used by many artisanal fishers, this is leading to a significant disruption of "traditional" livelihood patterns.
- A relatively high level of dependence on natural resources is a common feature in coastal and marine areas of the region. Coastal and marine areas offer a relative abundance of diverse resource "niches" that create many opportunities for exploitation. The fact that many of these resource niches are, or were until relatively recently,

open-access or common property, has made them particularly attractive for the poor.

- The exploitation of coastal and marine resources is often associated with low social status – fishing castes in India and Bangladesh occupy some of the lowest levels in the social hierarchy - and the influence and power of these groups is correspondingly limited.
- The technology used by those exploiting coastal and marine resources is in transition, with traditional, small-scale methods of exploitation increasingly competing with larger-scale, mechanised modes of production. This has also opened the doors to exploitation of these resources to non-specialised groups with little resource knowledge and little concern for longer-term resource sustainability.
- The low social status of many communities of coastal and marine resource users also affects their access to channels of political influence and decision-making. Some changes are occurring in the form of new associations to represent specific resource-user groups, notably fishers.
- Coastal and marine livelihoods have always tended to have a **strong market orientation** - people exploit coastal and marine resources in order to sell them or exchange them for other foodstuffs, goods and services. As coastal areas have progressively become more closely connected with distant, urban and international markets, this market orientation has become stronger and patterns of exploitation are increasingly closely linked with patterns of market demand that range from the local to the intercontinental.
- Market linkages have always played a crucial role in coastal and marine livelihoods, by not only ensuring access to markets for producers, but also by providing inputs, credit and security for producers otherwise isolated from institutions and market mechanisms. These ties of dependency have often facilitated the development of exploitative relationships between market intermediaries and producers but they are deeply ingrained in many coastal and marine communities and have proved difficult to change. Shifts in market patterns seem to be undermining or changing many

of these traditional patron-client relations, not always to the advantage of primary producers who may find themselves with less security than they experienced within traditional systems.

- Many coastal areas of the Bay of Bengal are highly vulnerable to natural hazards such as flooding and cyclones. This has affected the levels of development in some areas and the quality of service delivery.
- Acute seasonality is also an important part of coastal and marine livelihoods in the area with strong monsoon effects that influence resource availability, weather conditions, ability to process marine and coastal products and many other aspects of people's livelihoods;
- The dependence of many coastal and marine livelihoods on the open-access or common property resources that are abundant in most coastal areas means that changes in legislation, rules and regulations regarding these resources have strong impacts on livelihoods. The increasing priority given to environmental protection by policy and law-makers frequently leads to the introduction of new rules and regulations that limit or exclude coastal and marine resource users from the resources they depend on, with negative impacts on their livelihoods. Where alternatives are not easily accessible to these people, they often continue to pursue their livelihood strategies even though they have been outlawed, rendering resource protection measures ineffective and adding increased vulnerability to their livelihoods.
- The people who depend on coastal and marine ecosystems for their livelihoods are influenced by a wide range of policies and policy processes, often relating to different sectors. The policy decisions in these different sectors often have impacts in other sectors and these impacts tend to be concentrated in coastal and marine areas, due to their "downstream" position. The impacts of conflicts between policies in different sectors are often felt most strongly in coastal areas.

SHARED AND TRANS-BOUNDARY ISSUES RELATING TO COASTAL AND MARINE LIVELIHOODS AND FOOD SECURITY IN THE BAY OF BENGAL

Key shared and trans-boundary issues that relate to coastal and marine livelihoods and food security are:

- **Poverty** represents a priority shared issue in the region that has important impacts on livelihoods in coastal and marine areas and the way in which these livelihoods impact on coastal and marine ecosystems. Widespread poverty among coastal and marine resource users reduces the effectiveness of measures to conserve coastal and marine resources as short-term concerns for survival and food security will almost invariably take precedence over concerns for long-term resource sustainability. Poverty also erodes the ability of resource users to build their capacity to seek out alternatives encouraging continued or increased exploitation of resources, which in turn increases poverty which thus becomes a self-perpetuating cycle.
- The **depletion of fisheries resources**, which seems to be affecting resources almost throughout the region and, where resources are shared, has direct transboundary impacts, is linked both to poverty and to the increase in fishing effort due to increasing population, high demand for fisheries products, habitat degradation and over-investment in the sector. Control of fisheries resource depletion is liable to involve costs for those involved in fisheries resource exploitation, in the form of reduced incomes from fisheries. These costs are also liable to be felt throughout the chain of actors involved in the handling and movement of fish from producers to consumers. In the face of sustained market demand for fish the incentives for accepting these costs are relatively limited unless viable alternatives are available for producers.
- The **capture of the live fish for the food and ornamental fish trade** represents one aspect of the depletion of fisheries resources and habitat degradation that is specifically fuelled by high market demand from high-value regional and international markets, making this a significant transboundary issue. This market demand, coupled

with limited capacity to control the use of destructive fishing methods, notably cyanide, means that the live fish trade has significant potential for negatively affecting the resource base. The live fish trade can probably be made sustainable although the renunciation of destructive practices is liable to involve costs for those involved, as they are generally cheap and simple to use whereas sustainable practices may require more skill and higher investment.

- The causes of the **degradation of critical habitats** are complex and range from the patterns of direct resource use by those dependent on the resources that derive from those habitats to a wide range of external factors – pollution from industry, shipping and human habitation, the concentration of external impacts from upstream catchment areas in the coastal zone and the clearance and conversion of coastal habitats to new uses. The degradation of these habitats has impacts on the livelihoods of those who directly depend on them and, potentially, on a far wider range of coastal and marine resource users who exploit species that depend on these habitats for part of their life-cycle. In order to reduce degradation, direct users are liable to have to bear costs by limiting their use of those habitats while a wide range of activities that may be having more indirect impacts – agricultural practices, land conversion, forestry and irrigation schemes in catchment areas – are also liable to incur costs in order to change practices to make them les damaging for critical habitats in coastal and marine areas.
- **Tourism development** has occurred in relatively limited areas of the region, but where it does occur it creates a wide range of new livelihood opportunities and attracts services to coastal areas that might not otherwise be available. This is particularly true of large, mass tourism developments, but these also create threats to the local environment and to the livelihoods of local people who may find themselves displaced by workers and service providers attracted from outside the coastal areas while their traditional sources of livelihood are severely disrupted. Eco-tourism is increasingly gaining

currency and would appear to offer possibilities for environmentally sustainable tourism with more pronounced positive impacts on local communities. All forms of tourism have significant social impacts on the communities involved with disruption of traditional livelihood strategies and a tendency for rapid change in values and priorities that can lead to strong internal tensions and generational conflict. Transboundary aspects of this issue include the possible transboundary impacts of habitat degradation and the patterns of demand on marine and coastal products created by large tourism developments across national boundaries.

- **Changes in catchment areas** have led to considerable changes in the environment in downstream coastal areas, most significantly in coastal areas of the delta of the Ganges-Brahmaputra – Meghna river system, with developments in one country often having downstream impacts on others. Coastal and marine livelihoods can be affected by changes in the quality of water available to them for agriculture, sanitation and drinking, the degradation of coastal resource areas such as mangroves and coastal swamps that may support their livelihoods and the disruption of fish migration routes with consequent negative impacts on fisheries resources.
- **Pollution** generated by urban and industrial development, increases in shipping and oil spills and the increasing use of chemical inputs in agriculture is both affecting critical habitats in coastal and marine areas, and the livelihoods that depend on them, and is affecting the overall health of coastal and marine ecosystems. Those making direct use of these resources see decreasing access to resources they exploit, declining environmental conditions that may affect their access to safe water and necessary livelihood resources and specific health risks generated by increased pollution. Pollution impacts are often particularly severe in coastal areas where pollution from multiple sources may be concentrated.
- Some of the Bay of Bengal nations are among those likely to suffer some of the most dramatic impacts from **climate change & sea-level rise**. These impacts may range from increased vulnerability to

natural hazards like flooding and cyclones, to the complete disappearance of large proportions of the land area of some countries like the Maldives and Bangladesh. Changes in climate may also directly impact habitats, the resources that depend on them, and the livelihoods of those that use those resources.

PRIORITISATION OF ISSUES AFFECTING COASTAL AND MARINE LIVELIHOODS IN THE BOBLME

The table presented below reviews the prioritisation of issues affecting coastal and marine livelihoods in the BOBLME.

ADDRESSING KEY ISSUES, KNOWLEDGE GAPS, DISTORTIONS AND INSTITUTIONAL DEFICIENCIES

A wide range of initiatives to address some of these issues are identified. It is noted that while there are a multiplicity of initiatives addressing specific ecosystem management issues in particular sites, there is a general lack of initiatives to address important cross-cutting issues and the general need to address conflicts between different sectoral areas and between activities in different countries.

Key knowledge gaps identified include:

- The lack of detailed knowledge regarding linkages between livelihoods and different ecosystems, particularly in terms of the specific flows of benefits generated to local livelihoods from different coastal and marine ecosystems and how these are changing;
- The lack of information on coastal and marine livelihoods in specific areas - notably Myanmar – and regarding specific groups of people engaged in marine and coastal-related livelihoods, such as those involved in small-scale mechanised fisheries and those working as labour in coastal aquaculture.

The major distortion identified derives from the differing levels of development encountered in different areas of the Bay of Bengal and the effect that this has on markets for coastal and marine products in the region. This strong market demand from more affluent areas of the region for products often produced in poorer areas creates a strong incentive for

intensive exploitation of resources without necessarily generating sufficient benefits for producers to allow them to diversify into alternative livelihood activities that would allow them to reduce pressure on the resource base.

Institutional deficiencies include:

- The lack of capacity for coordination between institutions concerned with coastal and marine areas;
- The lack of capacity among institutions concerned with ecosystem management to adopt and incorporate people-centred approaches into their initiatives;
- The lack of capacity among decision and policy-makers to systematically identify and harmonise conflicts between different policy areas, particularly across the range of sectors that can influence conditions in coastal and marine areas, and across national border, where the problems of policy harmonisation are even greater.

PRIORITIES FOR ACTION

Priorities for action include:

- **Support to greater harmonisation of policy and policy processes affecting coastal and marine livelihoods at the national level through development of guidelines on policy harmonisation**

  Intervention to provide policy makers with clear and systematic guidelines on how to identify and harmonise policy conflicts between sectors would make a significant contribution to diminishing the wastage of precious development resources caused by conflicts between policies in different sectors and to reducing the negative impacts such conflicts have on coastal and marine livelihoods, where the "externalities" of these conflicts are often concentrated. This approach would have the added advantage of also contributing to addressing many of the other issues that have been given a somewhat lower priority, such as degradation of critical habitats, pollution, changes in catchment areas, reduction of fisheries resources and impacts from tourism development. Many of the negative impacts of these areas also derive from the overlapping or conflict between policies in these different sectors.

- **Support to greater harmonisation of policy and policy processes affecting coastal and marine livelihoods at the international level through development of guidelines and appropriate mechanisms for negotiating policy harmonisation**

The development of similar guidelines to facilitate the harmonisation of conflicts at the international level, as well as appropriate mechanisms for the application of those guidelines, would build on the processes developed at the national level to create a basis for the systematic identification of transboundary and shared issues and strategies for their resolution.

- **Promotion of people-centred approaches to policy development for coastal and marine areas**

Particular attention should be paid to the incorporation of people-centred approaches into such guidelines to ensure that policies on environmental protection and conservation are developed with the needs and priorities of local communities of resource-users in mind, as otherwise these policies are liable to be in conflict with poverty eradication objectives and are liable to be rendered ineffective where the priorities of local people are in conflict with those of resource managers.

- **Support to the reduction of pressure on coastal and marine ecosystems through the enhancement and diversification of livelihoods**

The experience of the many initiatives in the region supporting livelihoods enhancement and diversification suggests that the process requires a long and flexible timeframe and is best implemented by local organisations with commitment to a particular area and strong local roots. The comparative advantage for an regional programme like the BOBLME does not lie in this field.

However, the BOBLME will have considerable advantages as a mechanism for generating and channelling information and learning regarding coastal and marine livelihoods and approaches for addressing the issues faced by coastal and marine dwellers. This is especially pressing given the current lack of comprehensive guidelines on how to

approach activities to enhance and diversify livelihoods. This suggests a role for the BOBLME in reviewing best practice in addressing livelihoods issues in coastal areas, developing guidelines and disseminating them, particularly among the community of environmental and resource managers and scientists that might not normally be exposed to these issues.

The focus on guidelines for livelihood enhancement and diversification could be supported by a facility to provide funding to local initiatives.

- **Support to responsible and pro-poor market mechanisms**

Support to making existing market mechanisms more responsible and pro-poor would focus on an initial assessment of the potential for ecological and social certification of marine and coastal products from the Bay of Bengal region. This would pay particular attention to the potential for such schemes in regional markets such as Singapore and Kuala Lumpur and eventually form linkages with existing certification mechanisms operating in other parts of the world.

- **Information support to action on climate change and sea-level rise**

- The development of mechanisms to generate information to support action on climate change and sea-level rise would help to fill important gaps in information regarding linkages between ecosystems and livelihoods in the region and create a linkage between policy makers at both the regional and global levels and the realities of dealing with climate change and sea-level rise at the grassroots level. Engagement of a range of local associations and community-based organisations in this activity would also enhance their role and awareness of issues related to

1. COASTAL AND MARINE LIVELIHOODS AND FOOD SECURITY IN THE BAY OF BENGAL REGION

1.1 INTRODUCTION

1.1.1 Defining livelihoods

People's livelihoods are not made up of simply a group of activities that they carry out in order to earn income and access the food that they require for their sustenance. While activities that generate income or secure food supplies are usually a critical part of people's livelihoods, they are shaped and influenced by a complex set of factors that need to be taken into account if people's choices and strategies for ensuring a livelihood for themselves and their families are to be fully understood.

When considering the livelihoods of those living in coastal areas of the Bay of Bengal and depending, to different degrees, on marine and coastal resources, these influences are of particular importance. Any analysis of livelihoods that focuses purely on the principle activities in which people are engaged in order to "make a living" will tend to ignore critical interactions that represent a fundamental aspect of people livelihoods and which exert very significant influences on what people do, why they do it and the "outcomes" of the livelihood strategies in which they are engaged.

A better understanding of the complex nature of livelihoods has derived largely from work conducted in research into poverty (Sen, 1981; Narayan *et al.*, 2000). This has grown out of the realisation that simple measures of poverty focussing on income and the ownership of assets such as land failed to capture many key features of poverty such as marginalisation, vulnerability, and exclusion from participation in decision-making processes that are often of greater significance than the simple material manifestations of poverty.

Livelihoods need to be understood as dynamic - subject to shocks, changes and seasonal effects – particularly when they depend heavily on access to natural resources, as is often the case among people living in coastal areas. The dynamic nature of the coastal environments means that the ability of

people to sustain their livelihoods in the face of shocks and changes is a particularly important issue in coastal and marine livelihoods.

> *A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain its capabilities and assets both now and in the future, while not undermining the natural resource base.* (Carney, 1998b)

The adoption of this holistic interpretation of livelihoods has important implications for our understanding of the relationship between people and the ecosystems in which they live and on which they may depend for at least part of their living. Particularly in coastal areas, dependence on the use of natural resources is often high, largely because of the relative abundance and diversity of resources that can be found in coastal areas.

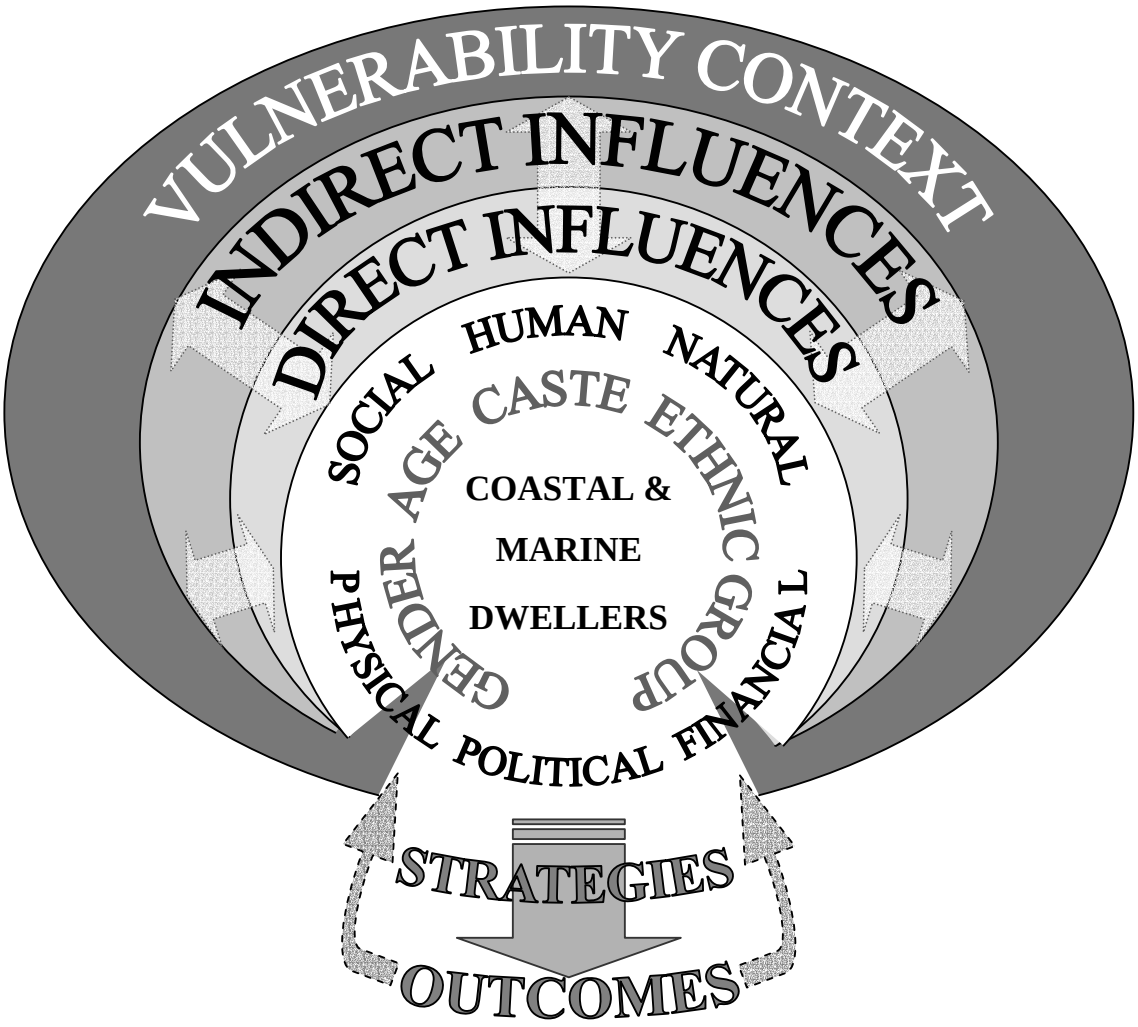
The diagram in Figure 1 shows how some of these different elements in livelihoods might be related and can provide us with a framework for analysing the current status of coastal and marine livelihoods in the Bay of Bengal region taking into account the diverse factors that are affecting them. Clearly, no "framework" can ever be completely comprehensive, especially when as complex a system as coastal and marine livelihoods in a large an area as the Bay of Bengal is being considered. The framework is merely offered as a "hook" on which to hang an analysis of livelihoods that would otherwise be so complex as to become almost impenetrable.

The people at the centre of the framework need to be clearly defined as the patterns of their livelihoods will depend one who they are. At the most basic level, this will depend on certain basic characteristics of these people – whether they are men or women, and the way this affects their capacities and roles in the society in which they live; their age; their ethnic group and the position that determines in society; their caste, or social class, and how that is defined in society as a whole. Understanding of livelihoods has to start from a differentiation of these basic features that often determine all aspects of the sorts of livelihoods that people are able to create for themselves and their households. This "starting point" is very significant as information that allows development workers to do this is rarely available

and initiatives are often designed on the assumption that these fundamental distinctions are not important, when in fact they normally constitute the most important factors determining how people's livelihoods differ.

Figure 1

A Framework for Understanding Coastal and Marine Livelihoods



Depending on their gender, age, caste or ethnic group, different people living around the coasts of the Bay of Bengal may (or may not) have access to different set of "livelihood assets". Given the ecosystem focus of the BOB-LME, it might seem logical to concentrate principally on the "**natural assets**" that people draw on for their livelihoods –natural resources like fish, water, the sea, coastal swamps, the work, food and produce derived from these resources and people's ability to access those resources. But those

natural asset constitute just one part, albeit important, aspect of coastal and marine livelihoods. Understanding the ways in which people make use of the natural assets at their disposal cannot be disassociated from the ways in which they are able to make use of other key sets of assets:

- **human** assets, or skills, knowledge, capacity to work, access to education or health facilities (**food security** can be regarded as an essential part of the process that ensures that people can sustain their human assets);
- **social** assets, or the networks of relationships, patronage and obligations within the household, the extended family, and the community around;
- **physical** assets, or the types of infrastructure, technology, tools and equipment that they can use;
- **financial** assets, or the wages they earn, their savings, their access to credit, whether informal or formal;
- **political** assets, or the extent to which they are represented within their community and able to play a role in decision-making.

When looking at the relationship of people with their surrounding ecosystem, it is crucial to understand their relationships with these assets as well as the ways in which they use natural resources.

But often the mere presence of a particular asset does not necessarily guarantee that people can make use of it for their livelihoods. For example, people may live next to rich natural resources but be unable to make any use of them for their own benefit for a variety of reasons. They may lack the technology to exploit them, or not be able to acquire that technology because they are too poor. The resources may be protected by environmental legislation or privately owned so that access to or use of them is not possible for local people.

Similarly, there may be school buildings (physical assets) in a community but the Ministry of Education may lack the resources to pay teachers to go and teach there: there may be a strong tradition of mutual self-help within the community (social assets) but changes in markets or technology, perhaps

encouraged by policy initiatives, may draw resources out of traditional systems and undermine them.

Therefore the various factors that affect people's ability to develop their livelihood assets, make use of them and derive benefits from them need to be understood. **Direct influencing factors** include those factors that are directly perceived by people in their attempts to create a livelihood. These are generated from outside their immediate environment, but affect their directly. Examples of these might include: the markets they are able to access for their goods; the rules, regulations and laws that they affect what they are able and not able to do or the resources they are able to use; the institutions and agencies that deliver goods and services such as health, education, transport, water supply, sanitation or credit; the kind of local institutions of governance that they come into contact with that are responsible for implementing projects and programmes; the sources of information that they can assess; the social institutions, norms and values that affect the way society function; the religious institutions that often play a key role in defining those norms and value.

"Behind" these direct influencing factors are other, **indirect influencing factors** that are less clearly seen from the point of view of people at the centre of this framework. These include the policies that dictate the way that that service agencies operate, the types of programmes and projects that they implement and the resources that are made available to them; the processes that lead to the formulation of those policies; systems of political representation and governance; the power structures within society that affect how things actually happen; broader structural institutions, like the law, the legal system and judiciary, money, private property and systems of land tenure; the structures that affect how information is made available and communicated.

Both these direct and indirect influencing factors are factors that can, with more or less difficulty, be changed – they are all factors that depend on people and the institutions they create. The **vulnerability context** is made up of those factors that cannot be changed. Some of them "direct", such as seasonality or natural shocks and disasters like cyclones, floods, droughts, outbreaks of disease or pests. Others are more indirect, such as processes

that are underway that are either impossible or very difficult to change. These might include processes of population increase, technological change, urbanisation or shifts in macro-economic conditions such as “globalisation”. While many of these factors in the vulnerability context cannot be addressed directly, agencies that are included in among the direct and indirect influencing factors can help people to deal with, or protect them against, these vulnerability factors more or less effectively. Good policies can strengthen the ability of people to make use of their assets effectively so that they can deal with seasonal changes, cope with shocks and adapt to trends.

Based on how these complex factors interact, people decide on certain **livelihood strategies** rather than others. Ideally, they should be able to “choose” how to combine their livelihood assets, taking into account the various factors that influence how they can use them, in a way that enables them to deal with vulnerability and achieve the **livelihood outcomes** that they aspire to. All to often, particularly in some parts of the Bay of Bengal region, their choices are limited, either because of poor access to livelihood assets, or direct and indirect influencing factors that create obstacles for them. Their livelihood outcomes are often far from ideal and many achieve outcomes that keep them in a condition of poverty.

These outcomes may themselves become forces that influence the way their future livelihoods are determined. In a condition of poverty, where they are not effectively supported by service delivery agencies and social safety nets, and policies do not help people to change their livelihood strategies to become more sustainable and effective, poor people may be forced to continue to rely on the short-term over-exploitation of natural resources simply in order to survive.

1.1.2 Defining coastal and marine livelihoods

Taking the term “livelihoods” to include the wide range of elements and influencing factors described above, “coastal and marine livelihoods” also need to be seen as involving far more than the direct exploitation of coastal and marine ecosystems by people living adjacent to them. Even for those directly involved in the use of coastal and marine resources, it often represents just one of the elements in their livelihoods. It may be more or less important, but it will be certainly strongly influenced by the other

options open to them, by the various direct and indirect factors in play and the vulnerability context that they have to deal with.

Taking into account the discussion of livelihoods above, the terms “coastal and marine livelihoods” can be interpreted in several ways. On the one hand there are livelihood strategies that include some form of dependence on the use of marine ecosystems or the products that derive from those ecosystems. Direct users of coastal and marine resources include the owners and crews of fishing enterprises and water-born transport vessels, shrimp or fish fry collectors, coral and sand miners, salt makers and mangrove cutters.

However, an even larger group of people are “indirect” users of these resources and depend on the exploitation of coastal or marine resources to provide raw materials for their processing, trading and other activities - fish processors and traders, the operators of cold storages and ice factories, traders whose goods are transported by sea, the operators of aquaculture enterprises that make use of shrimp and fish fry, builders who make use of sand and coral for their business, sellers and traders in salt, charcoal makers who use mangroves from coastal forests. Although many of these actors may not even live in coastal areas they can all be regarded as having a “stake” in the exploitation of coastal and marine ecosystems.

In addition, it is important to take into consideration an even wider group of people who may have very little direct contact with the coastal or marine environment but who in some way benefit from the goods or services it provides. Most people living in coastal areas, including those not directly involved in the use or coastal or marine resources, are liable to benefit from the economic activity and food supply generated by fishing activities or the exploitation of other marine resources. Coastal swamps and mangroves play an important role in providing protection of coastal dwellers from storms, tidal surges and coastal erosion – part of their “vulnerability context”- whether or not they are direct users of these resources. Likewise, owners and workers in industries that rely on rivers or coastal waters for dumping waste are also “using” the coastal ecosystem.

While this analysis of coastal and marine livelihoods cannot be expanded to include all those whose livelihoods potentially have an impact on coastal and marine ecosystems around the Bay of Bengal, a realisation of the

interconnectedness of the livelihoods of those directly using those ecosystems with the livelihoods of others potentially far away who have never even seen the coast is important. Siltation and run-off entering the coastal and marine environment from upstream activities have been identified, in the Bay of Bengal region, as major factors influencing the health of these ecosystems and efforts to eventually manage such influences entails addressing the livelihoods of those that depend on the activities that may be causing them – ensuring a more sustainable livelihood for coastal fishers using coral reef resources may entail the removal of livelihood options from upland farmers many kilometres away.

1.2 FOOD SECURITY AND POVERTY AMONG PEOPLE DEPENDENT ON COASTAL AND MARINE LIVELIHOODS IN THE BAY OF BENGAL

Access to an adequate supply of food can be regarded as both an outcome of people's livelihoods and one aspects of their "livelihood assets" that is likely to strongly determine people's choices regarding livelihood strategies. The maintenance of many of people's basic human assets – their ability to work and their health – clearly depends on being able to access adequate food.

To maintain this supply of food, individuals or households living in coastal areas can take several approaches. They can directly make use of natural resources that will enable them to provide food – access land either through ownership, rental or sharecropping to cultivate food requirements, or make use of the range of "wild" assets available in coastal areas. Or they can "convert" their produce or labour into earnings that they can convert into food. The distinction is particularly important when looking at coastal and marine livelihoods. While, in some areas of the region, there are no doubt "subsistence" users of coastal and marine ecosystems, who eat what they produce, it is important to realise that direct use of coastal and marine resources, and particularly fisheries, is generally market-oriented. Most fishers eat a relatively minor proportion of the catches they land – they mostly fish to generate income which can then be spent to purchase the other types of food they require. Therefore food security within coastal and marine livelihoods is certainly tied to access to marine and coastal

resources, but it is also tied to access to markets that will pay for those resources and so allow direct users to feed themselves and their households.

The issue of food security in the Bay of Bengal region is also closely related to the issue of poverty. As has been amply demonstrated, in the South Asia region where food security is still an issue, particularly in India and Bangladesh, failures in food security now, and in the past, are not generally tied to failures in **supply** of food, but to failures in **access** to food. People go hungry because they cannot command the resources required to access food, whether by purchase, trade or barter. This can be because food is too expensive, or their earnings are too low, but it is rarely because food is not there (Sen, 1981). Thus food security in the region is intimately connected with poverty and the complex causes of poverty which were discussed above.

This is also true for those whose livelihoods depend on coastal and marine resources. Failure of those resources, either because they are degraded or over-exploited, may have a relatively limited affect on the food security of resource users, provided they have other options available for generating the resources they need in order to gain access to food. For the very poor, it is frequently this lack of alternative options that is of major concern when considering the issue of degradation or overuse of the ecosystem, not the fact that the ecosystem has value in itself. This is not to say that the poor are immune to the values of a sustainable, healthy environment – often their entire cultural and social identities are intimately tied up with that environment, as is the case with traditional fishers all over the region. However, the poor can rarely allow those values to take precedence over their requirement to make a living and ensure their food security. Most resource-users who utilise unsustainable means of exploiting coastal and marine resources know very well that their actions are undermining the very ecosystem they depend on. But, in the absence of alternatives, long-term considerations about resource sustainability have to take second place to short-term priorities for survival.

Table 1 : Trends in Poverty in the Bay of Bengal Countries

	Population Below the National Poverty Line							
Country	**Survey Year**	**Rural %**	**Urban %**	**National %**	**Survey Year**	**Rural %**	**Urban %**	**National %**
Maldives	**NO DATA AVAILABLE**							
Sri Lanka	1990-91	22.0	15.0	20.0	1995-96	27.0	15.0	25.0
India	1993-94	37.3	32.4	36.0	1999-2000	30.2	24.7	28.6
Bangladesh	1995-96	38.5	13.7	34.4	2000	37.4	18.1	33.7
Myanmar	**NO DATA AVAILABLE**							
Thailand	1990	-	-	19.0	1992	15.5	10.2	13.1
Malaysia	1989	-	-	15.5	-	-	-	-
Indonesia	1996	-	-	15.7	1999	-	-	27.1

(adapted from World Development Report 2003)

Specific data on poverty among people dependent on coastal and marine livelihoods in the region is generally lacking but poverty trends in the region as a whole are of significant interest (see Table 1).

Almost all the countries in the region (except for Malaysia) experienced increases in poverty in the late 1990s. In Thailand, the World Bank data in Table 1 does not show information for this period, but other World Bank reports (World Bank, 2001) indicate a significant increase in poverty after the 1997 economic crisis. This increase has been particularly marked in the North-East of the country (traditionally the poorest part of Thailand) but also in the South, including the provinces bordering on the Bay of Bengal. This reversal of trends of falling poverty established in the early 1990s emphasises how poverty has remained a critical issue in the region not only in the countries where poverty is more marked and more intense– India and Bangladesh. Clearly, the data shown here for different countries are not necessarily directly comparable as they are based on national poverty lines rather than a common measurement of poverty.

The situation in coastal areas is extremely varied. Many coastal areas are relatively wealthy as their climatic, ecological and topographical conditions encourage development. Flat, well-watered coastal plains are often focal points for the growth of urban centres, transport by road, rail and sea, and communications networks. Agricultural development is frequently greater in coastal plains and the poverty situation in coastal areas often compares favourably with upland areas in the hinterland where poverty may be more extreme and more generalised. However, among these centres of development around the coasts are frequently found areas of extreme deprivation. Certain features of some coastal areas – the presence of diverse open-access resources and a wide range of livelihood “niches” - often attract the poor who find opportunities along the coast that are not available elsewhere. Even when coastal areas are relatively well-developed, pockets of “hidden” poverty may remain and, precisely because they are located amidst relative prosperity, they often remain unseen (IMM/ICM, 2003a).

The FAO estimates (FAO, 2002) that there are approximately 19 million people involved in fisheries in Asia who are “income poor” (see Table 2). The exact number of these living around the shores of the Bay of Bengal are

not known, but it can be assumed that a significant proportion of these poor people engaged in fisheries-related livelihoods are to be found there. In addition, this figure is based on estimates of those living below the overall World Bank poverty line of US1$ per day and assumes that the proportions of the poor in fishing communities is the same as in the rest of the population at large. In fact, in many parts of the region, fishers and fishing communities are generally regarded as having higher levels of poverty than many other groups in rural areas.

Table 2 : Poverty in small-scale fisheries communities in Asia

% of population on < US$1 per day	**25.6%**
Inland	514,023
Marine coastal	95,837
Marine other	551,133
Unspecified	3,660,428
Total nos. of fishers	**4,821,421**
Number of related income-poor jobs	14,464,262
Total income-poor in small-scale fisheries	**19,285,683**

Assumptions:

1. *Overall figures for the numbers of fishers are based on 1990 FAO Data.*
2. *Marine deep-sea fishers and those engaged in aquaculture are excluded.*
3. *The percentage of total fishers and those in related employment who are estimated to be income poor is based on the World Development Report 2000/2001 figures for the share of the population in the region in 1998 that was living on less that US$ 1.00 per day i.e. it is assumed that the level of poverty in fisheries is the same as in other sectors.*
4. *There are assumed to be three people in related jobs for each fisher.*
5. *One hundred percent of inland fishers are assumed to be small-scale while 90 percent of all marine, coastal, unidentified marine and unidentified fishers are assumed to be small-scale.*

Source: adapted from FAO, 2002

Paradoxically, this poverty is often manifested not so much in the form of "income" poverty but in other ways. Fishers often command larger quantities of cash income than those working in agriculture as the commodity they deal with – fish - is generally in demand and easily convertible into cash. Tietze et al. (2000) found, in a study of fishing communities all over the world including some from coastal Bangladesh

and from India and Malaysia (although not on the Bay of Bengal coasts of these two countries) found that, contrary to the widespread belief that fishers are among the poorest of the poor, fishing communities were generally better off than adjacent farming communities.

However fishing communities often suffer from other forms of poverty. Access to productive land can be restricted, either because of the low status of fishing communities, as in India, or the marginalisation of fishing communities in remote areas where land is poor quality. In remote coastal areas, services are often limited and access to institutional support of any kind can be difficult. In many areas, particularly in the western and northern shores of the Bay of Bengal, the vulnerability of coastal fishing communities to natural calamities such as cyclones is particularly high. IFAD (2002) considers coastal areas in Asia are prone to poverty and coastal fishing households are regarded as being amongst the poorest of the poor, largely on the basis of their dependence on an open-access resource where competition is high and increasing.

2. CURRENT STATUS OF COASTAL AND MARINE LIVELIHOODS AND FOOD SECURITY IN THE BAY OF BENGAL

The status of livelihoods and food security among people making use of coastal and marine resources around the Bay of Bengal are not consistent and significant variations are encountered in different zones within the region. In the broadest terms there are major variations between the western and northern sides of the Bay of Bengal - the coasts of India, Bangladesh and Burma – and the rest of the region.

Clearly, generalisations about the livelihoods of such a large and diverse group of people is dangerous. Some common features can be distinguished but they are liable to be features that are also shared by people involved in coastal and marine livelihoods almost all over the world. The review below tries to pick out key features of these livelihoods as they are likely to be of concern to the planning of management of the large marine ecosystem of the Bay of Bengal.

2.1 AGE, GENDER, CLASS/CASTE AND ETHNIC CHARACTERISTICS OF PEOPLE INVOLVED IN COASTAL AND MARINE LIVELIHOODS IN THE BAY OF BENGAL

2.1.1 Age

Age often plays an important role in defining the types of livelihood activity that people engage in. This is true for many coastal and marine livelihoods. In fishing communities throughout the region, elderly people tend to continue their economic contribution to the household by shifting to specific types of activity – fish processing and small-scale fish vending are typical activities often involving older members of the household.

The age structure of fishing communities generally indicates higher rates of fertility compared to neighbouring agricultural communities. Children often begin working in fishing at a relatively early age, and this may encourage higher numbers of children. The same is true of other coastal resource-based

livelihoods, such as shrimp post-larvae collection in coastal swamps, where children are often involved (Islam et al., 2001).

2.1.2 Gender

Coastal fishing communities in the region are usually characterised by clearly defined gender roles in relation to the exploitation of coastal and marine resources. Women are rarely involved directly in resource exploitation in most areas of India and Bangladesh although there are notable exceptions. In coral reef areas, women can be involved in the collection of seaweed and other products from the reef (Whittingham et al., 2003) and women are active in Bangladesh in shrimp post-larvae collection. Women's involvement in activities outside the home is sometimes associated with low social status.

In post-harvest activities, women are far more involved often dominating fish processing and trading activities, although there is evidence that this may be changing under the pressure of changing market conditions (IMM/ICM, 2003b).

There are markedly different perceptions of the respective roles of men and women on the eastern side of the Bay of Bengal compared with the west.

2.1.3 Caste and class

On the western side of the Bay of Bengal, caste continues to play an important role in defining the type of activities in which people are engaged, although there are signs that this is weakening. Even in non-caste societies, involvement in fishing and even in the exploitation of other coastal and marine resources are often associated with a relatively low social status and are regarded as the preserve of poorer groups in society

2.1.4 Ethnic group

The diversity of ethnic groups living around the coastline of the Bay of Bengal means that ethnicity can be an important determinant of livelihood in the region.

Migration of groups around the coastline, either within countries or across borders, means that different ethnic groupings often come into contact and many conflicts over resource use result.

Of particular concern is the interaction between majority population groups and the smaller ethnic minorities, who often occupy specific ecological niches in coastal areas. Tribal groups in coastal India and on the Andaman Islands, as well as a diversity of ethnic groups along the coasts of Myanmar and Thailand, including nomadic "sea gypsies", all have to deal with complex relations with surrounding majority communities. These conflicts can often result in the relegation of ethnic minorities to very specific livelihood niches (IMM/ICM, 2003a).

2.2 ASSETS OF PEOPLE INVOLVED IN COASTAL AND MARINE LIVELIHOODS IN THE BAY OF BENGAL

2.2.1 Human assets

Human assets include the skills, knowledge (including traditional knowledge) education and health which people command or are able to gain access to. It can also be extended to include features of human character that of fundamental importance in ensuring that people are able to create a viable livelihoods for themselves and their households, such as self-confidence, psychological stability and readiness to adapt.

Skills

Some of the skills used by those traditionally involved in coastal and marine livelihoods are relatively specialised. This is partly because of the nature of coastal and marine resources and the traditional technologies used for exploiting them in coastal areas around the Bay of Bengal. For example, traditional *kattumaram* fishers along the east coast of India require a set of skills in order to operate their craft and fishing gear that are not easily acquired by non-fishers and are not easily transferred to other activities, this being one reason why efforts to involve fishers in "alternative livelihoods" often encounter difficulties. Farming in coastal saltwater swamp areas, such as those along the Malacca Straits coast of Sumatra in Indonesia also required, in the past, specific abilities that were passed down from generation to generation among farmers settling in those areas.

Different skills in the use of coastal and marine resources in the region are often sharply determined by gender roles. Women in many coastal

communities have traditionally been active in fish handling, processing and trading and in the exploitation of specific resources found in coastal areas such as medicinal plants, near-shore resources and materials that are important in reproductive labour within the households. Skills in fisheries are generally the domain of men.

However, new technologies, such as mechanised fishing craft and trawlers, pump irrigation for agriculture, semi-intensive and intensive aquaculture have made these technologies gradually less relevant and have opened up the exploitation of coastal and marine resources to a far larger group of people than in the past. Fishing labourers on mechanised trawlers do not need the skills that traditional fishers possessed and are essentially just manual labourers.

The gender distribution of skills also affects the ways in which changes in patterns of resource use affect different groups. Changes in fish marketing practices – the increased use of ice, the penetration of distant urban and international markets to fish landings, the shift in fish landing sites brought about by increasing motorisation and mechanisation – have all tended to diminish the role of women in fish handling as they are often less mobile than men and less able to adapt to changing market conditions (IMM/ICM, 2003b).

Knowledge

Just as life in coastal areas and exploitation of marine and coastal ecosystems in the past often required specific skills in order to be successful, detailed empirical knowledge of these ecosystems was also an essential prerequisite for livelihoods depending on these resources. Many fishing communities in the region have various forms of "master fishermen", such as the *panglima laut* in fishing communities in Aceh Province in Sumatra (Purnomahadi, 2003). These are individuals who play a specific social role within the communities as repositories of knowledge and skill regarding the exploitation of fisheries resources. Often this knowledge is extremely localised but it may be extraordinarily detailed and complex in its understanding of those limited areas. Access to and maintenance of this reserve of knowledge was of critical importance for those using relatively inefficient traditional means of exploitation and, in situations where coastal

or marine resources were easily subject to overuse, it was often manifested in careful regulation of levels of resource use through social controls and sanctions.

Changes in the forms of exploitation have often made this knowledge increasingly marginal to the activities undertaken to exploit coastal and marine resources. More efficient and larger scale technology does not generally require this detailed empirical knowledge but technical skills that traditional coastal and marine resource-users do not always possess.

Access to education

Education standards among households in the region who depend on coastal and marine resources is extremely variable. Malaysia, Thailand, Sri Lanka and the Maldives have achieved high levels of access to education that also affect coastal communities. Some states in India have also made significant progress in encouraging access to education, particularly in Tamil Nadu and Andhra Pradesh.

Access to education is often affected by the relative remoteness of coastal communities from urban and administrative centres. In remote coastal areas where access is difficult, even if the physical infrastructure of schools is available, teachers are often unwilling to work there and may visit only rarely. This constraint can severely affect access to education in some coastal areas although cultural processes can sometimes be a more important constraint, particularly where the education of women is concerned. (Soussans et al., 2003; Ahmad, 2003).

The efforts of governments throughout the region to ensure universal access to education is having positive impacts with more and more coastal people able to send their children at least to primary school

Health

Coastal and marine livelihoods are affected by a range of health risks that are often specific to coastal areas. Sanitation and water supply are often problematic in coastal areas, especially where water tables are affected by saline intrusion.

Exposure to natural disasters, such as cyclones and flood, that characterise some coastal areas of the region can have important long-term impacts on overall health conditions, causing loss of life, epidemics and injury.

Access to health services is often affected by the same constraints as those experienced for education. Infrastructure is frequently lacking and staff may be unwilling to go to remote coastal areas

Access to food

Information on food security specific to coastal communities in the region is generally lacking but data on trends in food security in the area is contrasting.

According the FAO (2003), in South-East Asia as a whole, there has been a marginal increase in the numbers of malnourished in recent years, following years of steady improvement in the food security situation. The economic crash suffered throughout South-East Asia in 1997 was largely responsible for this setback, which saw the rate of decrease in numbers of undernourished people slow in some countries (Thailand, Myanmar) and numbers actually increase in Indonesia – from an estimated 11.4 million in 1995-97 to 12.6 million in 1999-2001. Food security is not a significant issue in Malaysia.

However, while food security remains a problem in some areas of South-East Asia, both the numbers and proportion of undernourished people on the west side of the Bay of Bengal are far greater and the contrasts in trends are of greater significance. In Bangladesh, the food security problem increased significantly during the early 1990s but considerable progress has been made since then in reducing the numbers of undernourished people in the growing population. 32% or 44.1 million people were thought to be undernourished as of 2001. In India, the trend is more worrying, both because of the numbers of people involved and the reversal in the latter half of the 1990s of the generally positive progress that had been made in the decades before. Given the natural increase of the population, the stagnation in the rate of reduction of the proportion of the population living with inadequate food supply between the periods 1995-97 and 1999-2001 has meant an estimated increase in the numbers affected by food insecurity in

the country of 19 million people with over 213 million people now undernourished.

Food security is not considered a major issue in Malaysia, and Thailand has experienced constant improvement in its food security situation between 1990 and 2001 (FAO, 2003) in spite of recent increases in poverty. The proportion of the population living with insufficient food in Sri Lanka remains high at 25% in spite of steady economic growth and progress in ensuring food security over the last decade and a half.

Evidence regarding the extent to which coastal communities specifically fall within these undernourished groups is patchy. The nature of coastal, and in particular fishing communities in India and Bangladesh, where the problem of food security is most significant, tens to make them vulnerable to food crises on a seasonal basis. Many fishers have extremely limited access to land or to alternative livelihood options to see them through seasonal variations in fish catches. Recent studies (Tietze et al, 2000) suggest that this may be changing in some places, but recent studies in Orissa, India (ICM, 2003) revealed the continued prevalence of food insecurity among poorer households in coastal fishing communities.

2.2.2 Natural

Access to natural resources has, in the past, been the cornerstone of the livelihoods of many people living in coastal areas in the region, and particularly of poor people. The poor have often been “attracted” to coastal areas as they are rich in a diverse array of natural resources that are often governed by either common property, open access or poorly defined tenurial arrangements. Marine resources are the clearest example of this, but coastal ecosystems are complex and provide many niches for natural resource exploitation that are not available in inland areas (IMM/ICM, 2003a). This is particularly true in estuarine or swamp environments, or around coral reefs (Whittingham et al., 2003), all extremely diverse environments that do not lend themselves easily to more intensive forms of exploitation.

However, the coastal and marine poor have been able to take advantage of these “niches” as long as it was not technically or economically viable for wealthier sets of interests to make use of these areas. This is now changing.

Technological innovations are allowing more intensive exploitation of many of the areas that the poor in coastal areas depended on and the poorly defined sets of use rights that characterise many coastal environments no work to the disadvantage of the poor who are unable to establish sustainable rights to the use of these resources in the face of more powerful interest groups. The conversion of coastal land and swamps to aquaculture is a case in point, where local resource users have often been displaced as areas previously regarded as "unproductive wasteland" has acquired value if converted to new forms of use (Ahmed et al., 2002).

Similar processes are apparent in coastal and marine fisheries in the region, where the steady increase in mechanised fisheries over the past decades has contributed to reducing access to fish for smaller-scale, traditional fishers. This process has been apparent almost throughout the region but is particularly marked along the coast of India, where a large population of traditional small-scale fishers interacts closely with a sizeable fleet of mechanised trawlers.

Fisheries resources

Sustainable access to fisheries resources is not only of critical importance for the livelihoods of millions of fishers around the Bay of Bengal but for a far broader group of stakeholders who depend on coastal and marine fisheries to supply them with high-quality animal protein.

Almost universally in the countries around the Bay of Bengal, there are widespread perceptions among those for whom fisheries forms part of their livelihoods that fisheries resources are in decline. In some areas numbers of fishers are actually declining (Tietze et al. 2000). In others, numbers of fishers are still increasing but most perceive that catches are declining and the composition of their catches is changing under the impacts of increased fishing effort and habitat degradation. Information regarding how this affects the livelihoods of fishers is unclear. Some studies indicate that the living standards, including food security, of some small-scale fishers are declining (ICM, 2003): others indicate that the rising prices that can be obtained for fish mean that, at least for the moment, the actual earnings of fishers is not always negatively affected. They may have to catch different

species and sell them in new ways, but their income may actually improve (IMM/ICM, 2003b; Tietze, 2000).

The changes in fish resources are sometimes having more dramatic impacts on those more indirectly dependent on them. Changes in the value of different species, and the increased use of ice, means that traditional livelihoods based on fish processing and small-scale trading have often been displaced. In India, more fish is being sold at larger landings in fresh form and is being fed into marketing networks that take it to urban and international markets (IMM/ICM, 2003b). To some extent decreased supplies of fish for local consumers may be compensated by the landing of more lower value fish for local markets, but the livelihoods of those who used to process fish and sell it locally have often declined significantly.

Traditional rights to coastal and marine resources

Traditional rights to marine fisheries have been, and in some locations still are, recognised in many coastal communities living around the Bay of Bengal. However, these have generally been relatively informal arrangements recognised by local communities but with not regarded very seriously outside of local areas and by formal institutions. Highly developed systems of reciprocal rights to fishing grounds, such as those found in Eastern Indonesia, Melanesia and the Pacific, are not generally encountered in the region. What traditional rights were recognised in the past have increasingly been eroded as fishing grounds have become the subject of conflict between local fishers, using small-scale and artisanal fishing gears, and larger scale mechanised fisheries.

Whereas marine areas around the Bay of Bengal, have rarely seen the development of strong sets of traditional rights, estuarine areas – such as rivers, swamps, lagoons and backwaters – have often been subject to much stronger sets of informal use rights pertaining to particular communities or groups. Many of the delta areas along the east coast of India and the large brackishwater lagoons there have, in the past, had areas that were recognised as “belonging” to particular communities. More and more communities are now attempting to formalise these rights in the face of growing competition for almost all coastal resources.

Mangroves

Mangroves have served numerous livelihood functions, both for those living immediately adjacent to them, for people making use of resources that spend part of their live-cycles in mangrove areas and for those who benefit from the environmental services provided by mangroves.

Mangroves have, in the past, provided rich and diverse sources of livelihood activities for people living in adjacent areas. The relatively shallow waters of mangrove areas and the numerous species of aquatic organisms living there have always been exploited, particularly by poorer groups of the population. Until relatively recently, mangroves were not easily exploited by larger-scale, intensive activities and were difficult to convert to other uses. Instead they constituted areas where use-rights were either open to all or poorly defined allowing poor people who were willing to work there with numerous livelihood opportunities – fishing, the collection of crabs, shells, firewood and honey, charcoal making – and numerous other activities that better off people were unwilling to undertake. With the spread of shrimp aquaculture in the region, the collection of shrimp post-larvae, often (though by no means exclusively) in mangrove areas has also become an important source of income for poorer sections of the coastal community, in India and Bangladesh in particular (Thomas et al. 2001).

The widespread disappearance of mangroves, either through excessive firewood and timber collection, conversion to agriculture and aquaculture, or degradation from pollution or changes in freshwater flows has removed this set of livelihood options.

Coral reefs

Coral reefs, and the sets of livelihoods that depend on them, are a feature of extensive parts of the Bay of Bengal. While most of the east coast of India and the coast of Bangladesh (with the notable exception of St.Martin's Island) are devoid of coral structures, much of the rest of the coasts of the in the region are characterised by the occurrence of coral reefs. The extreme biodiversity of coral reefs, the fact that they are often accessible from the coast and, in some cases, can be exploited on foot means that they are often of considerable importance in providing benefits for local communities.

In the case of atoll nations like the Maldives, this dependency of local livelihoods on coral reefs is complete. The land people live on is formed by coral structures and protected from storms and saltwater inundation by surrounding reefs; people use coral reefs on an almost daily basis for the collection of food, produce for sale and the collection of building materials. The advent of mass tourism, on which the national economy is now highly dependent, has been generated by the attractions of reefs and their associated marine life.

Everywhere where reefs occur, they support a wide variety of livelihoods and are often of particular importance for poorer people as, at least in the past, they have been resources open and accessible to all and best adapted to small-scale exploitation. They have also provided opportunities for exploitation of marine resources directly by women, enhancing their role in supporting household livelihoods. As reefs are home to many resident species that are less subject to seasonal variation than many other marine species, they often serve as living "storehouses" that local people can turn to when other elements in their livelihood strategies fail, either because of seasonal shifts in resources or shocks of one sort or another (Whittingham et al. 2003).

The benefits that people have been able to draw from coral reefs are under seriously threat almost throughout the Bay of Bengal region. Reefs are suffering from a series of environmental changes including rising sea temperatures, and levels; overexploitation of reef resources; destructive forms of use such as coral mining and blast fishing; and siltation because of increased run-off from adjacent rivers. In addition to the direct affects of declines in the reef ecosystem, efforts to protect reefs are also affecting the ability of reef-dependent groups to access the benefits they previously drew from the reef environment.

Common property resources

Coastal areas are often also characterised by relatively large amounts of common property land, often regarded as "waste" land and not seen as worth exploiting for more intensive uses. Like mangrove swamps, these areas have provided, in the past, numerous livelihood options for people living in coastal areas. Wastelands are used for grazing livestock, collecting

firewood, medicinal plants and materials for local manufacture and handicrafts (IMM/ICM, 2003a).

Pressure on all land from increasing population is tending to lead to the conversion of many common property areas to private use or more intensive uses. Where common property rights are not well defined or protected by specific legislation, this is leading to a reduction in access to these resources, particularly for the poor. In India, the notion of "common land", belonging to local communities and open for the use of all in those communities – whether for fuelwood collection, grazing of livestock or collection of wild produce – is more and more frequently being undermined as these areas are converted to private use, either through formal arrangements with village authorities or simply through occupation.

Significantly, as the pressure on both fisheries and other "common property" or open-access resources in coastal and marine areas has become stronger, more and more communities, or in some cases, associations of communities or professional groups are attempting to secure clearer and more formally recognised sets of use rights for those who are directly dependent on such resources.

Land

While coastal and marine communities, and particularly the poor in those communities, often have high levels of dependence on the diverse marine and coastal resources that are commonly found in the areas where they live, access to land often plays an extremely important role in their livelihoods (IMM/ICM, 2003c; ICM, 2003). In the predominantly rural areas of coastal India and Bangladesh, this is particularly so as secure access to land, whether through labour or through ownership or rental, is often an essential source of employment as well as food.

Where urbanisation is taking place, or where alternative uses of coastal areas has raised the value of land previously used for farming, this has often led to a decrease in the opportunities for people to include agriculture-based activities as part of their livelihood strategies. In some cases, new development have provided alternative options – shrimp culture in coastal Bangladesh may have diminished the demand for agricultural labour for the

coastal poor but it also created a demand for shrimp post-larvae caught from the wild that the poor were able to engage in and, in some cases, led to improved earnings for them. Likewise tourist developments in coastal areas of Thailand, Malaysia, Sri Lanka and the Maldives have often led to a reduction in traditional means of earning a livelihood – because of pollution or conversion of land to new uses – but created in new opportunities in services.

2.2.3 Social assets

Particularly in poorer communities around the Bay of Bengal, social assets can be of critical importance to people's livelihoods. In the absence of secure access to other livelihood assets, the poorest are often highly reliant on the social networks around them for their survival.

Many of the communities living on the coast - marine fishers, particularly caste fishers in India and Bangladesh, migrant communities moving along the coast either within or between countries, or nomadic marine communities such as the "sea gypsies" on the coasts of the Andaman Sea, have traditionally held a low social status. This has translated into social marginalisation, lack of representation and limited participation in the economic, political and cultural "mainstream" of their nations. The mobility of many communities depending on coastal and marine ecosystems, often required in order to follow fugitive and seasonally variable resources, contributes to this general lack of social influence seen in many coastal communities.

Reciprocal exchange networks

"Traditional" communities in rural coastal areas, like rural communities everywhere in the Bay of Bengal region, are often close-knit and have, in the past, had strong internal networks of reciprocal exchange and assistance. These would function as community "safety-nets", where families in need would be supported by family, clans, neighbours, religious and social institutions, and village leadership institutions.

Increasing mobility, with people moving in and out of what were previously relatively isolated communities either for work, education or migration, has often led to these network breaking down. Clearly, in some cases, the

traditional networks are replaced by better services as communications with the outside world improve and new forms of safety net have taken the place of the old. But many communities face a steady breakdown in the systems that ensured basic survival, especially in times of crisis and particularly for the poorer and more vulnerable parts of the community (IMM/ICM, 2003a).

Changes in patterns of fish landings, markets and fish utilisation have also led to the loss of resources on which these informal networks often depended. In India (IMM/ICM, 2003b), with more fish being landed at fewer, larger fish landings, the numerous complex series of exchanges of services and goods at fish landing sites within communities that ensured that a significant proportion of the benefits from fish catches remained within communities have often been replaced with exchanges taking place at distant urban landings. The benefits from these exchanges follow different channels and end up in different hands, leaving community level support systems weaker. The same changes are weakening, or changing, the role of fish buyers and middlemen, who previously lay at the centre of webs of patronage that provided fishing communities with vital sources of credit and support.

Tourism activities in coastal areas are reported to be having similar impacts in areas of Sri Lanka and Thailand. Tourism development often brings with it an influx of “outsiders” who may disrupt existing community networks and weaken systems of mutual support between community members.

Caste

Specifically in India and in Bangladesh, among Hindu fishing communities and other coastal communities, caste has traditionally played an important role in determining the sort of assets to which households have access and the livelihood strategies open to them. While caste is above all a network of social and cultural relations that define relationships and roles between different groups in Hindu society, one of its manifestations has often been the identification of a particular group with a particular occupation. This identification with particular occupations is not necessarily rigid. Many caste groups may be identified with on occupation but be involved in many others as well – basket weavers may also work as agricultural labourers, and

some “fishers” may also be involved in agricultural work (IMM/ICM, 2003c; ICM, 2003).

However, the western Bay of Bengal is also characterised by particular caste groups for whom their identity as a community is “defined” by their role as fishers. For these groups, dependence on fisheries resources, and the health of those resources, may be far higher compared to other groups that have greatly mobility from one occupation to another. For these groups, opportunities to shift their occupations from fishing to new strategies may be extremely difficult. They themselves may perceive changes in occupation as bringing with it a risk of loss of cultural identity. Other caste groups may see such shifts as an encroachment on their fields of activity and a threat to their livelihoods, and religious authorities may oppose it as being against the “natural order”.

Increasingly, social changes in India and Bangladesh are weakening the barriers identifying particular castes with particular occupations. This is bringing both advantages – caste groups living in coastal areas may encounter less opposition within surrounding society to shifts in their involvement in new types of activity – but it also brings risks. Identification of caste groups with particular livelihood strategies also provides as strong cohesive force within these communities, with strong traditions of reciprocal assistance and clear roles and responsibilities that provided stability and security. These are now weakening in many areas.

2.2.4 Financial assets

The status of access to financial resources among those dependent on coastal and marine livelihoods in the region is highly variable. In many areas – Malaysia, coastal areas of Thailand on the Andaman Sea, in many parts of Sri Lanka and in urban areas all around the Bay of Bengal, development of industries, demand of services and tourism have all created greater opportunities for people to gain access to better wages, to accumulate savings and to gain easier access to credit.

Even in some rural coastal communities, particularly those dependent on fisheries, there are indications that earnings from fisheries remain relatively high -one feature that tends to attract new entrants in some places, such as

India and Bangladesh (Tietze et al., 2000), and it appears that often rising prices for fish have kept pace with declining catches to ensure attractive earnings from fishing (IMM/ICM, 2003b).

However, income generated from fisheries and from the exploitation of other coastal and marine resources is threatened, in the longer term, by the degradation of those resources. This threat affects not only those directly dependent on the exploitation of those resources but a far wider network of people involved in the trading, handling and processing of those resources for their livelihoods. In addition, the relatively high cash incomes generated from the exploitation of coastal and marine resources often play a crucial role in otherwise cash-poor rural economies.

The decline in access to fisheries resources for coastal communities also affects their access to informal credit networks that are traditionally linked to middlemen and traders. While often regarded as exploitative, the linkages between producers and these middlemen has, in the past, provided an important element of security in the livelihoods of coastal resource users that helped them to cope with seasonal variations in production and household crises. The decline in availability of the commodities that formed the basis of these relationships threatens these informal systems.

2.2.5 Physical assets

Infrastructure

Development in some coastal areas around the Bay of Bengal has attracted a relatively high level of services and infrastructure. Flat coastal lands are often particularly suitable for the construction of roads and railways. Ports are often important poles of service development. But this situation is by no means universal. Coastal Bangladesh includes some of the remotest and most under-served areas in the region and tidal swamp areas are often difficult to develop, leaving communities there poor access to infrastructure.

The vulnerability of many coastal areas to cyclones and floods, particularly along the coasts of India, Bangladesh and Myanmar also makes communications, power lines and water supplies there prone to frequent disruption and destruction. The degradation of ecosystems that provide

protection against such events, for example coral reefs, mangroves and coastal forests, can exacerbate this vulnerability.

Similar issues apply to areas prone to coastal erosion. In Sri Lanka, destruction of coastal infrastructure on exposed coastlines is consistently a matter of concern.

Tools and technology

Coastal communities, and particularly poor coastal communities, have often founded their livelihood strategies on the exploitation of particular ecological niches using specific technologies that have developed over centuries to adapt to local conditions and the specific needs of that particular livelihood strategy. Frequently, these technologies have remained small-scale and labour-intensive. Some areas of the coast, such as shallow coastal waters, estuarine areas and lagoons, and coral reefs continue to support this type of technology as they do not lend themselves to more intensive forms of exploitation.

The use of these forms of technology, often constructed locally using appropriate and relatively inexpensive materials, ensured easy access for coastal people, either through ownership or labour.

Increasing mechanisation and intensification has tended to change these patterns of access to technology. Ownership is often more concentrated as the levels of investment are higher and the high numbers of owner-operators found in traditional fishing communities has declined in favour of fewer owners employing larger numbers of labourers.

Shifts in markets have also created pressure for greater mobility, increasing the necessity for producers such as fishers, and handlers of goods, such as traders, to be able to move to locations where resources are available or where they can take advantage of the best market opportunities.

Aquaculture represents another technology of increasing importance in coastal livelihoods. Particularly at the height of the shrimp “boom” in the 1980s, there was significant pressure for aquaculture producers to expand and intensify their operations. In some locations around the Bay of Bengal this led to the alienation of common property lands or pressure on local smallholders to make their land available for aquaculture development

(Rahman et al., 1995; Thomas et al., 2001; PDO-ICZM, 2003). This resulted in conflict in many areas.

With the advent of increasing outbreaks of disease in cultured shrimp, the viability of many of the more intensive farms initially developed has declined and small-scale shrimp farming using extensive, low-risk technologies has become more diffuse. This has created opportunities for smaller-scale operators to become engaged in shrimp farming.

2.2.6 Political assets

"Political assets" are often thought of as part of people's social assets, but with the growing trend throughout the region towards political decentralisation, democratisation and greater attention to mechanisms of political representation, it is worth considering political assets as a distinct sphere of people's livelihoods. Clearly, it is sometimes difficult to distinguish between the social structures at the community level, that are thought of as social assets, the mechanisms that allow people to exert power and influence over their immediate environment – political assets – and the broader political and institutional environment within which people live and operate. These three areas are closely linked, particularly in countries around the Bay of Bengal where informal power structures and networks of patronage often underlie more formal political structures, but it is worth considering the ways in which people living in coastal areas in the region are able to have access to systems of political representation and influence.

Political representation

From the point of view of people engaging in livelihoods that depend on access to coastal and marine ecosystems in the Bay of Bengal, their access to systems of political representation can be extremely important in determining whether their priorities regarding the use of those ecosystems are able to influence policy formulation. Increasingly, throughout the region, policy-makers are becoming more sensitive to issues regarding the sustainability and conservation of coastal and marine resources as these are issues championed by foreign agencies, environmental groups and urban, educated elites that are generally not directly dependent on the use of these resources. However, the interests of direct users of coastal and marine

resources, and particularly poorer resource users, are not always so well-represented in spheres where decisions regarding resource access are made.

Democratic processes in many countries may ensure that poor resource-users, at least nominally, are able to exert some influence over political processes but often these processes are subject to much stronger influences from relatively better-off groups who are able to exert more effective pressure to have their priorities accommodated in policy decisions.

The establishment of political representation at progressively lower levels, such as the province, district or local area is an important step towards making mechanisms of political representation more responsive to local needs and priorities and should enable poorer groups to exert more influence. Such mechanisms are being introduced in several countries in the region, such as India, Bangladesh and Indonesia.

However, it takes time for these mechanisms to establish themselves and begin to function properly and, for many poorer groups living in coastal areas, effective representation is still limited and policy decisions are more likely to reflect the interests of lobby groups that have more direct access to policy makers.

Governance

The short-comings that often effect systems of political representation also affect mechanisms of governance in the region. Levels of transparency and accountability in local government are often low, although significant efforts are being made – such as Andhra Pradesh, India – to make local administrations more directly answerable to the people they govern.

Participation in decision-making

The low status of many coastal communities, particularly fishing traditional communities, is reflected in their lack of "political capital" – the ability to access and influence processes of power and decision-making.

Within traditional communities, various mechanisms for representation of the interests of different groups within the communities are often still strong. In Bangladesh and India, groups of village elders, or traditional village "courts" are often still important in terms of key decision-making within communities. However, the increasing emphasis on formal systems

of political representation is often seen as leading to the "politicisation" of local-level decision-making mechanisms and the undermining of their legitimacy in the eyes of local people.

In any case, many of the poorest groups tend to be excluded from both traditional and formal decision-making mechanisms. Women have often not had the opportunity to influence traditional mechanisms and even where specific efforts have been introduced by governments to ensure proper representation of women's interests and their participation in decision-making bodies, their participation is frequently nominal.

Processes such as male migration can also have an important influence on the degree to which particular groups may be able to participate in local-level decision-making. The long-term absence of male household members can often reduce the extent that particular households can take part, and influence, local decision-making.

Processes of decentralisation of government and administrative functions, which are widespread throughout the region, are having important impacts on the degree to which those involved in coastal and marine livelihoods are able to influence decision-making processes. Clearly, the development of capacity to participate in decision-making is a long-term process and decentralisation measures often require years before they begin to take root and become effective. However, there is strong commitment to decentralisation in many countries around the Bay of Bengal, including India, Bangladesh, and Indonesia.

Fisherfolk associations and organisations

The recognition of common interests among groups of people living in the coastal belt has led to the formation of numerous associations and organisations representing their interests. This movement has been particularly strong among fishing communities in order to counterbalance their general lack of political influence.

In India, various more or less formal organisations have been established, particularly in the southern part of the coastal area (Tamil Nadu and Kerala) but increasingly in other areas of the eastern seaboard as well.

In the case of Bangladesh, such organisations tend to take the form of non-governmental agencies that are also concerned with service delivery of one

sort or another but are focussed specifically on coastal communities and attempt to represent their interests to some degree. Indonesia has a long tradition of small-scale fishers organisations and these are also active along the coast of the Straits of Malacca.

2.3 VULNERABILITY OF COASTAL AND MARINE LIVELIHOODS IN THE BAY OF BENGAL

2.3.1 Vulnerability to shocks

An important feature of coastal and marine livelihoods in the Bay of Bengal, especially on the Western and Northern shores of the region, is their acute vulnerability to major shocks from natural disasters. The areas where these shocks are particularly frequent are the eastern coast of India, in the states of Andhra Pradesh, Orissa and West Bengal, along the whole coast of Bangladesh and the northern coast of Myanmar. The effects of cyclones can range from the temporary disruption of normal live to complete devastation caused by hurricane force winds, tidal and storm surges, and flooding due to heavy rain. In the short term, these can cause heavy loss of life, extreme psychological stress (especially where families and communities are decimated), the destruction of physical assets such as housing, infrastructure and water supply and major changes in the natural assets available to coastal people due to coastal erosion, the destruction of crops and forest and the inundation of crop lands by salt water. (IMM/ICM, 2003a; BCAS, 2001)

The exposure of many of these coastal areas to a high risk of recurring cyclones has an important impact on the types of people who are found living in coastal areas and the livelihoods that they undertake. In areas of high vulnerability, such as coastal Bangladesh, the incentives for investment, both by the private and public sectors, in infrastructure and services is limited as the environment is considered “high risk”. This can actually create opportunities for poorer groups who may be willing to accept the risks associated with living in such areas. The fact that better-off groups of the population may not be willing to live in such areas can actually leave more space for the poor to gain access to natural resources and “livelihood niches” that would not be available to them in more secure areas (IMM/ICM, 2003a)

Changes in climate attributed to global warming and sea level rise are all increasing the vulnerability of those living in coastal areas of the Bay of Bengal to the effects of cyclones.

2.3.2 Vulnerability to changes and trends

Population rise, and the pressure it places on natural resources, affects livelihoods both by leading to the long-term degradation of those resources, and by increasing the competition for those resources that remain. This often leads to the exclusion of the poorest who are the least able to deal with that competition.

Processes of urbanisation and the growth of mega cities discharging waste and effluents into the aquatic environment are accelerating processes of resource degradation that, in turn, affect the livelihoods of people over much wider areas that depend on those resources.

Sea-level rise is likely to have dramatic impacts on livelihoods in the Bay of Bengal region. Potentially this will affect people all around the coastal area, but the most severe impacts are expected in the low-lying coastal areas of Bangladesh (BCAS, 2001; World Bank, 2000) and in the Maldives, where the islands on which people depend threaten to disappear completely. Even prior to complete inundation, those areas vulnerable to sea-level rise are liable to experience increasing salt water intrusion affecting access to safe water and agricultural production in coastal areas.

Macro-economic trends are also changing the economic environment within which people dependent on coastal and marine livelihoods live. Processes of economic liberalisation are leading to the increased penetration of distant markets into all coastal areas, changing patterns of supply and demand. In the Bay of Bengal area, this has had radical impacts on the demand for fish and the way it is handled. The use of ice has become widespread and high-value species are increasingly sought out by traders in even the remotest corners of the region. Reef fish from the Andaman Islands, almost unexploited until 10 years ago, is now being exported to South-East Asia and Europe (pers. observation).

For coastal people who have the capacity to adapt to these changes they often create new opportunities – fishers and traders using ice can obtain

better prices for their fish, opportunities are created in the new channels required to move fish to distant markets. But for some, such changes are difficult, either because of their sex and the problems in mobility imposed by gender roles, or because of their age, their lack of capacity to take up or invest in new opportunities or simply because they lack the confidence to do so.

2.3.3 Vulnerability to seasonality

Many coastal and marine livelihoods are strongly dependent on seasonal changes in the climate and associated shifts in resource access. Many livelihood strategies involving fisheries are extremely mobile, involving extensive seasonal migrations to follow shifting resources. Changes in seasonal availability of fish can significantly alter the entire level of economic activity in areas where few alternatives are available (IMM/ICM, 2003a).

Seasonal fish migrations, such as that of hilsa in the rivers of Bangladesh and Myanmar, can attract large numbers of people not normally using coastal and marine resources to engage in fishing activity.

Clearly agriculture, which also represents an important livelihood activity in coastal areas as elsewhere, is also highly dependent on seasons, especially where irrigation has not been developed.

2.4 DIRECT AND INDIRECT INFLUENCING FACTORS

2.4.1 Direct influencing factors

Rules, regulations and laws

Rules and regulations, and the laws that create them, are among the most immediate influences of institutions and policies that people encounter in their everyday lives. Not surprisingly, for those who are primarily engaged in livelihoods that make use of natural resources, the rules and regulations governing their use of these are particularly influential.

Examples of rules and regulations that influence coastal and marine livelihoods are:

- Fisheries regulations and controls on the type, quantity and location of fishing activities;
- Environmental rules and regulation aiming at protecting habitats and resources; these often mean that livelihood strategies used by coastal people are rendered illegal, often without sufficient thought being given to the support of viable alternative strategies;
- Rules and regulations affecting coastal development that may be part of coordinated and integrated efforts but are often *ad hoc* and aimed at addressing specific problems rather than the context in which those problems arise.

Service delivery agencies

In terms of institutions, people living in coastal and marine areas may have relatively limited contact, especially if they live in remote areas. Service provision agencies are often poorly equipped to deal with the diverse and varied stakeholder groups that are often found in coastal areas. Service delivery is often geared to what is considered a "norm" of capacity of people to uptake those services, without realising that some groups – particularly the poorest groups – may lack the confidence and basic skills required to interact effectively with those agencies and institutions (IMM/ICM, 2003a).

In spite of this drawbacks, services for coastal and marine communities in many areas of the Bay of Bengal have steadily improved, often accompanied by improvements in communications and transport infrastructure allowing agencies to reach remote coastal areas more effectively. Some part of coastal Bangladesh and Myanmar remain relatively isolated from this point of view.

Source of information

The provision of information represents a crucial service that can play an important part in people's livelihoods. The region has seen a dramatic increase in access to information with the diffusion of first radio and then television throughout the region and increasing availability of information almost everywhere. Access to internet is still less universal as it depends on telephone communications that are often less of priority. The diffusion of

mobile phones has also been of great significance in facilitating the dissemination of information.

Markets

In coastal areas in the region, access to markets is generally relatively well-developed. Most producers in coastal areas have access to buyers for the produce they obtain from the coastal and marine environment. This reflects the high-value of many of these products and the increasing penetration of global market chains almost everywhere.

While access to markets is generally possible, the terms of access are not always the same for everyone. Particularly in remoter coastal areas, access to markets depends on intermediaries who come to exert significant control over the terms on which producers are able to gain access to markets. These intermediaries – market middlemen, buyers, traders and moneylenders – have often been seen as major factors influencing the perpetuation of poverty among the poor in coastal areas. This is particularly so in fisheries, where the need to sell fish quickly and provide special facilities for handling fish, as well as financial assets for the relatively fast turn-over of productive capacity, has, at least in the past, tended to concentrate a considerable amount of control over market access in the hands of these intermediaries. This position of power can clearly be used to impose highly inequitable terms on primary producers, especially where alternative channels of market access are limited. However, the “middlemen” also often represent important elements of the social assets of coastal producers as they also provide safety nets and security in areas where they are not available. In the absence of effective service delivery, formal credit systems or functioning institutional support, these market middlemen also play a critical role in supporting the livelihoods of coastal people and are often an integral and valued part of their communities. Some may use their position to extract excessive benefits for themselves, but many others play an important and supportive role.

The increasing penetration of new market linkages, often by-passing traditional middlemen or based on new middlemen who may not be members of coastal communities themselves, brings both advantages and disadvantages. For those in the condition to be able to take advantage –

either because of their greater human assets (education, self-confidence) or their greater control of financial and physical resources – this brings benefits. For the poorest sections, particularly women, the elderly and the infirm, it may result in the diversion of resources away from access points open to them to more centralised points of contact with distant markets (IMM/ICM, 2003b).

2.4.2 Indirect influencing factors

Policies

The policies that determine how service delivery takes place are an importance influence on livelihoods, although they are not directly "seen" by those they affect. Very often policies do not take into account the specific needs of different stakeholder groups in coastal areas and are instead aimed at satisfying what are perceived to be "generic" needs. The diversity of coastal and marine livelihoods means that often these policies either have no real impact on these groups, or fail to address the issues that are of importance for them.

Policies for environmental protection are a good example of this as they often aim to satisfy demands for improvement environmental management without taking into account the livelihood requirements of people who use the environment directly. This can lead to further marginalisation of the poorest groups and the criminalisation of their activities.

Often the policies themselves are of less importance than the processes in place to formulate those policies. These process often either actively exclude coastal and marine dwellers or fail to adequately allow them to participate in influencing policy formulation.

Systems of governance

Proper governance structures are a necessary part of the policy processes that properly accommodate the "voices" of the poor and other coastal people. Decentralisation, which is increasingly an important element on policy agendas throughout the region, should make the development of proper governance structures easier. But many areas of the region are characterised by long-standing acceptance of systems of governance that

lack transparency and accountability and tend to function as formalised systems of patronage and control.

Where formally accepted norms of governance are at odds with informal "rules of the game" that encourage the deviation of governance in favour of those with resources, power and influence, faith in government as a whole tends to be undermined. While efforts to decentralise government are, in some cases, improving the contact of coastal resource users with systems of governance and making them more "demanding" of the administrative systems they live under, it needs to be remembered that many coastal areas of the region are starting the process of improving governance from a very low base. Many coastal communities in countries like Bangladesh and India have, until relatively recently, been extremely isolated from contact with formal government of any kind and it can be expected to take a long time for improved governance arrangements to "reach" them effectively.

Systems of ownership

While the formal instruments defining norms regarding private and public property vary significantly throughout the region, some common features can be distinguished.

Some coastal areas of the region are characterised by relatively high concentrations of resources that are "public" property. Particularly in India and Bangladesh, legal frameworks inherited from colonial administrations often made efforts to clearly define notions of private and public property but, in reality, in the ground, the rights and responsibilities that distinguish the two are not always clear. In the absence of a clear definition of these rights, control over access to different "public" resources is often decided locally through informal mechanisms driven by patronage, power and influence with little reference to legal frameworks or formal systems of allocation of rights. Common property and public resources in coastal areas are often the subject of a "free-for-all" where control of resources is dictated by the ability of individuals or groups to exert a claim and maintain it in the face of competition, rather than by any legislated or innate set of rights.

In such situations, rights of resource access for the poor, although they may be formally recognised and legislated for, are often extremely difficult to enforce, even where enforcement mechanisms exist. Generally, the poorer

sections of the coastal community are able to sustain their rights only to sets of resources that are regarded as marginal or low value, high risk or difficult to exploit intensively. Traditional rights to resources, in the relatively few areas of the region where they are well-developed, are similarly secure only where they control resources that are of relatively little interest to others. Once coastal or marine resources acquire "value", they tend to end up in the hands of those who are able to exert the most influence over resource allocation mechanisms – this is rarely the poor (IMM/ICM, 2003c).

In the more developed nations in the region such as Thailand and Malaysia, the legal framework controlling rights to resources and property is better developed, but the changes in value of coastal resources, for example in areas where tourism is developing, can put considerable pressure on traditional resource users to surrender their use rights to developers. Often, loss of these rights or ownership will be adequately compensated, either through direct recompense or by the development of new economic opportunities. But this depends very much on the level of education and awareness of resource users and cases of abuse are not uncommon.

Social rules, norms and values

The livelihoods of people in many parts of the region have always been strongly influenced by their local cultures and the rules, norms and values which these disseminated. These have strongly affected the role of women in coastal communities, particularly on the west side of the Bay of Bengal.

3. SHARED AND TRANS-BOUNDARY ISSUES RELATING TO COASTAL AND MARINE LIVELIHOODS AND FOOD SECURITY IN THE REGION

As is to be expected in a dynamic and complex environment such as the coastal and marine ecosystems around the Bay of Bengal, there are numerous influences that affect the livelihoods of people who depend on those ecosystems. Some of these have been outlined above and the framework for analysis of coastal livelihoods helps to understand some of the different features of these influences and link them to the livelihoods of the people affected.

Many of these influences are specific to relatively limited areas, but there are also complex linkages between coastal livelihoods at the local level and much broader sets of influences that affect livelihoods over wide areas that often cross over national boundaries.

This section looks at some of these broad issues. Clearly, with many of these issues direct attribution of a particular cause to livelihoods of particular groups of people on the ground is difficult.

Shared issues are regarded as those where particular influences have affects on the livelihoods of people in more than one country.

Trans-boundary issues are regarded as those where specific influences – whether they be activities, environmental changes, or overall conditions – generated in one country have a clear influence on the livelihoods of people in another. Usually these “trans-boundary” issues will affect neighbouring countries, but in some cases may have influences further a field.

The following section first reviews shared issues in the Bay of Bengal region and discusses causes, livelihood impacts and trade-offs involved in each of these issues. The linkages between these issues and their various root causes are then investigated.

3.1 POVERTY

Especially in view of recent trends that indicate a reduction or stagnation in the rates of poverty eradication throughout the region, poverty remains a key shared issue affecting coastal and marine ecosystems in the Bay of Bengal.

3.1.1 Causes

As discussed above, the causes of poverty are complex. Specifically in relation to poverty in coastal and marine environments, the core causes of poverty can be summarised as follows:

- Dependence for livelihoods on coastal and marine resources that are under increasing pressure and threat of degradation;
- Vulnerability of coastal and marine dwellers to shocks and limited capacity to cope with those shocks;
- Changes in the economic environment and inability of some groups to deal with, and take advantage of, those changes (for other groups this may be a cause of poverty reduction or eradication);
- The high concentration of externalities in coastal areas, largely as a result of patterns of water flow which mean that the effects of upstream developments, agricultural or forestry practices, pollution and changes in catchment areas are often concentrated in downstream, and particularly in coastal, areas.

3.1.2 Livelihood impacts

Poverty can, itself, be regarded as a “livelihood impact” but some of the specific impacts that the prevalence of poverty in coastal and marine areas can create in terms of patterns of livelihoods are reviewed below.

- Increased intensity of exploitation of already declining resources, even in the face of diminishing returns, due to lack of access to alternatives;
- Reduced investment in human assets, particularly education of children, in favour of early entry into the work force so as to support household livelihoods;

- Increased reliance on social networks for survival and coping with crises;
- Declining access to financial assets and increased indebtedness;
- Declining access to physical capital and inability to invest in new productive assets;
- Inability to influence local decision-making and political processes;
- Increased vulnerability to shocks and seasonality due to reduced range of options for livelihoods;
- Inability to deal with changes and trends due to lack of self-confidence and reduced capacity;
- Reduced range of alternative livelihood strategies and necessity to create "coping" strategies to deal with day-to-day survival rather than "development" strategies leading to poverty reduction or eradication.

3.1.3 Trade-offs

While it may be generally assumed that there are no trade-offs involved in poverty eradication, some can be identified. These are largely trade-offs to do with political will and decision-making regarding the distribution of resources in order to focus on poverty-related issues.

Dealing with poverty requires a focussing of effort and resources on those areas where poverty is prevalent and on dealing with the underlying causes of poverty. This implies a diversion of effort and resources from other areas where they are currently focussed, to the possible detriment of the benefits generated by this current focus and the groups who benefit from that focus. Resources in particular are finite and devoting them to one issue rather than another inevitably implies a trade-off.

Efforts to make policy more responsive to the needs of the poor will require changes in the political *status quo* and a shift in power relations that will inevitably work against the interests of those who benefit from the *status quo*. Decentralisation, the opening up of decision-making processes to the poor and the creation of effective mechanisms to represent their interests in the policy process all require some surrender of influence and power by those who currently enjoy them.

3.2 DEPLETION OF FISHERIES RESOURCES

The depletion of fisheries resources is clearly recognised as a common problem affecting all the countries bordering on the Bay of Bengal. It can be regarded as both a “shared” and a “transboundary” issue in the sense that it is a common problem all through the region but also a problem that affects certain stocks that are known to move back and forth across national borders.

3.2.1 Causes

Key causes of depletion of fisheries resources in the Bay of Bengal are:

- Excessive fishing effort, as a result of excessive numbers of fishers, fishing craft and fishing gear being used and increasingly efficient fishing gear, and destructive fishing practices;
- Habitat degradation (coral reefs, mangroves, tidal swamps, sea grass beds), due to land-based and marine pollution, destructive fishing practices, run-off from the land causing siltation in coastal areas; land reclamation; sand and coral mining;
- High demand for fisheries products, generated by increased wealth in urban centres and cultural preferences for live and fresh fish;
- The poverty of many resource users, making it difficult for them to diversify their livelihood strategies and seek out alternatives to fisheries resource exploitation.

3.2.2 Livelihood impacts

Increasing fishing effort is leading to increased competition for access of fisheries resources, competition in which poorer resource users, with less access to technology, less influence over mechanisms to control access and less recourse to enforce access rights, tend to lose out.

Reduced benefit flows from resource use lead to reduced livelihood security, including reduced food security, and an increased need to seek out alternative livelihood strategies. Where people’s capacity to adapt is limited, this often translates into coping strategies that may include increased

exploitation of already threatened resources and ignoring legislation aimed at protecting resources leading to involvement in illegal livelihood strategies with the accompanying risks.

The localised decline of fisheries resources also forces resource users to adopt more mobile strategies, moving further away in order to follow declining resources or migrating to completely different areas in order to seek new opportunities. This also creates new vulnerabilities for those involved and is a relatively high-risk strategy as it means abandoning familiar environments and social support networks.

Poorer groups of resource users may not have the capacity to adopt alternative strategies and continue to exploit fisheries resources further exacerbating the decline of the resource.

3.2.3 Trade-offs

The activities that are contributing to the depletion of fisheries resources in the region also support the livelihoods of millions of fishers, fisheries ancillary workers, traders, and processors. Efforts to reduce the process of overexploitation implies the reduction of flows of benefits from the resource to these groups, with potentially widespread livelihood impacts and even increased poverty, at least in the short-term, for these groups. Given the sustained demand for fisheries products and the intense competition for fisheries resources, the incentives to producers to accept these costs in the name of resource conservation are limited unless viable alternatives are available.

Controls on fisheries resource exploitation in order to reduce depletion will also have implications for the supply of fish to consumers, with the possible need to seek out alternative sources of high-quality protein.

The knock-on effects of reduced flows of wealth, at least in the short-term, will be felt throughout local economies, particularly in rural coastal areas where the sale of fish often represents an important source of cash income into the local economy, supporting activities in many other sectors as well as within fisheries.

3.3 CAPTURE OF LIVE FISH FOR THE FOOD AND ORNAMENTAL FISH TRADE

3.3.1 Causes

The key cause of this threat is the sustained high demand for both live fish for food and for ornamental fish in both regional markets. The trade in live reef food fish for Hong Kong alone, in 2000, amounted to about US$400 million (WRI, 2003). While much of this came from cultured fish and producers from Australia and the Pacific do not generally use destructive fishing techniques, fishers in South East Asia make widespread use of cyanide for catching live reef fish for this trade.

Likewise, the demand for ornamental fish in more affluent areas of the world is high and sustained. This encourages the continued exploitation of coral reefs fish resources. Illegal and destructive methods of carrying out this fishery are significantly easier than less destructive methods.

While fisheries for live fish are still limited in much of the Bay of Bengal – with the exception of some ornamental fish trade from Sri Lanka and live fish from Indonesia and Thailand – the potential pressure for an expansion to the relatively pristine reef areas of the Andaman and Nicobar Islands and Myanmar is certainly there.

3.3.2 Livelihood impacts

The intensive targeting of particular species of fish to supply the live fish trade, whether for food or ornamental purposes is leading to the disruption of coral reef ecosystems. While the effects of this are not always clear, there is a risk that this may will affect the overall productivity and sustainability of reef ecosystems and so the flow of benefits to people who are dependent on those ecosystems.

The practices used for live fish capture, particularly cyanide, are directly destructive for coral reefs and diminish the productivity of the system, with accompanying impacts on livelihoods.

For those who depend on a wider range of reef products for their livelihoods, the destructive methods used to extract specific species cause a reduction in access to other species as well, with negative impacts on livelihood outcomes. These impacts are likely to be felt, above all, by local

resource users who see their overall flow of benefits from reefs reducing as the habitat is progressively degraded.

The livelihoods of those responsible for these destructive fishing practices are also likely to be affected in the long-term. In some areas these stakeholders will also be from local communities but some are more mobile and have the option of shifting their activities to other areas – an option that may not be open to local resource-users.

There may also be wider impacts on fisheries in the region although the relationship between coral reefs in one location and fisheries resources over wider areas is not clear.

Destructive practices leading to degraded coral reefs are also likely to affect earnings from tourism as the aesthetic tractions of the area for tourists may diminish.

3.3.3 Trade-offs

The live-fish trade generates high income and feeds extremely high value markets. Controls on this trade will inevitably result in short-term reductions in the benefits deriving from the trade to the various stakeholders involved, including poor primary producers. While others involved in the trade may be able to shift their activities into other fields, producers may have fewer alternatives at their disposal.

Controls on the trade, or the encouragement of more sustainable harvesting practices, while ensuring long term sustainability of the overall benefits flowing from coral reefs may also lead, at least in the short term, to reduced flows of foreign exchange generated by the trade.

3.4 DEGRADATION OF CRITICAL HABITATS

Degradation of any critical habitat, such as mangrove areas, tidal swamps, sea grass beds or coral reefs where aquatic organisms spend part of their life cycle, is likely to have important affects on resources over a far wider area than that habitat alone. This will impact on all livelihoods that depend on those resources and the communities that depend on the livelihood strategies that make use of those resources.

3.4.1 Causes

Degradation of these critical habitats has numerous causes:

- Land-based pollution from urban agglomerations, industrial development and increased use of polluting agents in agriculture;
- Marine pollution from increasing marine traffic;
- Changes in hydrological patterns either because of siltation due to run-off (often caused by deforestation in upstream catchments), or diversion of water flows for irrigation, river training or hydropower schemes;
- Clearance of swamp and mangroves for agriculture, aquaculture and urban development;
- Destructive practices for the exploitation of those habitats, including blast fishing (for coral reefs), trawling (sea grass beds), forest clearance (mangroves).

3.4.2 Livelihood impacts

Degradation of critical habitats has impacts on the livelihoods of those who use them directly, reducing their access to the benefits derived from use of those resources. This can include impacts on swamp and mangrove fishing activities, firewood collection and forestry activities in mangroves and coastal forests and fishing on coral reefs.

There are potentially impacts on a far wider range of livelihoods that depend on the organisms that use critical habitats for key parts of their lifecycle. The extent to which these impacts spread and are genuinely shared between countries around the Bay of Bengal is unclear but the interconnectedness of marine ecosystems suggests that there are likely to be impacts, particularly in adjacent areas but also potentially further away. Relatively distant fishing activities may be affected by the destruction of critical habitats where target fish species breed or spend part of their lives, in spite of the distance of these habitats.

3.4.3 Trade-offs

Protection of critical habitats, whether mangroves, swamps and wetlands, sea-grass beds or coral reefs implies trade-offs in terms of the activities taking place in upstream catchments: reduced deforestation (affecting livelihoods of forestry workers and upland farmers), the renunciation of schemes involving changes in freshwater flows, or the restoration of river flows (affecting irrigation schemes and so agricultural production, as well as hydroelectric power and its contribution to economic development); the application of more stringent controls on pollution and the costs it involves for industrial development.

Control of destructive means of exploitation of those habitats also implies at least temporary reduction in the exploitation of those habitats by those that depend on them in return for long-term sustainability.

3.5 TOURISM DEVELOPMENT

3.5.1 Causes

The natural attractions of many coastal and marine habitats around the Bay of Bengal, especially those associated with beaches and coral reefs, mean that the area is likely to attract increasing numbers of tourists.

While many of these tourists come from the developed world, rising wealth and leisure time in urban centres of affluence within the region are also leading to a steady increase in regional tourism.

3.5.2 Livelihood impacts

Tourism is creating a range of new opportunities for those living in coastal and marine area around the Bay of Bengal. To date, these developments have been concentrated on the Andaman Sea coast of Thailand and Malaysia, in Sri Lanka, the Maldives and some areas of mainland India, but future developments are likely in the Andaman Islands and, eventually, on the coasts of Myanmar. Services related to tourism create opportunities for increased income and employment in local communities, although many of the benefits tend to be captured by better educated groups and those with the

skills specifically required for servicing tourism development. These skills are often provided by people from outside the local community.

Hotels and restaurants to service tourism also lead to an increase in demand for, and increase in prices of, marine products such as fish, crustaceans and molluscs for food, and other marine organisms for souvenirs and artefacts. This can create new income earning opportunities for local resource users and enhance their returns from existing patterns of resource use.

Tourism development also brings many services to coastal communities – water supply, electricity, health facilities, education and improved communications – that might otherwise not be attracted to the area.

Tourism, while nominally a non-extractive activity in terms of coastal and marine resources, can also have numerous impacts on the environment causing the degradation of the natural resource base and its associated livelihood impacts on those dependent on those resources. The construction of tourist facilities can cause the clearance of coastal mangroves and land reclamation with associated impacts on fisheries resources and siltation of the coastal and marine environment, both of which can diminish access to these resources for local people. The unregulated discharge of wastes and sewage from tourist facilities can also degrade the very environment that attracts the tourists in the first place and further reduce benefit flows from natural resources to other resource users.

Paradoxically, the forms of mass tourism that probably create the most livelihood opportunities are also those that are most threatening for the ecosystems on which that tourism depends. New forms of eco-tourism are gaining acceptance and are growing in several areas of the region but it is not clear to what extent they provide substantial and sustainable livelihood opportunities for local people. On the other hand, large tourist developments often become magnets for large numbers of workers and service providers from outside coastal areas who may end up displacing local people from new livelihood opportunities created by these developments.

Tourism also brings about important changes, and often disruption, of the social assets of local communities. Contact with large numbers of people from outside can lead to increased generational conflict, between young

people anxious to emulate new foreign or urban models of behaviour and older generations anxious to defend local traditions. The association of tourism with prostitution can lead to other social problems. Besides the tourists themselves, tourist areas tend to attract large numbers of workers and service providers from other parts of the county leading to significant changes in local norms and customs.

New forms of economic activity and the influx of new people into the community can disrupt traditional networks of support and mutual assistance within communities. While this is often more than compensated for by increased wealth overall, some of the poorer and more vulnerable groups within coastal communities often find themselves more isolated and marginalized as they lack the capacity to take advantage of new opportunities and may also lose the support they used to rely on from within the community.

3.5.3 Trade offs

Tourism involves a complex series of trade-offs.

On the positive side:

- Increased economic opportunities and overall wealth;
- Improved access to services;
- Increased demand for products from coastal and marine environment;
- Better prices for producers making use of coastal and marine resources.

On the negative side:

- Displacement of traditional livelihood skills;
- Disruption of social networks within communities;
- Increased conflicts between generations and between local people and outsiders;
- Degradation of local coastal and marine habitat and reduced access to resource from them.

3.6 CHANGES IN CATCHMENT AREAS

3.6.1 Causes

Changes in the conditions of upstream catchment areas due to interventions or activities in international river basins are having significant and clear transboundary impacts affecting livelihoods of those dependent on coastal and marine ecosystems in the region, often located far distant from where these changes are taking place. Interventions such as the Farraka Barrage and the numerous irrigation schemes drawing freshwater out of the Ganges system are having important impacts on the livelihoods of people living downstream in Bangladesh. Deforestation, industrial development and changes in agricultural practice in upstream areas are leading to changes in the conditions of coastal habitats that can have important impacts on the livelihoods of people living there.

The impacts of changes in catchment areas reflect a common factor of all coastal areas, their “downstream” location where externalities tend to be concentrated. Any changes in catchments areas will almost inevitably be felt in the coastal areas into which those catchments drain. The fact that coastal areas also often receive the drainage from more than one catchment means that any negative affects that follow the flow of water downstream will often be concentrated in the coastal areas which receive them.

This concentration of externalities in coastal areas, which is also seen at a purely national level as well as in transboundary conditions, also reflects the way in which coastal and marine areas a particularly vulnerable to conflicts in development processes taking place in different sectors. For example, policies in forestry, and the ways in which they are enforced, in hill areas of Nepal, India and even China, which fall within the catchments of the Ganges, Brahmaputra and Meghna Rivers, may create increased silt loads and so render policy decisions and priorities in water management and water transportation in downstream Bangladesh ineffective. Similarly, policies encouraging tourism development based on pristine marine environments may be undermined by policies encouraging industrial development or increased shipping traffic in neighbouring countries.

3.6.2 Livelihood impacts

Changes in the quality and quantity of flows of freshwater across boundaries as a result of changes in catchment areas are having several important livelihood impacts.

Access to freshwater downstream for irrigation and recharge of ground water may be reduced. Saline intrusion is facilitated further affecting access to freshwater close to the coast, with consequent impacts on agricultural production and livelihoods, as well as health because of poor hygiene.

The degradation of critical coastal habitats that can result from increased salinity will also be affecting livelihood dependent, directly or indirectly, on those habitats. The value of these habitats in terms of protection against storm and cyclone damage can also be reduced, increasing local people's vulnerability to shocks. Reduced river flows can encourage siltation of rivers and increase vulnerability to flooding.

3.6.3 Trade-offs

Structures to control water flow through rivers are constructed to provide benefits to people in upstream areas. Similarly, agricultural developments, forestry concessions, industries, hydroelectric and irrigations schemes, and river barrages all create significant benefits for upstream populations. Often this will include benefits for poor and marginalized groups. For example, it may be politically difficult for authorities in upland catchment areas to enforce forestry regulations strictly because illegal settlers in forest areas come from particularly poor groups such as tribal populations or poor migrants.

Accommodation of the needs and priorities of downstream communities in other countries implies renunciation of some of these benefits or their limitation in order to ensure more sustainable practices that will reduce downstream impacts.

3.7 POLLUTION

Pollution also represents an important threat with potentially direct transboundary impacts, as well as being a "shared" problem. This is

particularly so where pollution carried is downstream through river catchments and where it is impacting on specific critical habitats. At the same time, the general increase in pollution flowing into the marine environment is liable to be having wider impacts on the overall health of coastal and marine ecosystems throughout the Bay of Bengal and this, in turn, is likely to be affecting access to marine and coastal resources for local people who depend on them.

The fact that trade-offs relating to pollution span boundaries makes the resolution of these issues particularly complex, as past negotiations over water flows in the Ganges, and current debate regarding plans for river linkage systems on rivers running from India into Bangladesh, have shown.

3.7.1 Causes

Industrial development and urban agglomerations, as well as the increased use of polluting agricultural inputs, are the principal agents contributing to these transboundary problems of pollution. Increases in shipping and corresponding risks of oil spills are also forms of pollution that can cross national borders as well as oil production in off-shore and coastal areas.

3.7.2 Livelihood impacts

The livelihood impacts include those caused by shared issues such as critical habitat degradation – decreased access to resources that people use to support their livelihoods, such as fisheries and agricultural land, but also the degradation of their living environment with possible contamination of their water supplies and the possibility of specific health risks deriving from increased pollution of their environment. Many of these impacts are liable to be particularly severe in coastal areas as they are subject to pollution from multiple sources in catchment areas, in heavily populated coastal plains where large cities are often concentrated and agriculture is often particularly intensive, and from marine sources.

3.7.3 Trade-offs

The trade-offs involved in transboundary pollution are largely in terms of the costs to industry and urban development of pollution control compared to the livelihood and environmental benefits that would result from improved handling or reduction of pollution.

3.8 CLIMATE CHANGE / SEA-LEVEL RISE

Climate change and sea-level rise are shared issues in the broadest possible sense in that they are shared not only between countries in the region but globally. However, several of the countries in the region face particularly severe impacts as a result of changes deriving from these trends.

3.8.1 Causes

The causes of climate change and sea-level rise are still subject to dispute although there is a growing consensus that the discharge of CO2 and greenhouse gases accompanying industrial development and the developed and developing worlds growing need for energy are, at least, major contributing causes, and possibly the principle cause.

While the developed nations are the major contributors to this effect, with 200 years of industrial development behind them, the increasing pace of industrial development in developing nations, including those in the region, is making them important players as well.

3.8.2 Livelihood impacts

Potentially, the livelihood impacts of global warming and sea-level changes, particularly those living in coastal areas and dependent on marine resources, are far-reaching.

Global warming may be a contributing cause of the degradation of coral reef resources, leading to episodes of coral bleaching caused by the intensity and frequency of climatic anomalies such as *El Niño*. This directly affects the flow of benefits from these ecosystems to resource users.

Sea-level rise directly threatens not only the habitats that coastal dwellers use for their livelihoods but also their living spaces – the atolls environments where people live in the Maldives; the coastal plains where much economic activity is concentrated in India; the low-lying estuarine areas in India and Bangladesh where many of the coastal poor in the region are concentrated. The scope of impacts depends on the intensity with which these changes are manifested in the future and the hypothetical range is significant. Estimated losses of land area for Bangladesh, potentially one of

the worst affected countries in the region, range from 2% of the current total in the event of a 10cm. rise, 4% in the event of a 25 cm. rise, up to 17.5% in the event of a 1m rise (considered the “worst-case” high-end estimate) (IPCC, 2001; World Bank, 2000).

This would be accompanied by a loss of coastal habitats and agricultural land, increasing pressure on remaining resources that are already the subject of intense competition. Salt water intrusion would even more area, leading to reduced agricultural yields and reduced access to freshwater over an even wider area.

The potential impacts of climate change are more difficult to predict but include increased, and more intense rainfall, increased intensity and levels of flooding, and an increased frequency and intensity of cyclone with accompanying storm surges and tidal waves. All of these would significantly increase the vulnerability of people living in coastal areas.

3.8.3 Trade-offs

Just as the problems associated with climate change and sea-level rise are global rather than regional, the trade-offs involved also span the world. Economic growth(following current models) and development is increasingly regarded as responsible (at least in part) for these climate trends. Changes to these models of growth and development, whether in developed countries that are the major contributors or in developing countries, are likely to involve acceptance of lower rates of growth, and subsequent impacts on rates of poverty reduction.

4. PRIORITISING SHARED AND TRANSBOUNDARY ISSUES AFFECTING THE BOBLME

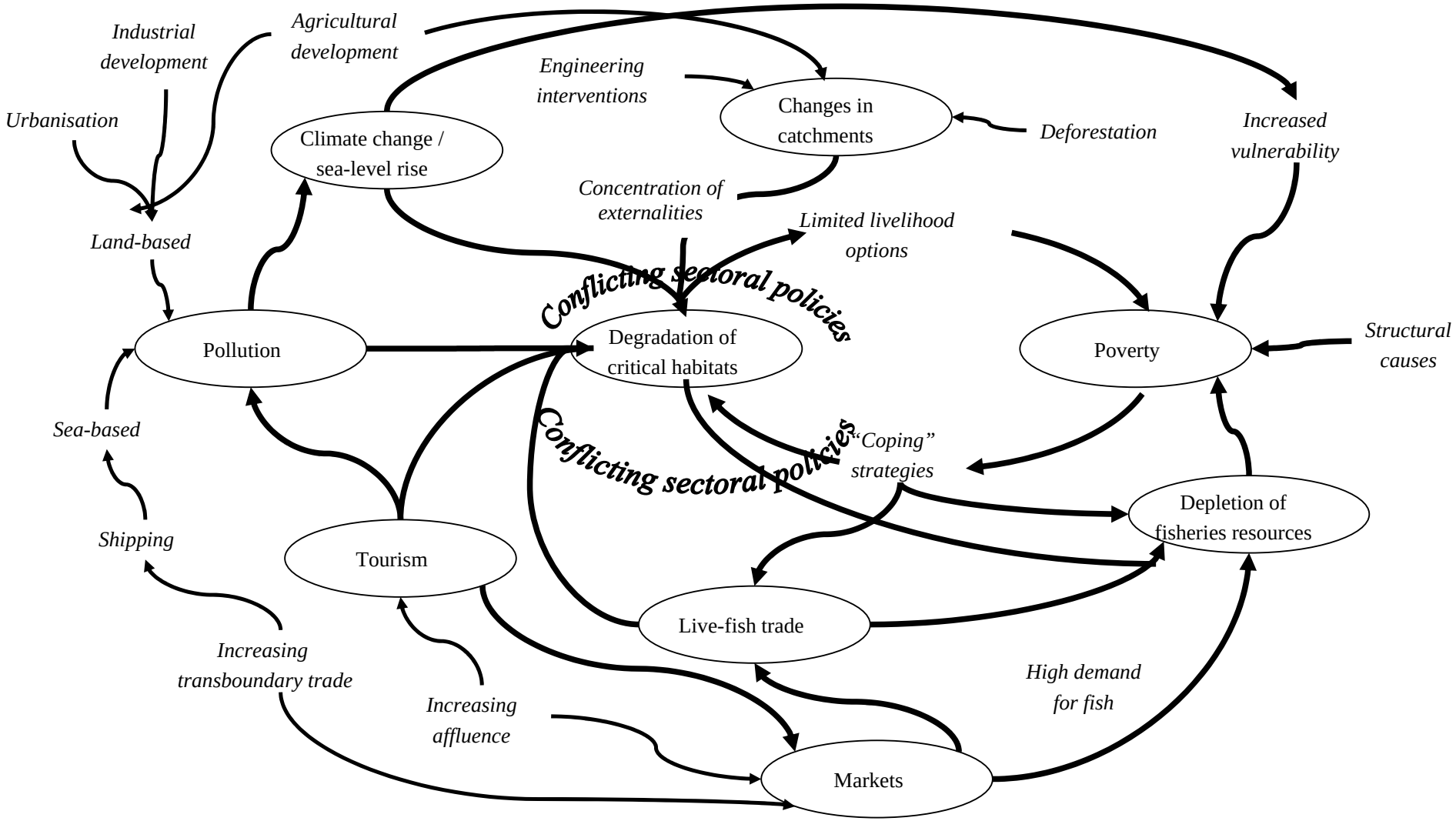
4.1 UNDERSTANDING LINKAGES BETWEEN KEY ISSUES

None of the issues discussed above exists in isolation from the others. A key feature of the issues affecting the livelihoods of those dependent on coastal and marine resources in the Bay of Bengal is the way in which they are interlinked, both with each other and with factors from outside the region.

In order to come to conclusions about the relative importance of different issues it is essential to understand these linkages. The diagram in Figure 1 shows some of the principal linkages between the various threats discussed above. The linkages shown here are by no means exhaustive but they serve to highlight a few key points in relation to the various threats affecting the livelihoods of coastal and marine resource users in the region. The following discussion focuses analyses those key linkages that are of particular importance for the BOBLME and are of particular relevance to livelihoods.

The diagram in Figure 1 shows how various root causes affecting livelihoods and coastal and marine ecosystems in the region are interconnected. The discussion reviews each of these root causes and discusses possible implications for the BOBLME, with a particular focus on those areas that have widespread impacts on the livelihoods of coastal and marine resource-users and which are of shared interest across the region.

Figure 1 : Linkages between key threats affecting coastal and marine livelihoods in the Bay of Bengal region



4.2 POVERTY AND THE MANAGEMENT OF RESOURCES AND CRITICAL HABITATS

Degradation of critical habitats and natural resources, such as fisheries, while extremely important in terms of its impact on livelihoods, is largely symptomatic of wider processes. It has direct causal links with poverty among resource users but cannot be regarded as a "root" cause. It is, itself, the result of a complex series of wider processes that need to be addressed if the health of these critical habitats is to be sustained or restored.

At the most immediate level of the relationship between resource-users and these critical habitats, the conditions of poverty experienced by many of these resource-users effectively forces them into patterns of resource use that threaten the sustainability of those resources and the critical habitats on which they depend.

"Management" of the resources themselves, and in particular of these critical habitats, cannot be expected to have far-reaching effects unless the causes of the behaviour leading to their destruction is addressed. Management, whether of critical habitats such as mangroves or coral reefs areas, or of the resources being exploited, such as fish stocks or particular species, usually requires some renunciation of exploitation on the part of those involved. Where those who use resources have a range of other alternatives available to them or where they are affluent enough to not be concerned with renouncing on element in their livelihoods, this may not pose a problem. But for the poor, the acceptance of natural resource management measures will often involve a deterioration in an already precarious lifestyle and alternatives or means of diversification to ensure that this deterioration in living standards can be coped with may not be readily available. This is why poor people often continue to exploit natural resources in ways that are clearly unsustainable and even in the face of legal instruments aimed at preventing them – continued use represents an acceptable risk compared to the certain deterioration in living conditions that resource "management" would often mean.

Elimination of poverty can therefore be seen as a key measure to facilitate improved management of the resource base.

In the short-term, alleviation of poverty might – all other factors being equal – encourage resource-users to take a more long-term view of their patterns of exploitation of the resource and help them to adopt more sustainable patterns of exploitation. In practice, given the multitude of other factors affecting the resource base, changes in use patterns by direct users will often not be sufficient, by themselves, to halt habitat degradation (just as the halting of resource degradation will not, by itself, eliminate poverty). In some locations, external influences may be limited and management that focuses on direct resource-users could have positive impacts, but, in general and in the longer term, the linkage between critical habitat degradation and poverty is likely to be more effectively broken by reducing dependence on resource use and changing, or diversifying livelihood patterns among resource users.

Where critical habitats are of clear transboundary or even regional significance, the reduction of resource dependence and destructive resource-use within that habitat might have wider spread effects on the livelihoods of those depending on those resources in adjacent areas or at other stages during their life-cycles.

In the same way, management of critical habitats without addressing the range of external influencing factors that are affecting them is unlikely to have sustainable impacts on the livelihoods of those who depend on those habitats. Resource managers might be able to completely halt destructive use patterns of mangroves or coral reefs, but pollution or changes in water flows from the land may completely undermine such efforts.

4.3 Conflicting policies across sectors affecting coastal and marine livelihoods

Figure 1 illustrates the range of influencing factors that can affect the livelihoods of those depending on coastal and marine ecosystems. The complexity of the interactions of these factors highlight the importance of integrated efforts to address them, as focussed interventions to address one issue can easily be undermined by developments in other sectors.

Although integrated coastal zone development is gaining increasing currency throughout the region, it is generally implemented through

projects. While these generally bring together a range of institutions, including policy-making bodies, that deal in some way with the coastal zone, this is often done on a temporary basis to address the specific, and temporary, needs of ICZM projects. Once projects are finished, the "integration" of actions taking place in different sectors is often abandoned.

However, to achieve a shift in the way in which the problems of coastal and marine areas are addressed, sustainable approaches and mechanisms are required that ensure that potential conflicts between developments in different sectors are identified and harmonised. Otherwise current patterns of conflict between policy objectives in different sectors and at different levels, which lead to the wastage of precious development resources and contribute to the depletion of the natural resource base are likely to continue. For example, efforts to conserve coastal resources may be undermined by changes in water flows and land use practices in upstream catchments; efforts to control fishing effort may be rendered difficult by increasing poverty; degradation of ecosystems through industrial development and pollution, or economic policies that reduce the resources for social safety nets in coastal communities may counteract efforts to reduce poverty.

Many of the contradictions and conflicts that occur between activities and development in different sectors that affect the coastal and marine ecosystems around the Bay of Bengal may be difficult to overcome in the short-term. The numbers of stakeholders involved is often enormous and their interests and "livelihood objectives" may be very different and difficult to harmonise. However, at least at the level of formal policy-making procedures, the development of mechanisms that help policy-makers identify conflicts and attempt to harmonise them is possible. Policy-makers in different sectors often develop policy in relative isolation from one another and generally lack systematic means of assessing how their policies might interact with those of other sectors. Even within sectors policies are often developed on the basis of targets, the agendas of particular sets of interests and lobbies, and political priorities without sufficient consideration of possible contradictions between these different agendas. Those bodies

whose mandate includes the coordination of policy often have few usable tools to apply to their task.

The problem is exacerbated by the lack of means at the disposal of policy makers to assess the impacts of their policies. The dominant means of assessing policy impact remains simply whether particular initiatives were undertaken and the resources assigned to them spent, and little attention is given to the real impacts of policies on people's livelihoods.

These conflicts between policy areas are often very evident at the national level, but they can also be seen at the international level. Policies for tourism development in one country can affect market demand for products, such as fish, from another; water control structures on international rivers, aiming at improving irrigation in one country, may significantly impact on the effectiveness of ecosystem management measures in other countries located further downstream.

International initiatives such as the BOBLME provide an important opportunity to address these conflicts both at the national and international levels.

4.4 Depletion of fisheries resources

The prevention of depletion of fisheries resources in the region is subject to similar constraints as those discussed above in relation to the management of critical habitats. As with the practices that are causing damage to critical habitats, attempts to manage destructive fishing practices, or the amount of fish being caught by those engaged in fisheries, are likely to encounter severe constraints as a result of the prevalence of poverty among fisheries resource users. Traditional fisheries management efforts that aim to control how much fish people catch, when they catch it or how they catch it are liable to continue to be hampered, in the foreseeable future, by shortage of resources and material for effectively enforcing such measures. In the Bay of Bengal region the task is made all the more difficult by the diversity of different fisheries involved and the different scales of fishing operations concerned. While intensive, mechanised fisheries involving a few very efficient craft are relatively easy to manage (although recent experience in western fisheries has shown how difficult even this can be) the management

of large numbers of small, artisanal craft involved in highly diverse, multi-species tropical fisheries is far more complex.

The development of approaches to fisheries management that foresee a greater role for local communities in managing the resources they depend on offers one means of dealing with some of these problems. However experience seems to indicate that there are specific circumstances where these approaches can be effective and the situations where these circumstances are encountered are limited (Pomeroy et al., 1998; Hoggarth et al., 1999). Especially in coastal and marine areas around the Bay of Bengal, resource-use areas are often not clearly defined, the communities involved in exploiting them are often not particularly homogenous and it may be extremely difficult to build the sort of consensus required to create effective community-based management systems.

Locations certainly do exist in the region where such approaches may be appropriate – coastal lagoons and backwaters or estuarine areas where limits to management areas can be clearly demarcated (such as those found in some parts of the eastern coast of India or in coastal Sumatra); islands where the numbers of resource users are limited (the Maldives, the Andaman and Nicobar Islands, perhaps in coastal Myanmar); coral reef areas where communities may recognise traditional sets of use-rights (the Gulf of Mannar, perhaps coral reef areas on the coast of Myanmar). However, in many areas in the region, the possibility of developing successful community-based management may be limited and alternative approaches are likely to be required.

Ultimately, resource-users whose livelihoods depend on the exploitation of fisheries resources require incentives to change their behaviour. Increased awareness of the importance of sustainable fishing methods can be important but it is rarely a sufficient motivation for renouncing resource use, especially for poorer households whose survival may depend on that activity. Generally, people will change their patterns of resource-use when there are better alternatives available. One of the problems facing open-access resources everywhere is that resource-users will almost always continue to exploit them until their returns from resource-use are less than those available from other, readily accessible activities. Thus the principle

challenge facing attempts to reduce the depletion of fisheries resources in the region is not so much the management of the resources themselves, but the creation of an environment where resource-users are able to access viable alternatives to the livelihoods activities that are leading to resource depletion.

The role of “alternative livelihoods” for resource-users is widely recognised as of importance in the management of coastal and marine resources, however systematic approaches to how these alternatives might be developed are rarely adopted. Numerous initiatives in the region (WRI, 2003; ADB/IUCN, 2003) have highlighted the importance of alternative livelihoods for the management of natural resources in the region, but strategies for their development have generally focussed on the enumeration of possible alternatives without considering the means by which current resource-users can assess the relative appropriateness of different options and their own capacities to adopt those options. While there is general acceptance of the need for participatory approaches where resource-users are involved in the process of identifying options, little attention has been given to date to providing tools to assist them in making choices.

Approaches to promoting alternative livelihoods clearly need to take a more holistic, taking into account both the existing strengths and capacities of resource users, their current livelihood strategies, the circumstances in which they live and the various influences that affect their choices (IMM/ICM, 2003a). In particular, more attention needs to be paid to market conditions and the capacity of markets to absorb the goods and services being promoted. As an activity, the promotion of alternative livelihoods is not easily implemented through individual alternative livelihood “projects” as local demand for single products or services is invariably limited. A programme approach is more likely to be appropriate, focussing on building the capacity of resource-users to assess local conditions and options and make viable choices, and putting in place the mechanisms required to support those choices through capacity-building and the provision of the required financial and technical resources.

In particular, experience in alternative livelihood support indicates that the timeframes involved are often considerable. Particularly where the cultural

identity of communities is closely tied up with particular livelihood strategies, short-term change is not easy and options ranging from livelihood enhancement (improving current livelihood strategies to make them more sustainable) to diversification (adding new components to current livelihood strategies) through to livelihood change (adopting new strategies) need to be considered.

4.5 POLLUTION IMPACTS ON CRITICAL HABITATS AND COASTAL AND MARINE LIVELIHOODS

Reduction of pollution can benefit coastal and marine livelihoods both through the preservation of critical habitats and so ensuring the sustainability of the resource base, and also through directly improving the environment in which people live and work, with beneficial impacts on human assets or health and ability to work.

Pollution affecting coastal and marine livelihoods occurs on different "levels". Specific sources of land-based pollution, such as particular industrial complexes or polluting practices in particular locations, can be addressed by focused action to promote better practice. The specific transboundary implications of these centres of pollution may not necessarily be clear but, where they are known to be having severe local impacts, it can be assumed that there are likely to some impacts on the overall health of the larger ecosystem and addressing these pollution problems is likely to benefit coastal and marine livelihoods in some way. Examples of this include:

- ship-breaking activities in the Chittagong area of Bangladesh;
- the discharge of urban wastes from major urban areas located near the coast of the Bay of Bengal such as Male in the Maldives, Colombo and Negombo in Sri Lanka, Tuticorin, Chennai, Visakhapatnam and Kolkata in India, Yangon in Myanmar, Penang, Johor and Malacca in Malaysia, and Banda Aceh, Lhokseumawe, Medan and Tanjung Balai in Indonesia;
- the discharge of solid and chemical wastes from specific industrial developments such as textile factories in Colombo, Sri Lanka and the Lhokseumawe Industrial Zone in Aceh Province, Indonesia.

Clearly, there are also likely to be some industries located upstream of the coast that may be producing important pollution affects in coastal areas. This is an area of concern in the Ganges Basin where the concentration of industrial and urban development on rivers over a very wide area is having marked affects on pollution levels downstream.

Other important sources of pollution are less specific to particular locations but are associated with diffuse practices that may affect far wider areas and the overall health of the ecosystem. Clearly it may be more difficult to tie these sources of pollution to specific livelihood impacts.

Particular important in this regard are practices of pesticide and fertilizer use in agriculture and plantations, as well as aquaculture practices. In these cases, addressing pollution issues may be more concerned with the introduction and promotion of codes of practice than measures to combat pollution in particular locations.

Sea-based sources of pollution are of particular concern in areas of intense marine traffic such as the Straits of Malacca, and in the vicinity of busy ports such as Colombo, Chennai, Visakhaptnam and Chittagong. Of particular concern is the potential for serious damage to livelihoods dependent on marine and coastal livelihoods in the event of major marine accidents such as oil or chemical spills from tankers.

The risks associated with pollution, whether land or sea-based, are intimately linked with processes of development, such as industrial development, agricultural development and urbanisation, that may well be playing an important role in providing new livelihood opportunities for coastal people and therefore, in the long-run, relieving pressure on coastal resources. However, it is clearly important, and possible, to minimise the impacts of these activities on the marine and coastal environment through better regulation. Such measures, while inevitably associated with costs, need not necessarily slow down development and the provision of new livelihood opportunities.

4.6 CONCENTRATION OF EXTERNALITIES IN COASTAL AREAS

Because coastal areas are, by definition, “downstream”, any changes in upstream catchment areas is likely to affect them. Changes in water flows on rivers flowing into the marine and coastal environment represent an important transboundary impact specific to the catchment of the Ganges and Brahmaputra Rivers that joins two Bay of Bengal countries – India and Bangladesh, as well as China and Nepal.

Changes in patterns of water flow through this system have largely been the result of engineering interventions aimed at diverting water for agricultural uses and to increase water flows in other areas. However, changes in the quantities and timings of water flows have had dramatic impacts on the livelihoods of those downstream : dry-season water flows are reduced, limiting access to water for irrigation; habitats that are dependent on freshwater flows are suffering, as is the case of the Sundarbans mangrove forest in Bangladesh; saline intrusion has affected the productivity of coastal agricultural land.

The diversion of water flows is clearly carried out with specific benefits in mind. Upstream livelihoods based on agriculture are likely to have benefited significantly as well as water transport through the river systems located upstream of structures like the Farakka Barrage in India. However, the negotiation of measures to minimise downstream impacts is clearly made more complex because of the trans-boundary nature of these impacts.

Concern for the effects of man-made hydrological change is not limited to the coastal area, but, in the case of the water flows between India and Bangladesh, it is having clear impacts on critical habitats of regional significance such as the Sundarbans. Not only do these habitats directly support the livelihoods of many people, including some of the poorest in the region, they are likely to play an important role in the overall health of the marine ecosystem and therefore in supporting the livelihoods of a far wider group of stakeholders.

Interventions to ensure proper water management across boundaries are clearly politically sensitive but this should not mean that they are avoided where they are of great importance for local livelihoods. This is particularly

important given current discussions of further major engineering works on in the Ganges-Brahmaputra basin.

Other man-made activities that may be having significant ecosystem and livelihood impacts downstream are logging and forest clearance activities in catchment areas. In terms of trans-boundary impacts this is likely to be of importance above all in the Ganges – Brahmaputra system although it involves not just Bay of Bengal countries but others in the catchment system as well, notably Nepal.

4.7 TOURISM AND COASTAL AND MARINE LIVELIHOODS

Just as upstream engineering interventions may create opportunities in one area while removing them in others, so tourism development can play an important role in creating new livelihood opportunities and bringing significant wealth to coastal areas while at the same time creating a series of threats to other livelihood strategies. There are obvious benefits from tourism in terms of job creation, promotion of service delivery and infrastructure, encouragement of investment, access to information and, ideally, the promotion of non-extractive and non-destructive use of local natural resources. However, there are also clear negative impacts: poorly planned tourism development can have direct negative impacts on the coastal and marine ecosystem by destroying critical habitats to make room for developments and adding to run-off and pollution loads; the influx of outsiders to coastal areas can also cause significant disruption to local communities and their cultural and social norms, increasing conflict and the break down of social assets that are important for people's livelihoods.

The promotion, and enforcement, of codes of practice for tourism development can ensure that the benefits are generated while minimising the negative impacts (UNEP, 2002b).

4.8 MARKETS AND COASTAL AND MARINE LIVELIHOODS

As discussed earlier, poor people in the Bay of Bengal region make use of the coastal and marine ecosystem in unsustainable ways often because they have little in the way of alternatives open to them. The creation of opportunities to identify and take up either enhanced (and more sustainable)

approaches to what they currently do, or alternatives to existing strategies is therefore of particular importance. However, the principal incentive for carrying out a particular activity, in a particular way, generally comes not from considerations of environmental sustainability but from the market. The market determines the level of demand for a product and this may in turn determine the way in which it is produced. Extremely high demand and willingness to pay high prices for a product will tend to encourage its production “at all costs”, whether those costs be merely financial, or also social or environmental.

This is the case with fisheries in most parts of the world including the Bay of Bengal. The high and sustained demand for fisheries products means that selectiveness in how fish are produced and brought to the market is not a priority.

This is beginning to change in some parts of the world with the introduction of certification schemes that satisfy consumers’ desire to ensure that their consumption patterns are not damaging either socially, environmental or in terms of human rights. Clearly these are concerns that not all consumers are willing to pay for, but they are becoming of greater significance.

In the long-term, given the prevalence of poverty in the region, resources drawn from the coastal and marine ecosystems around the Bay of Bengal are likely to continue to be exploited as long as there is market demand for them and that market demand is largely non-discriminatory. Attempts to shift the quality of market demand are however possible through information and education in those areas where consumers are concentrated. In the case of the Bay of Bengal, addressing market demand and working to make it more sensitive to issues relating to sustainability might well mean moving beyond the limits of the Bay of Bengal region to the centres of consumption for products produced there. Regionally these might include urban centres such as Singapore, Bangkok, Kuala Lumpur and Jakarta and even more distant markets in Australia, Japan, Europe and North America.

The particular case of the live fish trade, whether for food or ornamental fish, is a case in point. The live fish trade, in particular, is one that is focussed on regional centres of consumption and can be addressed more effectively by regional action.

4.9 CLIMATE CHANGE AND SEA-LEVEL RISE

Climate change and sea-level rise represent global processes that cannot be addressed on a purely regional level. They require concerted action, particularly by developed and developing industrial nations that are responsible for the production of the “green-house” gases to which these changes are widely attributed. However, the **effects** of these changes will be seen in particularly dramatic ways in the Bay of Bengal region. Low-lying atoll nations like the Maldives risk their very existence and countries like Bangladesh, already subject to extreme poverty and vulnerability to coastal inundation and extreme weather events, are likely to see that vulnerability increase. The costs of these changes to countries in the region is liable to be extremely high.

The impacts of climate change and sea-level rise are liable to be seen first in sensitive marine and coastal ecosystems such as coastal wetlands, coral reefs and mangroves. Changes in these systems will in turn affect local livelihoods. The progress of these changes and information about the impacts that they have are potentially important arguments in support of more effective action to combat the causes of global climate change.

4.10 PRIORITISATION OF ISSUES

The table below attempts to review the issues discussed above, their relative impacts in terms of the area they affect and the numbers of people involved and, based on this, come to some kind of prioritisation of these issues.

Such a prioritisation can only be regarded as approximate as information regarding livelihood impacts of different issues in the region is singularly lacking. These priorities, and particularly the rankings given to different sets of issues, therefore need to be subject to continuing review and revision.

It should be noted that the rankings here are based on impacts on livelihoods, rather than on impacts on ecosystems. As discussed above, these two are often closely linked but there are distinct differences in priorities. For example, pollution may have dramatic impacts on ecosystems and critical habitats and be regarded as ecologically very significant, but often its direct impact on livelihoods may be more limited if those affected

have the possibility of taking up non-ecosystem based alternative livelihood activities.

Likewise, the depletion of fisheries resources is rated as directly affecting only a “medium” number of people’s livelihoods as fishers represent only one part of the coastal and marine population. However, indirectly a far larger group of stakeholders are affected by fisheries resource depletion as income from fisheries supports many other coastal livelihoods and fish is critical to food security in many areas. Likewise, the implications for livelihoods of continued depletion of fisheries resources are severe as declining fisheries livelihoods, without access to viable alternatives, is liable to have wide-ranging impacts on coastal areas throughout the region.

Similarly, issues like poverty, markets and climate change are clearly of primary importance in terms of livelihood impacts for extremely large numbers of people over the entire region whereas pollution or tourism are liable to have much more localised impacts.

Clearly, the rankings below are extremely crude measures. They provide some indication of relative “importance” from a livelihoods point-of-view, of the issues discussed in this report but their significance would need to be verified in local situations prior to the design of specific interventions to address them.

Table 3 : Prioritisation of issues affecting coastal and marine livelihoods in the Bay of Bengal

Issue	Area affected	Nos. of people affected		Future implications for livelihoods if not addressed		Scores & Ranking (*in italics)*
		Direct	Indirect	Short-term	Long-term	
Poverty in coastal and marine communities	Whole region but particularly: • India • Bangladesh • Indonesia	High	High	Severe	Severe	**12 (*1*)**
Conflicts between sectoral policies	Whole region	High	High	Severe	Severe	**12 (*1*)**
Depletion of fisheries resources	Coastal waters throughout the region	Medium	High	Severe	Severe	**10 (*3*)**

Table 3 (continued)

Issue	Area affected	Nos. of people affected		Future implications for livelihoods if not addressed		Scores & Ranking (*in italics*)
		Direct	Indirect	Short-term	Long-term	
Pollution	From urban areas & industries - intense impact over limited areas – all countries	Low	Medium	Medium	Medium	**7 (*5*)**
	From sea-based pollution, oil and chemical spills – intense impact over limited areas	Medium	Medium	Medium	Medium	**8 (*4*)**
	General health of ecosystem – all countries	High	High	Medium	Medium	**10 (*3*)**
Concentration of externalities in coastal areas	All coastal areas but especially: India and Bangladesh (Ganges-Brahmaputra delta) Possibly Myanmar (Ayeyarwady delta)	High	High	Severe	Medium	**11 (*2*)**
Markets	All parts of all countries	High	High	Severe	Severe	**12 (*1*)**
Climate change & sea-level rise	Coastal lowlands and coral reef areas in all countries	High	High	Severe	Severe	**12 (1)**

Table 3 (continued)

Issue	Area affected	Nos. of people affected		Future implications for livelihoods if not addressed		Scores & Ranking (*in italics)*
		Direct	Indirect	Short-term	Long-term	
Tourism	Specific areas with particular tourist attractions: • Maldives • Sri Lanka • India (Gulf of Mannar, Tamil Nadu, some areas of Andhra Pradesh & Orissa), Andaman Islands • Bangladesh (Sundarbans & Cox's Bazar) • Myanmar (potential) • Thailand – Andaman Sea coast • Malaysia –Lengkawi, Penang • Indonesia – Nias Island,	Low	Medium	Low	Low	**5 (*6*)**

Ranking based on following "scoring" of impacts & implications:

Nos. of people affected – High = 3: Medium = 2: Low = 1

Future implications if not addressed – Severe = 3: Medium = 2: Low = 1

Rankings (*in italics)* according to total score – max = 12: min = 4

5. ADDRESSING KEY ISSUES

5.1 CURRENT EFFORTS TO ADDRESS KEY ISSUES

The table below looks at current efforts throughout the region to address the issues identified above as of critical importance. This table reviews those efforts that have a specific livelihoods orientation, in other words initiatives that attempt to address the livelihood impacts of changes in coastal and marine ecosystems. Initiatives that focus on the management of the ecosystem itself, without reference to livelihoods, are not included.

As can be seen from the tables below, there are a multiplicity of initiatives already undertaken in the region to address issues that are related, in some way or another, with marine and coastal livelihoods. However, the majority of them focus either on specific ecosystem areas and the issues relating to them, or on specific types of ecosystem around the region.

The lack of initiatives that address “cross-cutting” issues is notable. Coastal Zone Management initiatives in some areas are attempting to bring together the various institutions and areas of concern that relate to coastal areas, but their impacts in the long-term are often limited by their “project” format, that tends to encourage a focus on particular sets of activities at the field level with a limited time span and limited objectives beyond a notional “demonstration” effect. The underlying processes that influence how policy that affects the coastal areas, whether at the national or at the international level, has not really been addressed up until now.

It can also be seen that there are currently many initiatives that, in one way or another, attempt to address the issues of poverty alleviation and of alternative livelihoods among coastal and marine dwellers. The various poverty reduction schemes being undertaken, particularly on the western side of the Bay of Bengal, tend to have wider coverage and not be specific to groups reliant on one or another ecosystem, while alternative livelihoods activities tend to be closely related to efforts to protect specific ecosystems. Significantly there is often little interaction between these two strands of experience relating to livelihoods.

Table 4: Current efforts to address priority issues

Issue	National Policies / Institutions	Externally-Supported Projects / Programmes	Countries involved
Poverty reduction in coastal areas		Establishment of Regional Economic Centres (ADB)	Maldives
	Subsidised food for poor and vulnerable sections		India, Sri Lanka
	Poverty Reduction Strategy Papers (PRSP)		Sri Lanka
		North-East and Eastern Provinces Coastal Community Development Projects (ADB)	Sri Lanka
	Subsidised school meals		India, Thailand,
	DWCRA Programme (GoI / World Bank)		India
	Poverty Alleviation Programs		Sri Lanka, Bangladesh, Thailand,
		Andhra Pradesh Rural Poverty Reduction Project (World Bank)	India
		Support for Rural Livelihoods (UNDP)	India
	Housing programs for the poor		India, Thailand

Issue	**Current efforts to address issues**		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Poverty reduction in coastal areas (*continued*)		Integrated Community Development Project (UNDP)	Myanmar
	CHARM Project (Ministry of Fisheries)		
	"Children of the Sea" Project (Ministry of Fisheries)		Thailand
	Poverty mapping		Indonesia, Bangladesh
		Kecamatan Development Project (World Bank)	Indonesia
		Water Supply and Sanitation for Low Income Communities (World Bank)	Indonesia

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Dealing with conflicts between sectoral policies affecting coastal areas	Biodiversity Action Plans		Most countries
		RETA– Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction (ADB / IUCN)	Maldives, India, Sri Lanka
		Coastal Resource Management Project (ADB)	Sri Lanka

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Reducing depletion of fisheries resources through support to alternative livelihoods	National Fisheries Policies		All countries
		Promoting Sustainable Human Development in Vaavu Atoll	Maldives
		RETA– Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction (ADB / IUCN)	Maldives, India, Sri Lanka
		CORDIO – Coral Reef Degradation in the Indian Ocean (SIDA)	Maldives, Sri Lanka, India
		Conservation of Biodiversity through Integrated Collaborative Management in Rekawa, Ussangoda and Kalametiya Coastal Ecosystems (UNDP / GEF)	Sri Lanka
		North-East and Eastern Province Coastal Community Development Projects(ADB)	Sri Lanka
		Empowerment of Coastal Fishing Communities for Livelihood Security (FAO / UNDP)	Bangladesh
		Fourth Fisheries Project (WB / DFID / GEF / GoB)	Bangladesh
		Integrated Community Development Project (UNDP)	Myanmar
		Livelihood Development for Poor Coastal Fishing Communities Sector Project (ADB)	Indonesia

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Reducing livelihood impacts of pollution in coastal and marine ecosystems		Pollution Control Evaluation and Rating – PROPER (World Bank)	Indonesia
	National Environmental Action Plan		Maldives,
	National Solid Waste Management Strategy		Sri Lanka
	Coastal Zone Management Plan		Sri Lanka
	Hazardous Waste Management System		Sri Lanka
	State-level Coastal Zone Management Plans		India
	National Oil Spill Contingency Plan		India

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Reducing the livelihood impacts of habitat degradation in coastal and marine ecosystems	Marine Protected Areas (MPAs)		Maldives, Sri Lanka, India, Myanmar, Thailand, Malaysia, Indonesia
		Protected Areas System Project (AusAid)	Maldives
		CORDIO -Coral Reef Degradation in the Indian Ocean (SIDA)	Maldives, Sri Lanka, India
		Global Coral Reef Monitoring Network - GCRMN-South Asia (IOC / UNESCO)	India, Sri Lanka, Maldives
	Special Area Management (SAM)		Sri Lanka
	Area of Particular Concern		Sri Lanka
	Coastal Conservation Department		Sri Lanka
	Integrated Coastal Zone Management Plans		Sri Lanka, India, Bangladesh,
	National Action Plans on Biodiversity		Most countries
		RETA– Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction (ADB / IUCN)	Maldives, Sri Lanka, India
		Joint mangrove management (ICEF-supported: M.S.Swaminathan Foundation)	India

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Reducing the livelihood impacts of habitat degradation in coastal and marine ecosystems (*continued*)		Management and Sustainable Use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity (UNDP / GEF / M.S.Swaminathan Foundation)	India
		Strengthening Sustainable Livelihoods for Biodiversity Conservation in the Sundarbans (UNDP / GEF)	India
		PDO – ICZM (World Bank, Netherlands, DFID)	Bangladesh
		Sustainable Environmental Management Program – SEMP (CARE / Local NGOs)	Bangladesh
		Biodiversity Conservation in the Sundarbans Reserve Forest(IBRD / GEF)	Bangladesh
		Coastal and wetland biodiversity management at Cox's Bazar and Hakaluki Haor (GEF / UNDP)	Bangladesh

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Reducing the livelihood impacts of habitat degradation in coastal and marine ecosystems (*continued*)		Coral Reef Rehabilitation and Management Project – COREMAP II (IBRD / GEF)	Indonesia
	Decentralisation of government		Indonesia
		Decentralized Environmental and Natural Resource Management Programme (UNDP)	Indonesia
		Coastal Resources Management Project (USAID)	Indonesia

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Changes in catchments areas and their affects on coastal and marine livelihoods		Integrated Watershed Management Programmes (supported by DFID)	India (Andhra Pradesh & Orissa)
	Water-sharing agreements		India and Bangladesh
Coastal and marine tourism development and livelihoods		Good practice guidelines (UNEP)	All countries
Improving the livelihood impacts of market trends affecting coastal and marine resources		Marine Aquarium Market Transformation (GEF)	Indonesia

Issue	Current efforts to address issues		
	National Policies / Institutions	**Externally-Supported Projects / Programmes**	**Countries involved**
Reducing the livelihood impacts of climate change & sea-level rise		Reducing Vulnerability to Climate Change - RVCC (CIDA / CARE / Local NGOs)	Bangladesh

Projects supporting alternative livelihoods as part of resource management efforts often do not make proper use of the learning generated from broader schemes to address poverty, while poverty reduction efforts are often unaware of the specific issues relating to livelihoods dependent on coastal and marine ecosystems.

This suggests, as discussed in the identification of priority interventions for the BOBLME below, that the programme could play a more important role in promoting synergies between existing efforts, rather than in undertaking more "demonstration" activities when there is already a formidable body of experience within the region.

5.2 KNOWLEDGE GAPS, DISTORTIONS AND INSTITUTIONAL DEFICIENCIES

5.2.1 Knowledge gaps

Detailed knowledge regarding linkages between livelihoods and coastal and marine ecosystems

Knowledge regarding linkages between livelihoods and ecosystems in the region is generally limited. Assessments of ecosystems tend to focus on their environmental functions rather than looking at their importance in the livelihoods of people who depend on them. Other studies have attempted to develop overall valuations of natural resources with a view to incorporating these values into planning and to enable more accurate assessment of trade-offs between development and environmental sustainability (Cesar, 2000).

Some work has been done on the benefit flows from coral reefs to the livelihoods of the poor specifically in the Bay of Bengal region (Whittingham et al, 2003). This study, that looked at the relationship between livelihoods of poor coastal people and coral reefs in, among other sites, the Andaman Islands and the Gulf of Mannar, suggests possible methodologies for assessment that could equally be transferred to other ecosystems.

In addition, some information is available regarding fisheries livelihoods in the region, including recent work on the livelihoods of shrimp fry collectors in Bangladesh (Frankenburger, 2002).

More detailed information regarding how households and communities make use of coastal and marine ecosystems and the relative importance of different forms of resource exploitation to them is essential if work is to undertaken to look at ways of reducing dependence on natural resources and so creating the necessary conditions for better resource management.

Knowledge of coastal and marine livelihoods in specific areas or of specific groups in the region

Information regarding livelihood patterns in some specific areas, or regarding some specific groups, in the region is markedly lacking.

The most obvious *lacuna* in this regard is in information regarding livelihood patterns in coastal Myanmar. The relative isolation of this country in the recent past and the continuing lack of development activity there means that little is known about the specific characteristics of the livelihoods of people living in the coastal areas of the country, the ways in which they use the surrounding ecosystem, the institutional context within which they operate and their relationships with external markets.

In other areas of the region, while there is a relative abundance of information regarding artisanal fishers, largely as a result of the efforts of the Bay of Bengal Programme in the past, little information is available regarding those involved in the fisheries that are probably playing a more important role in resource depletion regionally – small-scale mechanised fishers. If action is to be taken for the management of these fisheries, more information regarding the people involved is urgently required.

A similar lack of information is available on those engaged in coastal aquaculture. Much of the focus on these activities has been, on the one hand, on their important contribution to foreign exchange earnings in several countries and, on the other hand, their environmental impacts. Little information is available on their actual role in the livelihoods of coastal dwellers, in terms of contributions to diversified livelihood strategies, the flow of benefits they generate for those involved and their role in attracting investment and services to coastal areas. Interestingly, where more detailed studies have been carried out looking at some of these issues (Aeron-

Thomas et al., 2001; Frankenburger, 2002; PDO-ICZM, 2003a), some of the more positive impacts of coastal aquaculture have been highlighted.

The relationships between natural resource conservation and poverty have begun to receive more attention in recent years (Whittingham et al., 2003; WRI, 2003) but the ways in which resource conservation efforts interact with the livelihoods need to be better understood.

5.2.2 Distortions

One major distortion affecting coastal and marine livelihoods in the Bay of Bengal region is the marked different in levels of development and poverty encountered in different areas of the region and between the region and more distant developed markets. This is manifested in market processes which tend to encourage the exploitation of resources from less developed areas, particularly some of those remoter areas along the coastal belt, in order to feed high-value markets in more developed areas. In terms of coastal and marine livelihoods this process particularly affects those dependent on the exploitation of fisheries resources.

This may not necessarily be regarded as a “distortion” – in economic terms it makes perfect sense for less developed areas to exploit their “comparative advantages” (low labour costs and access to natural resources) to supply goods for which there is a demand in more developed areas where labour costs are higher and access to natural resources may be more limited. However, this relationship can become “distorted” if the means of exploiting natural resources to feed these markets are unsustainable and the market mechanisms that feed goods towards centres of consumption are not accompanied by the provision of services and institutional structures that enable those who supply the market to improve their conditions and reduce their dependence on natural resources and exploit them in a more rational and sustainable way.

In practice, this rarely happens. For the poor in coastal areas in the region, the provision of services is often limited and not seen as a priority, partly because it inevitably comparatively requires more resources compared to service provision in other areas that a more accessible and to groups who are better equipped to “receive” those services (IMM, 2003a).

In the Bay of Bengal region, this "distortion" is seen both within countries – between remoter coastal areas and urban centres – and between more developed and less developed areas – fish from the coastal areas of India, from the Andaman and Nicobar Islands, from Bangladesh, from Myanmar, from coastal Sumatra all feed into major centres of consumption in more developed areas of Thailand and Malaysia, as well as to more distant markets in Singapore, Hong Kong, Europe and North America.

Access to these markets is clearly of great importance to the livelihoods of those living in these less developed areas and enables them to realise higher values for their products (although much of that value tends to be absorbed by the marketing chain itself rather than necessarily reaching the producer). But the added value realised by producers in this relationship is rarely sufficient to enable them to diversify their livelihood base or gain access to services that tend to be focussed in more populated urban centres or set up in ways that make them difficult to access for poorer groups.

5.2.3 Institutional deficiencies

Capacity for coordination between institutions concerned with coastal and marine ecosystems

There is increasing awareness throughout the region of the special needs of coastal and marine areas in terms of institutional support. This is reflected in the increasing adoption of integrated coastal zone management approaches.

However, the difficulties of implementing such approaches are significant as they involve coordination between institutions (government policy making and planning bodies, line ministries, implementing agencies, multi- and bi-lateral donors, international and national NGOs, communities and community-based organisations) that are generally not used to working closely with other institutions and the range of stakeholders involved is often considerable (Aeron-Thomas, 2002; PDO-ICZM, 2003b).

If problems in coordinating institutional actions are acute **within** countries, the challenges facing efforts to coordinate them **between** countries are even greater.

Capacity for adopting people-centred approaches to ecosystem management

Most institutions in the region concerned with ecosystem management are primarily focused on the biological and technical aspects of management and have limited capacity to address the issues surrounding the livelihoods of resource-users. Clearly, as the discussion of coastal and marine livelihoods above emphasised, "livelihoods" represent an extremely diverse set of issues that include the biological and technical aspects of natural resource-use but also include social, economic, cultural and institutional issues that technical agencies may not be equipped to address.

It is not necessarily realistic to expect institutions with a specific disciplinary focus, such as agencies concerned with environmental management, to become "multi-disciplinary" in the short-term, but means for them to effectively accommodate these diverse areas of concern are critical if they are to achieve their objectives effectively. Enhancing the understanding and skills of technical staff within institutions to at least understand these wider issues relating to livelihoods and ecosystems is one way of approaching the problem. An alternative is to enhance the capacity of technical institutions to work in partnership with other agencies and organisations that have the skills required to address these issues. Given the limited resources often available, particularly within government institutions, to bring in new skills and staff, this "partnership" approach is often more practical.

Capacity for identifying and harmonising policy across sectors and across national border

Problems in getting institutions to work together in coastal areas are mirrored by the problems in integrating policies relating to different aspects of coastal and marine ecosystems. Policies aimed at the protection of resources are often instituted without adequate reference to the needs of people living near and dependent on those resources, and often ignore the policies of other sectors. For example, policies for the protection of fisheries resources or specific coastal ecosystems such as coral reefs or mangroves may come under the purview of particular agencies whose principle objective is the conservation of those resources. Matters relating to the

livelihoods of people who depend on those resources will often come under other agencies whose principle objective may be poverty alleviation or the development of economic activities. Especially in areas, such as many of those around the Bay of Bengal, where poverty is an important issue, the objectives of these different agencies may be in direct conflict. Poverty alleviation strategies will often focus on ensuring equitable access to resources and sustainable use while ecosystem conservation strategies may be focussed on limiting access to resources and reducing or eliminating use completely.

In addition, with the increasing trend towards the decentralisation of decision-making and, in some cases, control over natural resources, conflicts between national, provincial or district and local priorities are also becoming more and more significant.

Policy-making bodies rarely have the tools to enable them to undertake a systematic analysis of potential sources of conflict between different policy areas and levels. Some tools to do this have been developed (Campbell, 1996; IIED, 2001) but familiarity with the analysis and improvement of policy processes is often limited.

5.3 MEANS OF ADDRESSING GAPS, DISTORTIONS AND DEFICIENCIES

The means of addressing these gaps, distortions and institutional deficiencies are included in the discussion of priorities for action below in section 6.

6. PRIORITIES FOR ACTION

To address both the key issues and the knowledge gaps, distortions and institutional deficiencies identified above, four key areas of intervention can be envisaged for the Bay of Bengal Large Marine Ecosystem programme:

1. Support to responsible and pro-poor policies and policy processes;
2. Support to the reduction of pressure on coastal and marine ecosystems through the enhancement and diversification of livelihoods;

3. Supporting responsible and pro-poor market mechanisms;
4. Support to action on climate change and sea-level rise.

The first of these areas - support to responsible and pro-poor policies and policy processes - largely aims to address institutional deficiencies and fill knowledge gaps that are leading to inappropriate policies in coastal and marine areas of the region. The second area – support to the enhancement and diversification of livelihoods in coastal and marine areas – could involve specific interventions in locations where human need is greatest and demonstration effects can be maximised but, for reasons explained below, should primarily aim to address knowledge gaps, distortions and institutional deficiencies. The third area – support to responsible and pro-poor market mechanisms – involves addressing key distortions and knowledge gaps. Support to action on climate change and sea-level rise will be primarily concerned with dealing with knowledge gaps.

The identifications of appropriate interventions for a regional programme like the BOBLME needs to bear in mind the comparative advantages of a programme of this kind. There are numerous opportunities for direct intervention at the field level to support the livelihoods of people who are currently affected by the decline of coastal and marine ecosystems. However, it is doubtful whether this represents the best use of BOBLME resources as there are numerous other resources, and institutions or programmes, that are better placed to intervene in these areas. This is especially important given the nature of direct interventions at the livelihood level that tend to require long-time frames, extremely flexible approaches and detailed knowledge of specific local circumstances.

Bearing in mind these considerations, the interventions suggested below focus on broader issues relating to policy and policy processes, and in particular the dissemination of guidelines on best practice that seems to be more appropriate for an international initiative like the BOBLME.

6.1 SUPPORT TO RESPONSIBLE AND PRO-POOR POLICY AND POLICY PROCESSES

This area of intervention needs to look at policies and policy processes affecting coastal and marine ecosystems and the livelihoods of those who depend on them at three levels:

- The processes required to ensure greater harmonisation of policy processes affecting coastal and marine areas at the national level;
- The processes required to ensure greater harmonisation of policy processes affecting coastal and marine areas at the international level;
- The processes required to make policy processes affecting coastal and marine areas more people-centred.

6.1.1 Support to greater harmonisation of policy processes affecting coastal and marine areas at the national level

At the national level, participating countries should be supported in achieving greater harmonisation of the policies and policy processes affecting coastal and marine ecosystems and the people who depend on them. The aim of this support would be:

- to minimise conflicts between different national policies that lead to increased externalities affecting the livelihoods of people living in coastal and marine areas;
- to minimise the wastage of development resources and maximise their impact on the livelihoods of people living in coastal and marine areas;
- to ensure the effectiveness of other interventions aiming at supporting the livelihoods of people living in coastal and marine areas and reducing their dependence on coastal and marine ecosystems.

This integration of policies at the national level involves both horizontal integration between the different line ministries concerned and the various projects and programmes involved in working in coastal and marine areas, and vertical integration between the policy-making level and lower levels of

administration, implementation agencies, NGOs, civil society and communities themselves.

In some of the participating countries, there are already initiatives underway to achieve better integration of policy-making in relation to the coastal area (Sri Lanka, India, Bangladesh). These initiatives can be supported and their experience drawn upon to **develop and implement appropriate guidelines for integrated policy development for coastal and marine areas**. These guidelines should focus on identifying:

- processes for achieving integrated policy development;
- approaches and mechanisms for achieving greater inclusion of the concerns of diverse stakeholders, with particular attention to poor and marginalized groups;
- procedures for systematically identifying potential areas of conflict in policy, both "horizontally" between different sectors, institutions and stakeholders, and "vertically", between different levels of administration, institutions and stakeholders;
- systematic means of harmonising these conflicts and making rational choices between the different trade-offs that will inevitably arise between the priorities and objectives of the different stakeholders and sets of interests involved;
- a clear identification of the needs for integration of trans-national and shared issues into national policy frameworks, providing an "agenda" for international integration of policies;
- systematic approaches for identifying and designing means of informing and influencing policy-makers and institutions to ensure the adoption of integrated policy-making processes.

In several participating countries, notably Sri Lanka, India and Bangladesh, elements of such guidelines already exist as a result of work done by Integrated Coastal Zone Management programmes or projects already underway. Clearly interventions by the BOBLME should not duplicate such work but build upon it, fill any gaps and promote of the use of such guidelines.

The development of these guidelines would have the added advantage of also contributing to addressing many of the other issues that, from the livelihoods point of view, have a somewhat lower priority, such as degradation of critical habitats, pollution, changes in catchment areas, reduction of fisheries resources and impacts from tourism development, as many of the negative impacts in these areas also derive from the overlapping or conflict between policies in these different sectors.

Mechanisms for implementation

The development of these guidelines for each participating country should be entrusted to a national forum coordinated either by existing institutions or programmes where these exist or directly by the BOBLME where there are no existing mechanisms that are deemed appropriate. Most of the participating countries have national-level planning bodies of one sort or another whose task is to coordinate policy and planning across sectors. Members of such bodies would be key components of any forum involved in the development of such policy guidelines, support by senior representation from the various line ministries involved.

The exact purview and terms of reference of such a body, and in particular, its relationship with existing mechanisms for policy coordination would need to be negotiated at the national level to ensure that its role is clear and not in conflict with existing mechanisms. In most cases, it is probable that the role of developing national guidelines can be incorporated into the activities of existing planning bodies.

6.1.2 Support to greater harmonisation of policy processes affecting coastal and marine areas at the international level

The development and adoption of guidelines for the systematic harmonisation of national policies affecting coastal and marine ecosystems should generate a clear identification of the specific issues that require integration of policies at the international level. Clearly this level of integration is far more sensitive, as the strategic interests of each individual country come into play. However, the adoption of common guidelines for policy processes at the national level should help in the recognition by all parties of the *bona fide* nature of issues raised by individual countries in

relation to interactions with neighbouring countries, or the region as a whole, that are having impacts on the livelihoods of coastal and marine dwellers.

This can then form the basis for international efforts to address these transboundary or shared issues using similar systematic approaches to policy integration to those developed at the national level. **International guidelines for integrating policy for coastal and marine areas** would have similar objectives to those of national guidelines:

- to analyse where there are conflicts between the national policies of different countries;
- to systematically identify the means of harmonising these conflicts;
- to develop specific strategies for informing and influencing policy-makers to address these areas of conflict and adopt measures for resolving them.

Mechanisms for implementation

The implementation of this component is potentially complex as it needs to involve policy-makers from the participating countries that are from a sufficiently high level to be able to address sensitive issues of national interest during the development of these guidelines. Existing regional mechanisms, such as the Bay of Bengal Programme, are too oriented towards specific sectors, such as fisheries, to be able to effectively address the wider range of policy issues that are liable to arise during the course of the development of such guidelines.

Once again, the ideal components of such a body would be senior staff from national level planning commissions who are tasked with the coordination of policy and planning.

6.1.3 Promotion of people-centred approaches to coastal and marine policy development

An integral part of the development of the guidelines suggested above, at both the national and international levels, would be the promotion, within these processes, of a more people-centred approach that incorporates the livelihood concerns of people dependent on coastal and marine ecosystems.

This would involve ensuring that the process of policy harmonisation across sectors relating to coastal and marine ecosystems take into account not just priorities relating to ecosystem conservation and larger-scale developments of industry, aquaculture and tourism, but the specific needs of different groups engaged in the diverse livelihood activities that are typical of coastal areas in the region.

This is likely to involve the inclusion of the following specific points into the policy harmonisation process:

- careful stakeholder analysis based on detailed knowledge of coastal livelihoods;
- rigorous and participatory approaches for ensuring that knowledge about coastal and marine livelihoods, and the people involved in them, is available and accessible to policy-makers;
- the development of mechanisms to ensure that the priorities and needs of different stakeholder groups are incorporated into policy-making processes;
- the development of monitoring mechanisms that enable the impacts of policy on the livelihoods of different stakeholder groups to be assessed and to feed into the process of review of policy.

The experience of regional and national programs and projects involving the monitoring of livelihoods dependent on coastal and marine ecosystems, for example GCRMN (GCRMN, 2003) could be built upon for the development of appropriate approaches to the monitoring of livelihoods dependent on coastal and marine ecosystems.

6.2 SUPPORT TO THE REDUCTION OF PRESSURE ON COASTAL AND MARINE ECOSYSTEMS THROUGH THE ENHANCEMENT AND DIVERSIFICATION OF LIVELIHOODS

As described above, the reduction of the dependence of people, an particularly the poor, on coastal and marine ecosystems for their livelihoods is, in the long-term, an essential part of the process of protecting those ecosystems. Experience is increasingly showing (Whittingham et al., 2003)

that efforts to protect ecosystems without providing viable livelihood alternatives to those that currently depend on their exploitation are unlikely to prove sustainable in the long term. This is encouraging more and more efforts to manage ecosystems to include “alternative livelihoods” components which attempt to encourage resource-users to diversify or change their livelihood strategies in order to relieve pressure on key resources.

For the BOBLME programme, this seems a logical area of intervention that would apparently be in line with its long-term objectives. However, several considerations are in order.

1. There are already many projects and programmes in the region that are already involved in supporting such programmes in the field, to the extent that most critical habitat areas in the region currently have ongoing programmes of one sort or another aiming to encourage either the enhancement, the diversification or the change of resource-users’ livelihoods. This means that there would be a significant risk of duplication if the BOBLME were to become directly involved in similar activities.
2. Experience from existing programmes indicates that the process of alternative livelihood development is extremely long-term and resource intensive and is probably best undertaken by agencies that have a long-term, if not open-ended commitment to the communities and stakeholders in a particular area. This generally means either government agencies that have a structural role in a particular area or NGOs or CBOs that are based there. It is questionable whether an international body such as BOBLME, with its wide remit and limited time-frame, would be the best organisation to become directly involved in such activities.
3. There is, however, a real need for the extraction and dissemination of learning from the varied experiences in the region in this field and the development of evidence-based guidelines that draw on best practice in the region. This need is particularly pressing given that the task of ecosystem management, and associated support to alternative livelihoods, is often assigned to organisations and

agencies who primarily have a scientific or environmental protection focus and are not always familiar with the issues and problems associated with alternative livelihood programmes. BOBLME, as an organisation dealing with such agencies, would be well-placed to develop guidelines based on the experience of grass-roots development agencies in the region and making sure that these guidelines reach the agencies that often find themselves involved in the support of alternative livelihoods programmes associated with ecosystem protection measures.

Based on these considerations, a further priority area for the involved of BOBLME in support of coastal and marine livelihoods in the region would be the **development of guidelines on livelihood enhancement and diversification for people dependent on coastal and marine ecosystems.**

Key features of such guidelines, and the process for developing them, should include:

- A systematic review of best (and worst) practice in support to livelihoods enhancement and diversification in the region;
- A review of key policy features that are supportive or obstructive to the development of such programmes and the incorporation of such analysis into the guidelines on policy harmonisation suggested above;
- The development of guidelines based on these reviews;
- The development of strategy for informing and influencing concerned agencies in the region on the use of these guidelines.

In addition, the appropriateness of setting aside some funds within the programme for supporting specific livelihood enhancement and diversification initiatives related to key coastal and marine habitats within the region could be considered. While, as indicated, existing projects that are either currently being implemented or are planned for the near future, seem to largely cover most critical areas, the National Reports developed for the BOBLME indicate that some areas do exist that are not currently being supported from this point of view. Specifically, these include:

- Various locations on the eastern seaboard of India, particularly in Orissa, where coastal communities may not be adequately covered by current government or NGO programmes of support;
- St.Martin's Island, Bangladesh – the only important coral reef area in the country;
- Coastal Myanmar, particularly mangrove areas in the Ayayarwady Delta and possibly coral reef areas in the Myeik Archipelago;
- The west coast of North and West Sumatra Provinces, Indonesia.

In addition, means of supporting existing programmes in the region that are dealing with this area could be assessed on an *ad hoc* basis. Programmes that include some element of livelihood enhancement or diversification include:

Maldives:

- ADB RETA Project – Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction
- GEF Sustainable Use of Coral Reefs Project
- AusAid Protected Areas System Project
- UNDP Promoting Sustainable Human Development in Vaavu Atoll
- ADB Establishment of Regional Economic Centres

Sri Lanka:

- ADB RETA Project – Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction
- GEF Conservation of Biodiversity through Integrated Collaborative Management in Rekawa, Ussangoda and Kalametiya Coastal Ecosystems
- ADB North-East Province Coastal Community Development Project
- ADB Coastal Resource Management Project
- ADB Eastern Province Coastal Community Development Project
- UNDP Transition Programme

India:

- UNDP/GEF Strengthening Sustainable Livelihoods for Biodiversity Conservation in the Sundarbans
- UNDP Capacity Building for Decentralised Planning and Budgeting (Orissa)
- UNDP Support for Rural Livelihoods
- UNDP / GEF Management of Coral Reef Ecosystem of the Andaman and Nicobar Islands
- UNDP / GEF Management and Sustainable Use of the Gulf of Mannar Biosphere Reserve's Coastal Biodiversity
- M.S.Swaminthan Foundation Coastal Wetlands: Mangrove Conservation and Management Programme
- WB Andhra Pradesh Rural Poverty Reduction Project

Bangladesh:

- Integrated Coastal Zone Management (ICZM) Project
- ABD Sundarbans Biodiversity Conservation Project
- UNDP / GEF Coastal and Wetland Biodiversity Management in Cox's Bazar
- UNDP / FAO Empowerment of Coastal Fishing Communities for Livelihood Security
- WB / DFID / GoB / GEF Fourth Fisheries Project

Myanmar:

- UNDP Integrated Community Development Project

Thailand:

- Ministry of Fisheries CHARM Project
- Ministry of Fisheries "Children of the Sea" Project

Indonesia:

- USAID Coastal Resources Management Project

- WB / GEF Coral Reef Rehabilitation and Management Project (COREMAP)
- UNDP Decentralized Environmental and Natural Resource Management Programme
- ADB Livelihood Development for Poor Coastal Fishing Communities Sector Project

There do not currently appear to be any specific projects in Malaysia relevant to the support of alternative livelihoods in coastal areas.

6.3 SUPPORTING RESPONSIBLE AND PRO-POOR MARKET MECHANISMS

In response to growing awareness among consumers in wealthier countries regarding the environmental soundness of the practices that bring coastal and marine products to the market and the social equity of production arrangements, much emphasis is currently being placed, world-wide, on the introduction of certification mechanisms of various kinds. These are intended to provide guarantees to consumers regarding the ways in which products they purchase have been produced.

Such mechanisms are seen as a market-based and sustainable approach to applying pressure on producers to use more environmentally sustainable practices for harvesting from the wild and, in some cases, ensuring that the distribution of benefits from production is equitably distributed among market intermediaries and producers.

Given the importance of the market for coastal and marine produce in dictating the levels of pressure exerted on these ecosystems, support to the spread of these mechanisms in the Bay of Bengal region would seem to provide an avenue for intervention for the BOBLME that could have widespread impacts on patterns of resource use.

The penetration of existing certification mechanisms in the Bay of Bengal region is limited. Some work has been done by the Ethical Trading Initiative (www.ethicaltrading.org) on shrimp farming in India and an important USAID-funded initiative, the Shrimp Seal of Quality, is underway in

Bangladesh. There are no activities in the region by the Marine Stewardship Council, the principle body dealing with eco-labelling for marine products.

Also, while various organisations dealing with fair trade, or trade that ensures a more equitable distribution of benefits between producers and market intermediaries, are gaining increasing acceptance in North America and Europe, they mostly deal, to date, with agricultural and manufactured products and have limited involved in fisheries.

An further area for action for the BOBLME would therefore be **assessment of the potential for the ecological and social certification of coastal and marine products** in the Bay of Bengal region. Such an assessment could focus on several key areas:

- Current experience worldwide in the ecological and social labelling of coastal and marine products;
- The impacts of existing certification mechanisms on producers;
- The identification of products in the region with potential for participation in such certification schemes;
- The assessment of regional market potential for such schemes, focussing on major centres of consumption in the region or adjacent to it such as Singapore, Kuala Lumpur, Bangkok and Hong Kong.

Particular attention should be paid to products that where such initiatives have already been considered, notably farmed shrimp and the live reef fish trade.

6.4 INFORMATION SUPPORT TO ACTION ON CLIMATE CHANGE AND SEA-LEVEL RISE

Climate change and sea-level rise are clearly areas of global concern and that are “shared” and “transboundary” in the fullest possible sense. For this reason, specific interventions to effectively address this issue are difficult to envision within a single programme such as the BOBLME. However, given the importance of these issues for countries around the Bay of Bengal and potentially dramatic impacts of climate change and sea-level rise in the region, any means of contributing to efforts to address these issues need to

be pursued. While the Maldives and Bangladesh may be those countries facing most drastic impacts, changes in weather patterns, resources, the conditions of critical habitats and the vulnerability of low-lying coastal plains will affect all countries to some extent.

A key area where the BOBLME may be able to make contributions would be in facilitating the flow of information regarding environmental changes in coastal and marine ecosystems, and, more specifically, on the livelihoods of people who depend on them, into broader global forums where the overall impacts of these changes are being analysed and understood.

The lack of information on specific linkages between ecosystems and livelihoods in most areas of the region has already been noted, but this could be addressed within the context of looking at the progressive affects of climate change and sea-level rise through the **development of approaches and mechanisms for monitoring the impacts of climate change and sea-level rise on coastal and marine livelihoods**. Such approaches and mechanisms could build upon methodologies already developed for some specific habitats, such as coral reefs (GCRMN, 2003; Cattermoul et al., 2003), to facilitate the development of monitoring networks for other livelihoods and ecosystems liable to be sensitive to such changes. This could include mechanisms for:

- Recording and verifying changes in fisheries-based livelihoods around the Bay of Bengal;
- Monitoring changes in ecosystem conditions;
- Combining and comparing available scientific data and the perceptions of resource users regarding changes on a regular basis;
- Regular verification of these perceptions through field level consultations with resource users.

Emphasis should be placed in this process on the involvement of organisations that are in direct contact with different groups of resource users, rather than on independent data collection by outside agencies. Approaches could be discussed with associations representing fishers in different areas of the region to develop simple, replicable methodologies for collecting minimum data sets that would allow tracking of key changes in

resources, as perceived by those using them, and the effects of those changes on local livelihoods.

This would then require regular verification through field-level consultations with resource-users.

The information generated could constitute an important contribution to the capacity of regional governments to contribute to global forums dealing with climate change and sea-level rise, offering them a direct channel of information from those most immediately effected by changes.

A variety of existing mechanisms, and methodologies, for engaging in such monitoring already exist in the region including the following networks related to coral reef monitoring:

- The Global Coral Reef Monitoring Network – South Asia Node;
- ReefBase, based at the World Fish Centre in Penang, Malaysia;
- The Indian Coral Reef Monitoring Network.

The development of effective information networks would not necessarily directly respond to pressing human needs among resource-users. However, provided a consultative and participatory approach to information generation is adopted, significant benefits could derive from improving the capacity of resource-users to formulate their perceptions of ecosystem changes in ways accessible to wider audiences. The opportunities for improved contacts between local resource-user associations through a monitoring network would also be enhanced.

Table 5 : Review of proposed interventions

Intervention	Issues addressed	Locations	Demonstration effect	Human need
Support to greater harmonisation of policy and policy processes affecting coastal and marine livelihoods at the national level through development of guidelines on policy harmonisation	Conflicts between policies in different sectors resulting in negative externalities affecting coastal and marine areas	All countries	Maximise demonstration effects of existing efforts	High
Support to greater harmonisation of policy and policy processes affecting coastal and marine livelihoods at the international level through development of guidelines and appropriate mechanisms for negotiating policy harmonisation	Conflicts between policies in different sectors and in different countries	All countries	Maximise demonstration effects of existing efforts	High
Promotion of people-centred approaches to policy development for coastal and marine areas	The integration of livelihood and poverty issues into policy development relating to ecosystem management	All countries	Maximise demonstration effects of existing efforts	High
Support to the reduction of pressure on coastal and marine ecosystems through the enhancement and diversification of livelihoods	The lack of guidance on best practice regarding approaches to alternative livelihoods development	All countries	Maximise demonstration effects of existing efforts	High
Support to responsible and pro-poor market mechanisms	The demand for marine and coastal products produced using destructive methods in international markets	All countries	Significant	Medium
Information support to action on climate change and sea-level rise	Lack of information on linkages between livelihoods and ecosystems	All countries	Significant	Low

BIBLIOGRAPHY

ADB/IUCN, Sri Lanka (2003). Poverty and Environment Nexus Study – Sri Lanka Component. Regional Technical Assistance for Coastal and Marine Resources Management and Poverty Reduction in South Asia (ADB RETA 5974). ADB / IUCN, Colombo, Sri Lanka.

Aeron-Thomas, M. (2002). *Integrated Coastal Zone Management in Sri Lanka: a Policy Review*. Working Paper No.4 : Livelihood-Policy Relationships in South Asia. DFID/IIED/MRAG/ University of Leeds/ Overseas Development Group, U.K.

Aeron-Thomas M., G. Macfadyen and S. Chowdhury (2001). *The Costs and Benefits of Bagda Shrimp Farming in Bangladesh*. Bangladesh Centre for Advanced Studies, Dhaka, Bangladesh.

Ahmad, M. (2003). Coastal Livelihoods: Situation and Context. Working Paper WP015 of PDO-ICZMP Project, Bangladesh. PDO-ICZMP, Dhaka.

Ahmed, S.A., D.L. Mallick, M.D. Ali and A.A. Rahman (2002). *Literature Review of Bangladesh Shrimp*. Individual partner report for the project: "Policy Research for Sustainable Shrimp Farming in Asia (PORESSFA)". CEMARE, University of Portsmouth, U.K. and BCAS, Dhaka, Bangladesh.

Barkat, A. and P.K. Roy (2001). *Marine and Coastal Tenure / Community-Based Property Rights in Bangladesh*. Paper prepared for the Marine and Coastal Resources and Community-based Property Rights Philippines Workshop, Anilao, Philippines: 12th-15th June, 2001.

Battacharya, D, M. Rahman and F.A. Katun (2001). *Environmental Impacts of Trade Liberalization and Policies for the Sustainable Management of Natural Resources: a Case Study on Bangladesh's Shrimp Farming Industry*. UNEP/99/3. UNEP, Geneva and New York.

BCAS (2001). *Bangladesh: State of the Environment 2001*. BCAS, Dhaka, Bangladesh.

Campbell, J. (1996). *Participatory and Integrated Policy: a Field Guide for Policy Formulation in Small-Scale Fisheries.* IMM, Exeter, U.K.

Carney, D ed. (1998a). *Sustainable Rural Livelihoods: what contribution can we make?* Papers for the DFID Natural Resources Advisers' Conference, July1998. DFID, London.

Carney, D. (1998b). *Implementing the Sustainable Livelihoods Approach* in *Sustainable Rural Livelihoods: what contribution can we make?* Papers for the DFID Natural Resources Advisers' Conference, July1998. DFID, London.

Cattermoul, B., and J. Campbell (2003). *Further development of an informing and influencing network: GCRMN SA 2003 and onwards*. GCRMN / IMM, 2003. www.ioc.unesco.org/gcrmn

Cesar, H. (2000). *Collected Essays on the Economics of Coral Reefs*. CORDIO, Kalmar, Sweden.

EFTA (2003) *Fair trade –let's go fair*. www.efta.org

Ethical Trading Initiative www.ethicaltrade.org

FAO (2003). *The State of Food Insecurity in the World 2003*. Food and Agriculture Organisation of the UN, Rome.

FAO, (2002). *The State of World Fisheries and Aquaculture.* Food and Agriculture Organisation of the UN, Rome.

FAO (1998). *Follow-up to some decisions and recommendations of the sub-committee on fish trade: sixth session.* Report of the FAO Committee on Fisheries Twenty-Third Session in Rome, Italy, 15-19 February 1999. FAO, Rome, Italy.

Frankenburger, T.L. (2002). *A livelihoods analysis of shrimp fry collectors in Bangladesh – future prospects in relation to a wild fry collection ban*. Tango International Inc. / DFID, Dhaka, Bangladesh.

GCRMN (2003). *Understanding Information Needs. Country Reviews for Future Management Information Needs for Coral Reef Ecosystem Policy Planning*. GCRMN / DFID / IMM, Colombo, Sri Lanka. www.ioc.unesco.org/gcrmn

Government of Bangladesh (2000). *National Water Management Plan*. Annex C-8.1 on arsenic. Dhaka.

Government of Sri Lanka (2002). *Regaining Sri Lanka: Vision and Strategy for Accelerated Development*. Government of Sri Lanka, Colombo.

Haylor, G., M.R.P. Briggs, L. Pet-Soede, H. Tung, N.T.H. Yen, B. Adrien, B. O'Callaghan, C. Gow, L. DeVantier, C.Cheung, R. Santos, E. Pador, M. de la Torre, P. Bulcock & W. Savage (2003). *Improving Coastal Livelihoods through Sustainable Aquaculture Practices: a Report to the Collaborative APEC Grouper Research and Development Network*. (FWG/01/2001). STREAM Initiative, NACA, Bangkok. http://www.streaminitiative.org/Library/pdf/apec/04Bohol.pdf

Hoggarth, D., V.J. Cowan, A.S. Halls, M. Aeron-Thomas, J.A. McGregor, C.A. Garaway, I. Payne and R.L. Welcomme, 1999. *Management guidelines for Asian floodplain fisheries. Part 1: A spatial, hierarchical and integrated strategy for adaptive co-management.* Fao Fisheries Technical Paper 384/1. Food and Agricultural Organisation of the United Nations, Rome, Italy.

ICM (2003). *Poverty, Food Insecurity and Vulnerability in Coastal Fishing Communities of Orissa*. Report from the FNPP-SIFAR (FAO) Project "Assessing the vulnerability of poor coastal communities to food insecurity and poverty". ICM, Kakinada, India.

IFAD (2002). *Assessment of Rural Poverty: Asia and the Pacific*. International Fund for Agricultural Development, Rome.

IIED (2001). *Power Tools : Tools for working on policies and institutions*. Series (in development) available on IIED website. www.iied.org

IMM/ICM (2003a). *Sustainable Coastal Livelihoods for the Coastal Poor: Supporting Pro-Poor Policies*. 11 Coastal Livelihoods Information Papers (CLIPS)– outputs from the DFID Sustainable Coastal Livelihoods Project. IMM – ICM – FIRM, Exeter, U.K. www.exeter.ac.uk/imm/SCL.htm

IMM/ICM (2003b). *Changes in Fish Utilisation in India and its Impacts on Poverty: the Findings of 2° Phase Research in 4 States*. Draft Report on Project R7799 of the DFID Post-Harvest Fisheries Research Programme. IMM - ICM, Exeter, U.K.

IMM/ICM (2003c). *Poverty, Institutional and Informational Factors affecting Poverty in 3 Coastal Communities in Andhra Pradesh.* Report on the Phase 2 Socio-Economic Research of the DFID Sustainable Coastal Livelihoods Project. IMM – ICM – FIRM, Exeter, U.K. www.exeter.ac.uk/imm/SCL.htm

IPCC (2001). *Climate Change 2001: Synthesis Report. A Contribution of Working Groups I, II and III to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. R.T. Watson and the Core Writing Team (eds.). Cambridge University Press, Cambridge, U.K. and New York, U.S.A.

Matrosubroto P. and R. Willmann,(2003). *An Ecosystem Approach to Fisheries Management in the Bay of Bengal- FAO Fisheries Development*. Paper prepared for the First Regional Workshop of the GEF BOBLME, Pattaya, Thailand, 17-21, Feb, 2003.

Macfadyen, G. and E. Corcoran (2002). *Literature Review of Studies on Fishing Communities and of Lessons Learned in using the*

Sustainable Livelihoods Approach in Poverty Alleviation Strategies and Projects. FAO Fisheries Circular No. 979. FAO, Rome.

Marine Stewardship Council. www.mrc.org

Narayan, D., R. Chambers, M.K. Shah & P. Pettesch (2000). *The Voices of the Poor: Crying Out for Change*. World Bank, Washington.

PDO-ICZM (2003a). *A system analysis of shrimp production*. PDO-ICZM Working Paper 14. PDO-ICZM, Dhaka, Bangladesh.

PDO-ICZM (2003b). *Review of Local Institutional Environment in the Coastal Areas of Bangladesh*. PDO-ICZM Working Paper 18. PDO-ICZM, Dhaka, Bangladesh

Pomeroy, R.S., B.M. Katon and I. Harkes (1998). *Fisheries Co-Management: Key Conditions and Principles drawn from Asian Experience*. Research Paper. ICLARM, Manila, Philippines.

Purnomahadi, S.H. (2003). *Indonesia BOBLME National Report*. Draft version.

Rietbergen, S., J. Bishop and S. Mainka (2002). *Ecosystem Conservation – a Neglected Tool for Poverty Reduction*. Paper in series: Opinion for the World Summit on Sustainable Development. International Institute for Environment and Development, London, U.K.

Rahman, A., M.A. Islam, I. Roy, L. Azad & K.S. Islam (1995): *Shrimp Culture and Environment in The Coastal Region*. Working Paper New Series No.8. Bangladesh Institute of Development Studies (BCAS), Dhaka, Bangladesh

Sampath, V (2003). *National Report on the Status and Development Potential of the Coastal and Marine Environment of the East Coast of India and its Living Resources*. Report for the FAO/BOBLME Programme (in publication).

Sands, P. (1996). *Bangladesh-India: Treaty on Sharing of the Ganges Water at Farakka: Introductory Note* 36 I.L.M. 519 (1997)+. American Society of Law, Washington, D.C. www.asil.org/ilm/india.htm.

Sen, A.(1981). *Poverty and Famines*. Oxford University Press, Oxford.

Soussan, J. and A. Datta (2003). *Coastal Zone Policies and Livelihoods in Bangladesh*. Briefing Note 6 from DFID-funded research project on "Improving Policy-Livelihood Relationships in South Asia". SEI, York, U.K.

Tietze, U., G. Groenewold and A. Marcaux (2000). *Demographic changes in coastal fishing communities and its implications for the coastal environment*. FAO Technical Paper 403. Food and Agriculture Organisation of the United Nations, Rome.

Toufique, K.A. and K. Turton (2003). *Hands Not Land: How Livelihoods are Changing in Bangladesh*. Bangladesh Institute of Development Studies and DFID/Bangladesh, Dhaka.

Townsley, P. (1998). *Aquatic Resources and Sustainable Rural Livelihoods* in *Sustainable Rural Livelihoods: what contribution can we make?* in Papers for the DFID Natural Resources Advisers' Conference, July1998. DFID, London.

UNDP, (?). *UNDP Initiatives in Tamil Nadu*. UNDP, New Delhi, India. www.undp.org.in

UNEP (2002a). *Tourism and Local Agenda 21 – the Role of Local Authorities in Sustainable Tourism*. www.unep.org

UNEP (2002b). *Sustainable Tourism in Protected Areas: Guidelines for Planning and Management*. www.unep.org

Vidal, J. (2003). *It's impossible to protect the forests for much longer*. Feature article in Guardian Unlimited: Thursday, 31st July, 2003. www.guardian.co.uk/life/feature/story/.

Whittingham, E., J. Campbell & P. Townsley (2003). *Poverty and Reefs* (2 Vols.). DFID–IMM-IOC/UNESCO. UNESCO, Paris. www.exeter.ac.uk/imm/rla.htm

Wilkinson, C.R. & R.W. Buddemeier (1994). *Global Climate Change and Coral Reefs: Implications for People and Reefs*. Report of the UNEP-IOC-ASPEI-IUCN Global Task Team on the Implications of Climate Change on Coral Reefs. IUCN, Gland, Switzerland.

World Bank (2003). *World Development Report 2003*. World Bank, Washington D.C., U.S.A.

World Bank (2001). *Poverty and Public Policy: Thailand Social Monitor No. 6*. World Bank, Bangkok, Thailand.

World Bank (2000). *Bangladesh: Climate Change and Sustainable Development*. Report No.21104 BD of South Asia Rural Development Team. World Bank, Dhaka.

World Resources Institute (2003). *Reefs at Risk in Southeast Asia*. www.wri.org/reefsatrisk/reefrisk.html

ANNEX 1 TERMS OF REFERENCE

1. The consultant will carry out a review of coastal and marine livelihoods and food security in the BOBLME region, and in particular along those coasts of the participating countries that face the Bay of Bengal, the Andaman Sea and the Straits of Malacca. The review will cover the following topics:

- Description of the current status of coastal and marine livelihoods and food security
- Evaluation of the socio-economic and environmental sustainability of these livelihoods and food security
- Identification of shared/common and transboundary issues relating to coastal and marine livelihoods and food security in the region;
- Analysis of the root causes of these issues;
- Prioritisation of these issues in order of regional severity;
- Identification of current attempts to address these issues, including any local, national and regional initiatives or programmes;
- Description of any knowledge gaps, policy distortions and institutional deficiencies that impede the development of solutions to transboundary issues of coastal and marine livelihoods and food security;
- Suggested actions that should be taken to eliminate such gaps, distortions and deficiencies;
- Priorities, in terms of regional need, for comprehensive, cross-sectoral ecosystem-based actions that integrate socio-economic, environmental and development considerations in response to the above issues, including suggestions for sectoral interventions and for local/national/ regional institutional mechanisms necessary for them to take place;
- Ways to assist the countries in the BOBLME region to better understand the transboundary issues related to coastal and marine livelihoods and food security and to work collaboratively to address them.

- Suggestions for location of the proposed activities in two types of areas:
    - where maximum demonstration/replication value can be achieved if it is an innovative activity
    - where the human need is the greatest.

2. The Consultant will consider and address as appropriate:

- The effect of traditional ownership and customary use rights to marine resources
- How these rights may be changing as a result of settlement patterns, community and economic development
- Seasonal and long-term migration in and out of the coastal zone
- The implications of poverty and vulnerability of the coastal communities and their coping strategies
- The effect of tourism, industry, aquaculture, residential construction for the affluent
- Need to supplement income/food from marine resources by other livelihood