

The Sida Marine and Coastal Zone Initiative

Environmental Economics and the Coastal Area of Developing Countries

Jessica Andersson

NATUR/SAREC/INEC

Concept-paper on Environmental Economics and the Coastal Area of Developing Countries

The Sida Marine and Coastal Initiative

Foreword

This concept-paper on Environmental Economics and the Coastal Area of Developing Countries has been elaborated on request by the working team for the preparation of Sida's Marine and Coastal Zone Initiative, an intended policy programme with plans of action for development of tropical and sub-tropical marine and coastal areas.

The views presented are those of the author, Ms Jessica Andersson (Dept. for Economics, University of Gothenburg) and are not necessarily shared by Sida.

The working team in Stockholm, September 1997

Content

<i>Executive Summary.....</i>	<i>3</i>
<i>Environmental economics and its role in developing countries.....</i>	<i>3</i>
<i>Why does environmental degradation take place.....</i>	<i>4</i>
<i>Market failure.....</i>	<i>5</i>
<i>Policy failure.....</i>	<i>7</i>
<i>Valuation of marine natural resources and the environment.....</i>	<i>8</i>
<i>The designing of policy instruments.....</i>	<i>10</i>
<i>Research activities of marine related Environmental Economics....</i>	<i>12</i>
<i>Environmental Impact Assessment.....</i>	<i>12</i>
<i>Development in the coastal zone.....</i>	<i>13</i>
<i>Case Studies- environmental economics in coastal management... </i>	<i>14</i>
<i>Conclusions and recommendations.....</i>	<i>16</i>
<i>REFERENCES.....</i>	<i>19</i>

Executive Summary

Environmental economics dealing with the marine and coastal environment is a relatively new field of research within economics. Nevertheless, economic theory can provide insights to why environmental degradation takes place and how to adjust for these distortions. This paper address those theories and the experience gained from applied research in the field. It describes how economic theory can assist in governing the marine and coastal zone in developing countries but also highlights the many restrictions encompassing its applicability.

An important field within environmental economics deals with the estimation of monetary values for natural resources and the environment. Valuation is a mean to communicate with decision makers and to allow for a judgement between non comparable factors. This is important in any project appraisal, investment decision or policy decision in order to provide a truer indicator of the economic performance. There is, however, a need to produce new techniques and methods for estimating economic values of marine and coastal resources that are applicable for developing countries. The methods existing today have mainly evolved in developed countries. This is mainly due to a lack of local students and researchers trained in the area.

In developing countries there is commonly a lack of qualified personnel and institutions that are capable of handling the complex activity of designing environmental policy instruments. This is further aggravated by a lack of data. In order to reduce the environmental problems, aggravated by trend such as growing numbers of coastal cities, it is necessary that countries adjust their institutions accordingly. For example, cities require organised waste collection systems which in turn requires a managing institution, infrastructure and a management plan to comply with this. The environmental problems are not solved by designing optimal policy instrument if they are not complied to. This is a common phenomena in developing countries where there is often a weak monitoring capacity, low enforcement of environmental laws and corruption.

When introducing programs such as the coastal initiative it is important to not focus on specific projects but on broad policies and strategies. Any project should be seen as part of an overall development policy in order achieve the most equally distributed and economically and ecologically optimal development for the coastal zone and in order to avoid distortions.

Environmental economics and its role in developing countries¹

During the 1950-60 economists mainly focused their attention on economic growth and spent intellectual effort on understanding this phenomena with little reflection on the fact that some of the inputs essential in the production process were limited in supply. Long

¹ This section is mainly adapted from A. Markandya and J. Richardsson (1992)

term growth coupled with increasing population could not be accommodated with earth's limited natural resources or to address it in a popular fashion, the *sustainability* of the growth process was not fully addressed. Together with this notion a new environmental awareness germinated. As people became richer their preferences for a clean neighbourhood, for natural goods (parks, natural forests, clean water) and future environmental services increased. Environmental issues was seen as a rich country's concern. This perception together with the perception that it was poverty that was the paramount problem to tackle in developing countries prevailed the main wisdom for much of the 1960s and 70s. The change came about in the 80s when the key role of the natural resource base in the very process of development led some economists to emphasise the protection of environmental resources in the development plans of such countries. Needless to say, environmental economics as a science in developing countries has, both in its theoretical and empirical applicability, a very recent history. Still, despite its junior position in the field there has been a recent boom in the economic literature covering various aspects of the environment in a developing country perspective².

The foundation for environmental economics as a discipline lay in the economic theory of welfare economics and in the theory of externalities. Welfare economics is concerned with questions of economic justice, of how resources should be allocated in society so that individual and social welfare is maximised. Externalities are items such as noise or pollution which have an effect on a person's welfare but whose level is determined without taking into account the welfare effect.

Most of the environmental economics literature that later evolved in developing countries grew out of agricultural economics and forestry economics. The coastal and marine environment, with the exception of fishery economics, has received relatively less attention in the economic literature. Lately, there has been an increasing focus on this area. This is probably triggered by its increasing economic importance (tourism, increased prices for marine products) and because of the tremendous population growth experienced in many coastal areas, and the many negative consequences coupled with this.

In broad terms the main areas of environmental economics, both in theory and in its applied form can be divided in; 1) the estimation of economic values for natural resources and the environment and 2) the designing of environmental policy instruments. These will be discussed separately and in relation to their applicability for the coastal and marine environment below. Before that we will see how economists explains why there is environmental degradation and see what this implies for the coastal zone.

Why does environmental degradation take place?

An economists answer to the question of why degradation and misuse takes place although it is long term non profitable, is that there is a dissociation between scarcity and

² To mention some of the available literature;, Scramm and Warford (1991), Winpenny (1991), Dixon et al (1996), Georgiou et al. (1997)

price, benefit and cost, rights and responsibilities, actions and consequences. This disassociation exist because of a combination of *market* and *policy failure*. What happens is that an incentive structure is created that induces people to maximise their profit, not by being efficient or including long term costs but by appropriating peoples resources and shifting their own costs to others, including future generations. For Third World countries this is exacerbated by a number of socio-economic trends such as; rising human population, heightened income aspiration, the expansion of market system, the availability of new technology, high effective rates of interest, difficulties in enforcing conservation measures and a sensitive an fragile environmental base.

The implications of market and policy failure as the underlying cause to coastal and marine degradation will be discussed in detail below³.

Market failure.

Much of the mismanagement and inefficient use of natural resources and the environment can be traced to distorted or totally absent markets. Prices generated by such markets do not reflect the true social costs and benefits from resource use and convey misleading information about resource scarcity which provide inadequate incentives for management. For example, although there are markets for many marine products such as fish, crustaceans and seagrass the fact that they are produced from an open access resource (the sea) makes their price, incorrectly, lower. This is because the price only reflects the opportunity cost of labour and capital used in their production, not the opportunity cost of scarce resources used in their production. The implicit rent or user cost for the fishing ground is taken to be zero regardless of scarcity and social opportunity cost.

The most common sources to market failures affecting the marine and coastal environment in developing countries can be summarised as; 1) ill-defined or totally absent property rights, 2) yet unaccounted externalities 3) myopia in the sense of too short planning horizons or too high discount rates arising from poverty, impatience, and risk or uncertainty which affects individuals but not the society as a whole, 4) irreversibility: when market decisions under uncertainty lead to irreversible results the market fail to allocate resources prudently. These will each be discussed separately below.

Property rights A fundamental condition for the efficient operation of markets is that there exist well defined, exclusive, secure, transferable and enforceable property rights over all resources, goods and services. Property rights are preconditions to efficient use, trade investment, conservation, and management of resources. No one in his right mind would pay for, invest in or conserve a resource without an assurance that he has secure and exclusive rights over it and the costs can be recovered through use, lease or sale and that such rights can and will be enforced. (Panayotou, 1992)

The property right structure is a core issue when dealing with the coastal zone. It is the underlying reason to how the resource is managed/mismanaged and what remedy that is appropriate in situations of mismanagement. All sorts of property right structures can be

³ The discussion of market and policy failure is mainly adapted from Panayoto (1992)

found in the coastal area. The sea, including all the resources and ecological services it provides is, unless designated a marine park or likewise, an open access resource. Mangrove forest can be either an open access resource or be governed through traditional rules by a community and it is then referred to as a common property resource (CPR) and the beach area adjacent to a hotel can be a private property. The largest threat to the environment are open access resources. CPRs are important parts of communities natural resource endowments in developing countries. There is a general decline of CPR's due to a number of factors such as public sector interventions and donor agencies. This is, among other things, because a CPR perspective have largely been missing in donors resource centred research strategies (Jodha, 1992).

Externalities An externality is the effect of one firm's or individual's action on other firms or individuals who are not parties in those actions. Externalities can be both positive and negative. An example of a negative externality is the damage that an upstream rice farmer's use of pesticide causes to a downstream shrimp farmer in the mangrove that uses the same water source. The society as a whole (not only the shrimp farmer) would benefit if less of this externality is produced. There is, however, no incentive for the upstream farmer to take the downstream farmers interest into account. The government could react by banning the use of pesticides altogether. This, however, may reduce social welfare if the loss from rice production outweighs the gain from shrimp production (including other possible damages to the ecosystem in the mangrove). The ideal situation would be for pesticide use to be reduced exactly to the level where the combined value of rice and shrimp is maximised⁴. There are two ways in which this could happened; 1) the price of the pesticide includes a charge above production cost that accounts for the environmental cost, 2) the same decision makers owns both the rice farm and the shrimp farm.

Short time planning horizon Environmental and market uncertainties coupled with a short and uncertain life span lead people to adopt short term time horizons and discount rates which results in short sited decisions in order to either survive or to make a quick profit at the expense of long term sustainable benefits.

Although, there exist several categories of fishermen in developing countries ranging from those possessing large motorised vessels to small outriggered canoes or those who only use a stick or their hands to collect octopus, seacucumbers or shells, the main part is very poor. For the very poor, where a hand-to-mouth economy prevails, the future is infinitely discounted. This often leads to over exploitation of the marine environment or to under investments in its conservation. The use of destructive fishing methods such as dynamite and an extensive harvesting of corals for building material as well as the deforestation of mangroves are the consequence of such thinking.

Another reason to the higher discount rate is the use of informal credit markets, with higher credit rates, which often exist in rural areas due to lack of institutional credit.

⁴ This level is obtained where the marginal benefit from pesticide use equals its marginal cost, where this cost includes both the production cost of the pesticide and its environmental cost, which is the effect on shrimp production.

Irreversibility Because of incomplete information many development decisions are made on the assumption that they can be reversed will there be new information proving them to be unwise. This assumption does not hold for most natural resources. Imagine for example the choice between conserving a coral reef in an area or building an oil rig on the same area destroying the reefs. If the social benefits from building the oilrig is larger than the benefits provided by the reefs we should choose to build the oilrig except that building the oil rig is irreversible while conserving the reefs is not. If we or future generations were to change our minds there would be no way to reproduce the uniqueness and authenticity of the original species of the reef that became extinct. Clearly there is a social value for the conservation option because of the irreversibility although it is difficult to estimate.

Development implications

Coastal development project can assist by promoting:

- ◆ the correction of ill-defined and weak property rights (including a CPR perspective)
- ◆ that possible externalities are accounted for and that the social cost of such are internalised
- ◆ a low discount rate when evaluating different development options or projects for marine and coastal resources (including to support formal credit markets in rural areas)
- ◆ that the risk of irreversibility in project decisions are included

Policy failure

Government interventions aims at correcting market failure through policy instruments. It happens, however, that government policies introduce additional distortions in the market for natural resources rather than correcting them. This is not uniquely caused by Governments, development assistance agencies can also cause these sorts of distortions. Through project and program lending and policy dialogue donors or other agencies may introduce or exacerbate a failure. An example of this is the liberalisation policy in the structural adjustment program where it, in absence of secure property rights and other legal institutions for markets, may simply transform a policy failure into a market failure. This is not an uncommon scenario with African liberalisation programs

Interventions may lead to different sorts of policy failure. For example, it might cause a distortion of an otherwise well functioning market. An intervention that cause a collapse of a well functioning Common Property Resource (CPR) structure illustrates such a failure. A policy failure can also be caused by a failure to internalise significant environmental externalities. This is mainly caused by a lack of information about the interlinked effects an intervention may have. For example, if government subsidies pesticides in an upstream area, as described in the example of externalities. This policy might be warranted from a welfare point of view but if the effect on the downstream forest is not considered in the decision it fails to internalise the social cost of the intervention. There is also the case of policy interventions that aim to correct or mitigate but end up generating a worse outcome than a free and failing market. For example, assume that government attach a tax to the use of a specific gear for fishing in order to reduce over fishing. If this result in an extended use of dynamite for fishing instead it can be concluded that the former market

was preferred although it was distorted. Last, failure to intervene in failing markets when such interventions are clearly needed is an obvious policy failure.

Policy instruments will be discussed in more detail below.

Developments implications

Any policy intervention or project should be carefully assessed such that it does not;

- ◆ distort otherwise well functioning markets
- ◆ fail to consider and internalise significant environmental externalities
- ◆ end up generating a worse outcome than a free and failing market

Valuation of marine natural resources and environment

Translating the value of environmental goods and services into the common unit of money is an important part of environmental economics. Valuation is relevant for both investment decision involving environmental impacts and for regulating the environment. Although valuation began with a narrower project focus of direct environmental impacts of activities, its use has extended to include analysis of impact of macro policy changes as well as in resource accounting or “green-accounting”. Examples where valuation can be useful for the coastal and marine environment is; to estimate the expected benefits or cost of converting a mangrove area to either a shrimp farm, salt pans or a golf course, to estimate the economic value of designating a particular area as a marine park and to estimate the economic benefit of either putting a ban on coral harvesting or of subsidising alternative building material.

In other words, valuation is a mean to remind society that the environment is not a free commodity even though there may not be a conventional market for its services. It is further a means of communicating with policy makers that are more familiar with dollars than with milligrams of Nitrogen, it provides a better insight when designing policy instruments such as taxes, subsidies and regulations, to secure a proper environmental use. It allows for judgement between non-comparable factors. In sum it helps to provide a truer indication of economic performance.

Economic valuation in the environment context is about measuring the preferences of people for an environmental good, or against an environmental bad. This means that the valuation process is anthropocentric. There is, however, ongoing research in trying to estimate the value of ecological functions and services provided by a resource or an ecosystem.

Economic values can be classified into a set of component parts. This can be illustrated in the context of a decision about alternative uses of a mangrove forest. According to a cost benefit analysis the decision to convert the mangrove (to salt pans, or a shrimp farm for example) have to exceed the net benefit of “conserving it”. Typically the benefits and costs

of converting it into an alternative use is readily calculated because it has attendant cash flows. For example the benefits of shrimp production can be valued because the market price of shrimp is observable. Conservation benefits on the other hand are a mix of associated cash flows and non-market benefits. Conservation benefits are classified in a "total economic value" (TEV) of the mangrove forest. TEV comprises use and non-use values. Use values can in turn be broken down into direct use, indirect use and option value and the non-use values into existence value and bequest value.

Direct use values are fairly straightforward since they most often have a market value, such as timber, fish, molluscs, medicinal plants, latex etc. *Indirect use values* correspond to what was discussed above, ecological services and functions such as sediment and nutrient retention. As indicated above these are difficult to attach monetary values to. *Option value* relate to the amount that individuals would be willing to pay to conserve an environmental asset for future use. It is thus like an insurance premium to ensure the supply of something which would otherwise be uncertain. *Non-use, existence value* measures the willingness to pay for preservation of an environmental asset that is not related either to current or optional use. The most common technique used to estimate this value is the Contingent Valuation Method (CVM). This method creates an hypothetical market where individuals are asked to reveal either their Willingness To Pay (WTP) for a benefit or Willingness to Accept Compensation (WTAC) for a loss or damage. Empirical measures of the existence values for tropical resources such as coral reefs suggest that existence value can be a substantial component of the TEV. *Bequest value* measures an individuals WTP to ensure that an environmental resource is preserved for future generations. The TEV is the sum of the Direct use values, the Indirect use values, the Option value and the Existence value.

There is relatively little research carried out of valuation techniques and methods for the coastal and marine environment in developing countries. Studies and research that have been carried out in this area have mainly taken place in developed countries. Often the same methods have been directly transferred to developing countries. There is a need for further research in this area, in finding new and applicable methods and techniques evolved from a developing country situation. For this to be successful environmental economics needs to be promoted and supported at economics department in developing countries. To further extend this to include coastal and marine management, marine and coastal studies need to be encouraged at the same department.

Another area in which environmental valuation is a useful tool is for carrying out Environmental Impact Assessment (EIA) in project appraisals. This will be discussed in more detail in a separate section below.

Development implications

To improve the use of valuation as a tool in decisionmaking and project evaluation for the coastal and marine environment in developing countries, there is a need for;

- ◆ more locally and regionally applied research in the valuation of coastal and marine resources
- ◆ the development valuation methods applicable for the special circumstances of developing countries
- ◆ qualified personnel to carry out cost benefit analysis in the respective countries

The designing of policy instruments

Environmental policy instruments are used to correct for environmental externalities.

These can be divided in; *direct regulations* (standards, resource use quotas and bans), also known as command and control strategies, and *market based regulations* (taxes, charges, redefining property rights, subsidies and deposit refund systems) which make use of the market mechanism and price incentives to correct for failures. These instruments can be used separately or in combination. Generally economists have favoured the use of market based instruments on the grounds of cost efficiency and technological dynamism whilst the most common policy instrument in the past have actually been command and control. In other words there is no single instrument or mix of instrument that can be considered superior another.

When designing instruments it is not enough to look at environmental degradation in terms of level of pollution, rate of reef degradation, rate of beach erosion or rate of over fishing. The above mentioned examples are the symptoms and in order to deal with the problem it is necessary to understand the underlying causes. The underlying causes of environmental degradation may often be related to activities that at first sight are only remotely connected to the observed effect. For example, an increased cutting of mangrove forests might be induced by a change in relative prices for timber due to trade liberalisation, or increased coral harvesting might be caused by an increased demand for cement (from lime produced by burning the corals) due to Governments decision to construct an airport strip on an island with no alternative building material (Andersson and Ngazi 1995), or eutrophication damaging the reefs could be caused by excessive use of fertilisers for agricultural activities because of governmental subsidies for pesticides. If project and policy measures are to be viable they should be based on a sound understanding of not only the physical linkages among events, but also equally complex economic, financial, social and institutional linkages that goes along with them. For example, if the use of dynamite for fishing leads to reef degradation it is not enough to ban the use of dynamite in fishing to stop the use of the method (let alone to stop the degradation of the reefs). The underlying reason might be found in relative prices of dynamite and other gears, collapse of institutional settings, poor monitoring, high unemployment, easy availability of explosives, migration to coastal areas (again maybe caused by low relative prices on agricultural goods). This calls for a multidisciplinary and intersectoral approach when designing policy instrument. Much work needs to be done in this area.

A common limitation in developing countries is a lack of data and of qualified personnel that ensures that the collection of and analysis of technical information of the complex linkages and interrelations are well focused and operational for policy decisions. The reasons for this are several; lack of trained personnel at responsible authorities, lack of financial-, material- and technical resources, lack of intersectoral links and collaborations and the occurrence of corruption. Often, coastal resources are governed by a number of different ministries, agencies and departments sharing or competing for the responsibility to manage even a single resource. A good example is the mangrove forest in Tanzania. Several different authorities are simultaneously responsible for the management of the mangrove, including; the Division of Forestry, the Division of Lands, the Ministry of Water Energy and Minerals, the Ministry for Tourism Natural Resources and the Environment and finally the National Environmental Management Council (NEMC).

Given the complexity of interest for such a multiple-use resource (for example for salt licences, land titles, shrimp farming or the commercial cutting of trees) it is not surprising that such a divergent institutional set-up fails to successfully govern the resource. In sum, to successfully manage the coastal environment and its resources it is necessary to form institutions with an overall responsibility. For many countries this means a restructuring of their institutional set up to more efficient environmental management.

It is not enough to design perfect policy instruments for the environment if they are not followed⁵. Direct regulations such as standards require for example a well functioning monitoring agency which has the power to impose penalties for non-adherence. For economic instruments to be efficient a market based economy is a prerequisite. Corruption, lack of enforcement, weak institutions and lack of proper infrastructure are common characteristics for developing countries that aggravates the ability to comply with any legal or policy framework. Even in a country such as the Seychelles which is relatively developed is the compliance to the existing legislation pertaining to the coastal environment weak at a local level. The enforcement of environmental laws is low and very few cases have even been brought to court (Shah, 1996). Another example is Mozambique where there is an increasing number of illegal tourist operations established along the beaches but the institutional framework is too weak to control it. This uncontrolled tourism industry has negative effects on the marine environment such as significant amount of litter on the beach, aquatic sports and the movement of boats at high speed on the corals, breaking and removal of corals and coral fish and the collection of shells for selling (Gove D. Z, 1996). In small countries and at local levels kinship patterns and social familiarities often complicates these matters.

⁵ For example Mexico have more advanced environmental laws than the US but because of poor compliance the US is more successful in governing their environment.

Development implications

For an efficient designing and compliance with policy instrument for the coastal zone there is a need for:

- ◆ a local ability to incorporate the complex economic, financial, social and institutional linkages that combine the underlying cause to marine and coastal environmental degradation or misuse
- ◆ institutions with an overall responsibility and understanding for the coastal zone
- ◆ data, qualified personnel and institutional set up to ensure that the collection of and analysis of technical information are well focused and operational for policy decisions.
- ◆ institutional capacity to comply with existing policies

Research activities of marine related Environmental Economics

As mentioned earlier, environmental economics is a fairly new subject within economics. Research related to developing countries within the same field is even more recent and consequently environmental economics of marine related issues in developing countries is a very new area of research. As a consequence, relatively few studies have yet been carried out and few theories developed.

Sida/SARECs regional marine program in East Africa includes an environmental economics project. The objective of the program is to improve the capacity in environmental economics dealing with the marine and coastal zone in the East African region. It includes the training of M.Sc as well as Ph.D. students, to organise workshop and build networks. However, not only academics and teachers are trained and educated but also planners and decision makers. This is an important contribution to the poor capacity in this field of both academics and policy makers in the region.

To achieve an even base of knowledge in a capacity building program it is important to train people at different levels. Ph.D's commonly acquire high positions in authorities or organisations that are not always within their own field of training. By emphasising training of students at levels such as BA and M.Sc., a resource base can develop for collecting and analysing data, carrying out environmental impact assessments and provide local assistance in development project. As in most social disciplines marine and coastal studies constitute only a small fraction within the broader social field, such as economics, and there is seldom any local training capacity. One way to combat this is to promote and encourage, financially and educationally, marine and coastal related studies at the respective institutions at local Universities.

Environmental Impact Assessments

It is mandatory to carry out an Environmental Impact Assessment (EIA) for all Sida projects. This should be carried out already in the appraisal stage. It is important that it is carried out in a way that allows for a continuous monitoring process all the way to the final

evaluation stage. It has been shown that the lack of such assessments is a large constraint in the evaluation stage (Alberts and Andersson, 1996).

To use a Cost Benefit Analysis (CBA) to assess different development options (see earlier section about valuation), including all existing and potential environmental impacts and externalities, does not only help to base the decision on truer economic and social performance, it also facilitate the continuous monitoring process and the evaluation of the project.

Sida is currently revising its manual for environmental impact assessments. Environmental economics will be included as a section in this. Hopefully this will lead to an extended use of environmental economics methods and techniques in EIAs.

Development implications

To improve the research quality of coastal and marine economics in developing countries as well as the capacity at policy level it is advisable to:

- ◆ support the training of local student, at all levels, in coastal and marine related environmental economics
- ◆ support and encourage research in the field
- ◆ train policy makers and decision makers in marine and coastal economics
- ◆ Involve existing local research capacity in development projects and EIAs

Development in the coastal areas

The links between improved environmental management and economic development were at the core of the 1992 Rio Earth Summit (the United Nations Conference on Environment and Development). One of the main questions was if fast economic growth and a clean and sustainable environment can go hand in hand? There are many different theories about this. One set of studies argues, for example, that as a country experiences fast economic growth the environment is initially degraded and things like pollution and environmental destruction increase. As growth leads to higher incomes the preferences of the people change which subsequently leads to a decrease in pollution. Another argument is that in an increasingly integrated world, triggered by for example trade liberalisation, it is predicted that the polluting or “dirty” industry will be exported to the countries with the most liberal environmental regulations, today being the developing countries. In economic terms this means that environmental quality is treated as a normal good that can be sold and exported.

Often the economic growth patterns experienced in the developed countries are used as examples describing the relationships of growth and the environment. There are several arguments against this generalisation. First, the development that the developed countries experienced took place without any other “world” or market existing simultaneously. Because of the order of the world today developing countries start from an inferior position. Second, the population growth existing today have never been experienced

before. Finally, most developed countries are situated in the temperate climatic zone. The environment in these areas possess a higher resilience towards disturbances which means that the necessary intensification required to feed a growing population and more specialised economy did not deteriorate or destroy the soil and the environment. Tropical environments on the other hand are more sensitive and intensified agricultural activities are for example not always achievable.

Governments in developing countries have become increasingly aware that environmental and natural resource endangers the potential for long term development. As a result they are more receptive to the implementation of measures which ensures that development projects take both the environment and natural resources into account. (Dixon et.al. 1996). It is, however, not always enough to be willing to ensure environmental sustainability if the linkages between the activity and consequence is not obvious. The enormous growth of the tourism industry is such an example. The rapid and ill managed tourism development in Kenya for example has led to the degradation of the environment in several marine parks and to a loss of biodiversity of different biotopes, reefs, mangroves and seagrassbeds (Okemwa and Ruwa, 1996). In other words the activity of tourism destroys the actual source for its attractiveness that it depends on. The same sort of development has been experienced in many other parts of East Africa, Sout East Asia and the Caribbean.

To be able to combine growth with environmental sustainability development must go hand in hand with necessary institutional changes. So far many developing countries have operated simultaneously in two different words, one traditional resource based and another more specialised and technically advanced. To cope with rapid urbanisation and increased integration with other parts of the world, through trade and tourism, a shift of the institutional set up is necessary. This is particularly obvious in the growing numbers of coastal cities where the infrastructure, technical knowledge and institutional framework is to slow to adapt to the new requirements. For example, in Madagascar solid waste is dumped along beaches due to lack of proper waste collection services, only 17% of the urban waste is collected. In the same country only between 20 -40 % of the coastal urban population have access to toilets of which only 6 out of 15 coastal cities have domestic wastewater collection systems of which there is no treatment anyway and the wastewater is discharged directly to the sea (J. Ranaivason, 1995).

A major policy distortion is the very emphasis on projects as opposed to policies and strategies. The emphasis is on choosing between projects rather than on asking whether anything needs to be done in a given resource area. When projects are seen as a part of an overall development policy many of what are now unaccounted externalities will be internalised and much of the environment-development conflict resolved. Many developing economies are far from, what is called, their efficient production frontier. It is possible and feasible to produce more development and better environment at the same time by correcting market failures and eliminating policy distortions. It is in this context that public projects should be planned designed and evaluated.

Another concern in developing countries and particularly for the coastal zone is the fact that the environment is especially fragile and possesses comparatively low resilience to disturbances. It is important that this is incorporated in any development strategy and that the issue of irreversibility is incorporated.

Development implications

- ◆ Assistance for coastal management should be seen as a part of an overall development policy, not as isolated projects.
- ◆ Development must go hand in hand with necessary institutional changes

Case studies-The applicability of economics in marine and coastal management

What is the role of environmental economics for the marine and coastal environment in reality. A few case studies illustrating its applicability will be presented here. The idea is not to present how the actual study was carried out in practice but to present areas in which economics can be useful.

Case 1 (Mangrove Valuation in Bintuni Bay, Irian Jaya, Indonesia by Ruitenbeek, 1992, 1994) Benefit cost analysis are very useful in assessing the optimality of different management options. This is a study that performs an extended benefit cost analysis of six management strategies for an mangrove area. The management options differ in different cutting restrictions; cutting ban, 20-year clear cut, 30 year clear cut, 30-year rotation together with 80 % selective cut, 30-year rotation together with 40% selective cut, 30 year rotation together with 25 % selective cut. Besides the direct costs and benefits for wood chip production the analysis considers the impact of the harvest activities on other beneficial goods and services, both traded and untraded, which are derived from or dependent on the mangrove ecosystem. These include:

- local uses including traditional fishing, hunting, gathering and manufacturing
- control of coastal erosion
- commercial fishery
- sago production
- capturable biodiversity

The result of the study allows the decision maker to choose a mangrove management plan that recognises and protects the importance of the mangrove to the continuing production of a wide range of economic goods and services.

Case 2 (Meeting Ecological and Economic Goals: Marine Parks in the Caribbean, Dixon 1993) Estimation of Benefits and costs of marine park This is an example of a study that attempts assess the trade off between increasing tourism revenues and considering the impact that an increased number of tourists have on the marine environment. The study looks at divers and the revenues acquired from this activity together with the observed damaging of corals to develop an estimate for a threshold level. The data suggested that

there might be a critical level of about 4,500 dives per year at individual sites after which reef degradation becomes apparent. The economic analysis illustrates the dependence of Bonaire on dive tourism because of its small size, modest resource endowment, dry climate and relatively remote location which limits the potential for other forms of economic development. They show that there is a scope for increasing diver based revenues (e.g. attract more visiting divers) and increasing retention of diver related income in Bonaire where the latter will require changes in the type and style of tourism development.

Case 3 (Potential Economic Effects of Sea Level rise on Bangladesh's Economy: A case study, S. Edwards) Sea Level rise is highly debated area because of the green house effect but it is also relevant from a local or regional perspective. For example, local activities such as withdrawal of groundwater or petroleum and gas resources or the destruction of coral reefs can have the same sort of effect. Certainly, concerns are heightened by the fact that for many coastal nation much of their economic activities occurs near the coast coupled by high population density. This means that a rise of the sea level can inundate massive areas of residential, commercial and industrial land and immobile capital (houses, hotels etc.) and displace (in the worse) case millions of people. In addition, coastal flooding and storm damage may be exacerbated, salinity of groundwater and estuaries could significantly reduce the size of potable aquifers and valued fish and shellfish populations. Oceanic island and countries with large river deltas such as the Ganges-Brahmaputra-Meghna rivers delta in Bangladesh are especially threatened. There are studies which have tried to estimate the economic loss a potential sea level rise will cause. One such study is carried out for Bangladesh where the potential damage was estimated up to about \$81.1 billion or 63% of the GDP estimate for the effected area. Although assessing the economic impact of sea level rise is considerably more difficult in practice than in theory mainly due to scientific uncertainty this is an indication of how damaging sea level rise can be to an country with large populations and several economic activities situated within the critical area for sea level rise. If protection measures are less costly it is economically justifiable to take such measures.

Conclusions and recommendations

It is clear that successful economic development depends on the rational use of environmental resources and on minimising, as far as possible, its adverse impacts. This can be done by improving project selection, planning and implementation. Both bilateral and multilateral institutions devoted to funding development projects and programmes see their role as promoting the efficient use of available resources within the context of the socio-economic priorities of individual developing countries. Valuation as described earlier, allows for a more complete economic analysis of alternative development projects to assess the whole range of direct and indirect benefits and costs of proposed actions from a broader perspective.

Approaches are needed that question some basic assumptions about economic development and raise generic issues about the relationship between macro economic planning and sector analysis, the handling of externalities and the welfare of vulnerable groups and future generations. This means that any coastal zone initiative is more likely to succeed if it is seen as an overall development policy not as a project.

Based on economic theory coupled with the result of some empirical research we have discussed the implications of how to initiate development programs for the coastal and marine environment. These are summarised in the below points. Each point is discussed in detail under separate sections in the earlier text.

- 1) Coastal development project can assist by promoting:
 - ◆ the correction of ill-defined and weak property rights (including a CPR perspective)
 - ◆ that possible externalities are accounted for and that the social cost of such are internalised
 - ◆ a low discount rate when evaluating different development options or projects for marine and coastal resources (including to support formal credit markets in rural areas)
 - ◆ that the risk of irreversibility in project decisions are included
- 2) Coastal development project should be aware of the fact that development assistance agencies, through their project and program lending and policy dialogue, may introduce or exacerbate a policy failure. The project should therefore carefully assess that they do not;
 - ◆ Distort an otherwise well functioning markets
 - ◆ Fail to consider and internalise significant environmental externalities of otherwise warranted policy interventions
 - ◆ End up generating a worse outcome than a free and failing market
- 3) Valuation allows for a more complete economic analysis of alternative development projects to assess the whole range of direct and indirect benefits and costs of proposed actions from a broader perspective. To achieve this for the marine environment in developing countries there is a need for;
 - ◆ more locally and regionally applied research in valuation
 - ◆ the development of new and better applicable valuation methods
 - ◆ qualified local personnel in the respective countries
- 4) For an efficient designing and compliance with policy instrument for the coastal zone there is a need for:
 - ◆ an incorporation of the complex economic, financial, social and institutional linkages that combine the underlying cause to environmental degradation or misuse
 - ◆ institutions with an overall responsibility for the coastal zone
 - ◆ data, qualified personnel and institutional set up to ensure that the collection of and analysis of technical information are well focused and operational for policy decisions.
 - ◆ institutional capacity to comply with existing policies

5) There is an identified need for local experts and qualified personnel for resource related activities such as research, in carrying out valuation studies, analysing data and in forming environmental policies. This is best achieved through;

- ◆ training of local student, at all levels, in coastal and marine related environmental economics
- ◆ promote local and regional research projects in the field.
- ◆ In Involve existing research capacity in development projects such as in EIAs

6) For economic development to be environmentally friendly is should;

- ◆ go hand in hand with necessary institutional changes
- ◆ be combined with overall development policy

REFERENCES

- Alberts and Andersson, (1996)** The environment in evaluations, Sida evaluation
- Andersson and Ngazi (1995)** Marine Resource Use and the Establishment of a Marine Park: Mafia Island, Tanzania AMBIO, Vol. 24 No. 7-8
- Dixon J. Scura L. Carpenter R. Sherman P. (1996)**, Economic Analysis of Environmental Impacts, Earthscan Publication Ltd
- Dixon J.A, Scura L.F., van't Hof, (1993)**, Meeting Ecological and Economic Goals: Marine Parks in the Caribbean, AMBIO, Vol. 22, Num. 2-3
- Gove D. Z, 1996**, Coastal zone management at Inhaca and the Portuguese islands, Southern Mozambique, Tropical Coasts Vol. 3, No 1
- Jodha N.S., 1992**, Common Property Resources, A missing Dimension of Development Strategies, World Bank Discussion Paper # 169.
- Linden O. and Moffat D. (1996)**, Environment and Natural Resources in Coastal Areas of Developing Countries, SAREC
- Markandya A. and J. Richardsson (1992)**, The Earthscan reader in Environmental Economics, Earthscan publications Ltd.
- Okemwa E. and Ruwa R. K., (1996)**, Integrated coastal zone management initiatives and progress in Kenya, Tropical Coasts Vol. 3, No 1
- Panayotou T. (1992)**, The economics of environmental degradation: problems, causes and responses, in, The Earthscan reader in Environmental Economics, Earthscan publications Ltd. E.d. Markandya A. and J. Richardsson
- Ruitenbeek H.J. (1994)**, Mangrove Management: An economic Analysis of Management Options with a focus on Bintuni Bay, Irian Jaya, Environmental Mngement in Development in Indonesia project, Halifax: Dalhoise University.
- Ranaivason J.(1996)**, Marine pollution in Madagascar, Tropical Coasts Vol. 3, No 1
- Ruitenbeek H.J. (1994)**, Modelling Ecology-wide Linkages in Mangroves: economic evidence for promoting conservation in Bintuni Bay, Indonesia. Ecological Economics, Vol. 10. No. 3 pp.233-47
- Shah N.J. (1996)**, How do we get from here to there? The challenging of achieving integrated coastal zone management in Seychelles, Tropical Coasts Vol. 3, No 1
- Scramm and Warford, (1991)**, Environmental Management and Economic Development, World Bank publication
- World Bank (1990)**, World Bank report 1990. Oxford University press, New York



STYRELSEN FÖR INTERNATIONELLT UTVECKLINGSSAMARBETE
105 25 Stockholm, Sweden
Tel: 08-698 50 00. Fax: 08-20 88 64
Hemsida: <http://www.sida.se>