

# Contribution of Africa's Coastal and Marine Sectors to Sustainable Development

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## **Abstract**

More than half of the world's population lives within 60 km of the shoreline, and in Africa trends in population growth indicate that this figure could rise to three quarters by the next century. The lives and reasonable aspirations for economic advancement of these coastal residents are inextricably linked to the productivity of coastal and marine resources. The coastal areas bordering the African continent have traditionally supported highly productive ecosystems from which fish and other aquatic resources have been harvested. Furthermore these natural systems provide valuable services in terms of recreation, tourism, transportation in addition to their natural protective functions against coastal erosion and flooding.

Unfortunately,

in many parts of the region, most of the natural resources are over-exploited and the fragile coastal and marine systems severely degraded by unregulated human activities. As a result, the productivity and usefulness of these coastal and marine areas have dramatically diminished and the prospects for sustainable development are greatly jeopardised.

There are a number of reasons for this serious situation. In general there is lack of knowledge and understanding of the coastal and marine resources and their interaction with terrestrial and oceanic processes. This lack of information and awareness, together with ineffective coastal and marine planning and management further aggravated the situation. In this paper, the present status and trends of coastal and ocean development in the African region are examined. The existing capacities in the region to implement sustainable development strategies are also assessed.

## **1. Introduction**

Coastal and marine areas are uniquely situated to support a variety of activities and to serve diverse human needs for food, transport and recreation. Ninety per cent of the world's fish catch comes from the continental shelf and upwelling regions. Again, about 20 per cent of the world's oil production comes from offshore areas and it is estimated that about 70 per cent of the world's ultimate recoverable hydrocarbon resources lie in coastal waters 200 metres in depth or less. Finally, the coastal area is a source of many other raw materials in the form of sand, gravel, and a variety of placer minerals such as diamonds. Coastal areas are, therefore, an integral part of the development process in a large number of countries.

The Eastern African coastal and marine areas for example, have some of the world's richest ecosystems containing extensive coral reefs, lagoons, estuaries and mangrove forests. The seashores of Somalia, Kenya, Tanzania and Mozambique are extremely rich in marine habitats and sheer numbers of marine plant and animal species. Economic benefits derived

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from the coastal and marine environments are essential for a large part of the population in the countries of the sub-region. These coastal and marine environments provide coastal population and communities inland with essential requirements in life such as food, building materials, firewood and many other vital resources.

The west and central African coastline, stretches for approximately 8,000 kilometres and is characterised by marked diversity. The climate ranges from desert in the north -the Sahara - through a humid tropical belt, which contains two of Africa's largest rivers, the Niger and Congo, to desert again in the south - the Kalahari. The coastal zone shows equal diversity, ranging from dunes through marshy delta lands and mangroves to Rias with steep Cliffs. The continental shelf also varies markedly in width from approximately 70 kilometres in the Gulf of Guinea to about 4 kilometres off Angola and Zaire. Equally, the countries that make up the sub region differ markedly, from small island states like Sao Tome and Principe to large mainland countries like Nigeria and Senegal. Their state of development also differs. Some have economies based essentially on handicraft and subsistence farming, whereas others have quite well developed industries.

The pressures from rapidly growing populations in coastal areas of the African region, expanding coastal tourism, intensified fisheries and a large number of other economic activities, however, pose an increasing threat that jeopardises the quality of these coastal environments. Large-scale destruction of some of Africa's most valuable resources, the coastal forests and mangroves, the lagoons and the coral reefs has caused serious degradation of the environment, thus affecting the life of the coastal inhabitants and the economic development of the countries in the region. The Seychelles Island in the western Indian Ocean for example, was famous for its luxuriant forests and an incredible abundance of wildlife. But many reefs have been mined for coral for the purpose of construction. Mangrove forests on the granitic islands have been raised to the ground or drained and reclaimed. Severe erosion is a result of this destruction.

There is general lack of knowledge and understanding of the coastal and marine resources and their interaction with terrestrial and oceanic processes. This lack of information and awareness, together with ineffective coastal and marine planning and management further aggravate the situation.

The objective of this paper is to provide background information on the present status and trends of coastal and ocean development in Africa and on the existing capabilities in the region to implement sustainable development strategies.

## **2. Coastal and Marine Issues in Africa**

The African marine environment is influenced by unregulated human activities on land and the changes can be viewed as taking place in a series of concentric circles - in the centre, desertification; towards the coasts, deforestation; on the coasts, erosion and pollution of the beaches; on the high seas, over-exploitation of marine resources, dumping of toxic and hazardous wastes and oil spillage. As the population increases, the African coastal and marine environments are assuming greater importance - hence the growing realisation that they need to be protected from pollution, coastal erosion, and overexploitation of marine resources.

### **2.1 Rapid Population Growth**

The coastal areas of a number of countries in the African region are coming under increasing pressure as a result of population increase and expansion of economic activities such as agriculture, industry, tourism and infrastructure development. Lagos with upwards of 8 million people and 85 per cent of Nigeria's industry, and Accra-Tema with 60 per cent of

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Ghana's industry are good examples. In Eastern Africa for example, a total of about 83.9 million people live in the coastal zone. The mounting concentration of people on the coasts of Africa for example has led to substantial increases in the volume of sewage and effluent being discharged into the nearshore waters - most of it untreated or only very slightly treated. With

sewage discharge taking place in this way there is obvious risk to human health through water contact and through the consumption of seafoods, which might be contaminated by sewage organisms. This potential problem seems to have received little attention in the region, although sporadic outbreaks of human diseases attributed to contact with faecal remains on beaches have been reported (UNEP, 1984). Thus rapid growth of population is an urgent problem to be addressed in affecting development in coastal and marine areas of the African region.

## **2.2 Sea Level Rise**

The African coastal zones along the Atlantic and Indian Oceans have been more and more vulnerable to sea level rise and other impacts of climate change. The coastlines of the eastern African sub-region for example, have been retreating inward and seaward as a result of the rise and fall in sea level due to past climate change (Odada, 1991). According to the estimate of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC), an average rate of mean global sea level rise could be about 6 cm per decade over the next century. This means that the total sea level rise could attain as much as one metre in a century. In such a case, hundred of thousands square kilometres of coastal wetlands and lowlands in the African region could be inundated. African beaches could retreat as much as a few hundreds metres and prospective structures may be breached. Flooding would threaten lives, agriculture, livestock, buildings and infrastructure. Salt water would advance landward into aquifers and up estuaries, threatening water supplies, ecosystems and agriculture in coastal areas of the African region. Given the near certainty of an accelerated rise in sea level, the only hope left for the African governments to avoid future chaos is through anticipatory planning and actions.

## **2.3 Development of Coastal Areas**

A number of development activities are leading to major changes in coastal areas of the African region. The most obvious of these are the construction of towns with associated industries and the creation or extension of ports and harbour areas. Although these are confined to a few locations they are frequently close to areas that could be exploited as tourist centres. For example, at Lagos in Nigeria, Victoria Beach has been eroded 2 kilometres inland since the construction of breakwaters. Similar problems were created at the Port of Abidjan when the Canal de Vridi was opened in 1950; since then the beach has eroded to the east of the canal and a road cuts through the area.

New or rapidly growing coastal zone activities often lead to the creation or rapid expansion of municipal centres on the coast. When such rapid expansion occurs, it is extremely difficult for national or local authorities to respond by planning for and providing infrastructure and social services. In Malindi, Kenya for example, the growth of a large tourist-related section has occurred at a traditional small municipal centre with extremely limited services and infrastructure. Population growth rates have reached 20 per cent per annum, and authorities are hard pressed to meet basic needs for sanitation, education, and commercial organisation. Similar situations do arise wherever new coastal zone activities stimulate extremely rapid growth in new or small existing municipal centres. The social and environmental effects of such development must be considered and dealt with in economic planning for sustainable development of coastal areas.

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## **2.4 Environmental Degradation**

Coastal environmental degradation is a major problem facing many countries in the African region. Sewage and domestic and commercial discharges in the vicinity of coastal towns and

cities, agricultural waste disposal, sand mining on the coastal strip and coastal and shallow waters; erosion and siltation, overcutting of forest products such as mangroves on the coastal strip and timber forests inland are mainly the sources of pollution from land. Poor agricultural practise, lack of agricultural land especially on the islands, over utilisation, burning, and mismanagement as well as over-exploitation of forest resources have resulted in extensive deforestation and severe soil erosion. This has caused severe siltation with the resultant destruction of coral reefs followed by erosion of the beaches and the destruction of the coastal mangrove and other trees. Examples of this are clearly seen in Madagascar, the Comoros and many other parts of the African region.

Development of ports and harbours, coastal construction such as reclamation for airport construction and dredging of the seabed also cause coastal erosion and especially siltation. There has been considerable work of this kind carried out in the African region in the past two decades and not enough environmental considerations have been given. For example, extensive dredging has been carried out in the Seychelles within the last decade and siltation of the coral reefs within the marine park and along the east coast of Mahe has been severe (UNEP, 1984). In some coastal areas, dynamiting coral reefs as a means of catching fish is widely used. These include Tanzania, Mozambique, and formerly Mauritius, which resulted in serious environmental degradation of their coastal and marine areas.

### **2.5 Coastal Erosion and Flooding**

This is a prevalent problem especially in west and central Africa. The degree of seriousness of the problem and the attempts to mitigate the nuisance and negative economic consequences vary. Retreat of the coastline with the concomitant flooding causes hazards by uprooting settlements, destroying agricultural and recreational lands, disrupting harbour and navigational structures and dislodging economic facilities located along coastal towns (Ibe and Queleennec, 1989). Natural factors for erosion include: storm wave regime with 'sea level set-up, orientation and nature of the coastline, low relief of the coastal plain, vulnerable sediment budget, narrowness of the continental shelf, presence of off-shore canyons and gullies, global estuatic rise in sea level, etc. In many cases, man's intervention in the natural environment has served to exacerbate the impact of natural forces. The Seychelles Island in the western Indian Ocean for example, was famous for its luxuriant forests and an incredible abundance of wildlife. But many reefs have been mined for coral for the purpose of construction. Mangrove forests on the granitic islands have been raised to the ground or drained and reclaimed. Severe erosion is a result of this destruction. There is, therefore, an urgent need to react timely and appropriately to coastal erosion and flooding problems in the African coastal areas. (compare also Akumu and Heidenreich, 1993).

### **2.6 Oil Pollution**

Marine Pollution, especially from oil spillage, is a major regional problem and is often aggravated by leakage due to accidents, grounding, harbour operations and discharges from refineries. With the increasing number and size of tankers travelling through the Indian Ocean for example, fear of oil spills has also increased in the Eastern African sub-region. In 1981, 3551 million tonnes of oil were transported through the main route from the Arabian sea to the Far East. Tankers discharge operations in the sub-region are accident-prone and many such accidents have been reported in Mombasa, Maputo and Dar-es-Salaam where *ACP-EU Fisheries Research Report (10) – Page 210* large areas of mangrove forests were completely destroyed. Oil refineries are found in most parts of Eastern Africa, which significantly contribute to oil pollution of the coasts and seas. The West and Central African sub-regions export oil to Europe and America. The coastline

lies to the east and is downwind of the main route of oil transport from the Middle East to Europe. Much of oil found on beaches arises as a result of spills or tank washings discharged from tankers visiting ports in the region although other sources are also important (Portmann et al. 1989). Investigation of pollution in the Ebrie Lagoon (Ivory Coast) by Marchand and Martin (1985 cit. in Portmann et al. 1989) produced a wide range of concentrations of total hydrocarbons in the lagoon sediments (1000-24000mg/kg). The highest concentrations were associated not with shipping but with industrial and domestic sewage discharges. However, a spill of 400 tonnes of oil at a refinery in 1981 was still clearly detectable at the time of their survey in 1983 (Portmann et al. 1989). There is, therefore, an urgent need not only for the development of national and regional contingency plans to combat oil pollution especially in cases of emergencies, but also for monitoring the levels and effects of pollutants in the Eastern and Western African coastal and marine areas.

### **2.7 Coastal Tourism**

The people of Africa have for a long time been associated with visitors from the Arabic and Persian nations, Europeans, and other distant lands. They are friendly and attractive with captivating life styles, customs and traditions, food preparation styles, costumes, and artistic expressions. In addition, the coastline of the African region is an area of great physical beauty, rich in living resources. In the Eastern African sub-region for example, Palm fringed beaches of white coral sand lead down to tranquil lagoons enclosed by spectacular coral reefs with their wealth of colourful fish, shell and corals. For many countries in the subregion, coastal tourism is one of the most important sectors of their economies producing foreign exchange.

Although available evidence suggests that before the 1980s, the growth of tourism in Africa occurred without significant deterioration in the fragile coastal ecosystem, this is, rapidly changing (Odada, 1993). The impacts of tourism on both social and cultural as well as on the natural environment are causing serious concerns in the sub-region. To ensure that the importance of the tourism industry is maintained in the economies of the African countries, there is need to develop and maintain environmental policies to govern the industry.

Protection and conservation of tourist attractions must be observed through the formulation of sound laws and regulations governing tourism, especially in the Eastern African subregion, and elsewhere in the African coastal areas.

### **2.8 Coastal Agriculture**

Agriculture is the main stay of the economy of most African countries. Agriculture contributes between 30 to 60 percent of their GNP and the majority of the population depends on it for their livelihood. In most African countries, the land that is available for agriculture is shrinking because of the use of the same land for non-agricultural purposes such as residential accommodation, industry or roads, and also due to loss of good agricultural land through soil erosion, salinisation and modification. As a whole, the net land resources available for agriculture are diminishing while population and therefore food demand is rapidly increasing in the African region.

The expanding agriculture is having undesirable effects on coastal zone and marine habitats due to erosion related to deforestation and unwise agricultural practises prevalent in the countries of the region. In Kenya, silt from rivers is affecting catches of fish, smothering

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coral reefs and is sulling beaches with serious consequences for fishing and tourism. The effect of pesticide pollution on marine life are now becoming apparent in many countries of Africa and are absorbed into living organisms. The health of humans is threatened by these

toxins reaching them through the fish they eat (UNEP, 1989). It is imperative, therefore, that soil conservation measures must be instituted particularly where agriculture is being developed in the coastal areas.

## **2.9 Over-Exploitation of Marine Resources**

In general productivity of African coastal waters is dependent on the extent of the continental shelf, coastal upwelling, mangroves, coral reefs, and run off from rivers. Fisheries in the countries of the region reflect the availability of these physical characteristics. The relatively extensive continental shelves of Madagascar and Mozambique for example, support lucrative shrimp fisheries, while the absence of such areas in island countries make them depend on offshore tuna resources. Shrimp and tuna are the main commodities supporting export ventures in the Eastern African coastal sub-region. For west and central Africa, the total annual catch of fish in coastal zone is estimated to be about 2.6 million tons per annum (FAO, 1987) and about 10 per cent of the coastal population engages in some form of fishing activity. Fish, shells, beche-de-mer, dugongs and turtles are, however, all subject to overexploitation

on a massive scale especially in many parts of Eastern and Western Africa, where agricultural land is in short supply and food is scarce. The over-exploitation is due in part to burgeoning human numbers coupled with a shortage of land-based jobs. Therefore, solutions need to be found to this depletion problem that escalates as populations grow in Africa.

## **2.10 Institutional and Administrative Limitations**

The institutional and administrative capacities of the different countries for coastal and marine resources development vary widely in the African region. It ranges from countries with virtually no capabilities to those with a growing capacity and considerable resources. There are however, two broad categories of the African coastal states as regards their present level of institutional and administrative capabilities. The first category includes countries like South Africa, Nigeria and Egypt, which already have good infrastructure for the development of coastal and marine areas and where the governments are well aware of the importance and crucial role of coastal and marine resources in the development of their economies. These countries have appropriate research and training institutions as well as other facilities so that they count with qualified national personnel to undertake an integrated management of coastal and marine areas.

The second category includes countries like Benin, Gambia and Djibouti which for various reasons are at a low stage of oceanographic development, where there is not as yet any substantial infrastructure for the development of coastal and marine resources, in the way of research and training institutions and other facilities, and where there are great shortages of trained manpower. In general, the present level of institutional and administrative capacities of practically all African coastal states is low, and far from adequate in providing a sound and sustainable base for the rational exploitation of coastal and marine resources of these countries. Thus, institutional and administrative capacity building in ocean affairs should be a top priority in the African region.

## **3. Capacity for Addressing Coastal and Marine Issues**

In general, in the African region, environmental values and natural resources factors have not always been integrated into national development plans. Development decisions and *ACP-EU Fisheries Research Report (10) – Page 212* social trends appear neither to have minimised environmental degradation nor to have optimised the value obtained from using natural resources. Industrial expansion has often been carried out at the expense of the environment. Economic and social development,

both in cities and the countryside, has tended to deplete natural resources and damage the environment and amenities. Institutions to promote environmental and resource values and to assure that they are taken into account in the governmental decision-making are just being created in some countries the region.

### **3.1 Environmental Policies**

The general situation with respect to the environment and relationships to national development and the expansion of human settlement is exacerbated in the case of coastal development. The states of the region have not by and large developed explicit policies relating to coastal and marine related development. Environmental concerns have not played a significant role in the development of the coastal and marine areas of the subregion. Very little efforts has been expended in incorporating socio-environmental concerns in development planning and though widespread problems have generally been discerned in the coastal and marine areas, they have generally been shrugged off as being an inescapable part of the development process. In the African region as elsewhere, the dynamic and, interactive nature of coastal and marine resources has meant that absence of adequate planning and management in these areas has been magnified in its effect on marine resources. Disturbing and perhaps irreversible trends are beginning to appear, some in connection with activities practised outside the coastal zone. The marine and coastal aspects of these problems must therefore, be effectively incorporated into national policy and decision-making.

### **3.2 Legislation and Environmental Law**

Many countries in Africa have formulated regulatory measures for their resources management in coastal and marine areas such as the issuance of permits for fishing, logging and mangrove harvesting. However, most of these measures have proven ineffective. Increasingly, the countries of the region are enacting more comprehensive environmental laws that can provide practical frameworks at the national level to implement environmental standards and to regulate activities of enterprises and people in the light of environmental objectives. At the international level, conventions like the Law of the Sea, protocols and agreements such as the UN-EP Regional Seas Programme have been providing a basis for co-operation between countries at bilateral, regional and global levels for the management of environmental risks, control of pollution and conservation of natural resources in coastal and marine areas. There is an urgent need for the African countries to expand the accession to and ratification of these conventions and institute mechanisms at the national level to ensure their application.

### **3.3 Coastal Zone Management**

In the African region a few countries are in the process of developing management plans for their coastal and marine areas. The Seychelles for example, initiated in 1992 a plan for coastal zone management under the UNEP Eastern African Regional Seas Plans. The objectives of this project are to prepare an inventory of the coastal and marine species, the state of coral reefs, mangroves and lagoons, to assess the extent, nature and causes of coastal and marine pollution and also to identify policy and remedial actions. The project components include training, institutional capacity building, workshops, provision of *ACP-EU Fisheries Research Report (10) – Page 213* laboratory equipment, etc. It is managed from the Department of Environment that was created in June 1989 under the direct leadership of the President of the Seychelles to solve the environmental problems that stem from a general increase in the population and the rapid development of the island. (Compare also Young, 1993 and Chua & Scrua 1992).

Tanzania is, as yet, only in the preliminary stages of the development of an integrated coastal zone management programme. In 1991, however, the country began the process of creating a protected area, to be known as the Mafia Island Marine Park (MIMP). This marine park will protect the last pristine coral reef ecosystem found in Tanzania's coastal waters - an area that is important as an economic resource upon which a significant coastal and island population group is quite dependent. The Tanzania government perceives that this project will serve as a preliminary or pilot project providing basic interaction and approaches for the development of Tanzania's integrated coastal zone management.

Uni-sectoral over-use of some coastal and marine resources has caused grave problems. For example, indiscriminate harvesting of mangroves might have brought large economic benefits to those countries in the Eastern African sub-region, but have proven detrimental to fisheries, aquaculture and coastal region tourism. Similarly, unregulated fishing efforts and the use of destructive fishing methods such as dynamiting have destroyed fish habitats and reduced fish stocks. Some African countries have formulated regulatory measures for their resources management such as the issuance of permits for fishing, logging and mangrove harvesting. However, most of these measures have proven ineffective due partly to enforcement failure, but mainly to lack of support from the communities concerned. There is, therefore, an urgent need for an integrated interdisciplinary and multi-sectoral approach in developing management plans for the coastal and marine areas of the African region.

### **3.4 Institutional and Administrative Limitations, Research and Training**

Practically all African coastal states are at present making only minimal use of their coastal and marine resources owing to limitation in the necessary scientific knowledge and technological know-how and to the lack of efficient organisational and administrative machinery. For example, the shipping and navigation services, which are so vital for the management, control and exploitation of marine resources and for the development of international trade, are still very much in their infancy in most African coastal states. Marine technology is also very much underdeveloped in the region. In very few of African countries are there marine technology training centres with comprehensive programmes of marine technology - marine engineering, fishing and fishing gear, boat building and repair, navigation, instrumentation repair and maintenance (including electronic equipment), fish processing and preservation, economics and marketing. Thus, the development of sound training and research programmes and their effective linkages with the production system, are basic and most important steps towards enhancing the capability of African States to make full use of their coastal and marine resources.

### **3.5 Basic Marine Science**

With regard to manpower the situation is similar. Although the majority of African countries now have national universities and other institutions of higher learning of their own, most of these institutions are young, and many are still facing teething problems concerning adequate staffing, adequate equipment, sound curriculum development, etc. In many of these countries, therefore, the universities are still grappling with the fundamental issues of producing adequate manpower for the vital organs of the civil service requiring high-level personnel, such as public administration, school education, public health and agriculture. It is understandable, therefore for the universities in these countries to be pursuing for the

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present, narrow crash training programmes with the objective of producing high-level manpower badly needed in key areas of- the civil service.

## **4. Measures for Integrating Coastal and Marine Areas into Sustainable Development**



## **Strategies**

Under Agenda 21, coastal states should "commit themselves to integrated management and sustainable development of coastal areas and marine environment under their national jurisdictions." In order to achieve this four priority areas for African governments can be identified: capacity building, creation of public awareness, policy formulation, and the implementation of effective integrated coastal zone management.

### **4.1 Capacity Building**

Many countries of the African region are confronted with serious manpower problems that are proving to be great impediment in the economic development of coastal and marine areas of these countries. In many cases, the most important cause underlying these problems is the lack of adequate training facilities for the type of manpower required. Since the requirements for high level manpower in certain areas of marine sciences e.g. physical, chemical, biological oceanography, aquaculture, etc. are not so great in terms of numbers needed by any one country at any one time, existing institutions (e.g. universities) in the region suited for teaching and research in these areas should specialise as regional or subregional training centres. They can enlarge their facilities to enable the enrolment of students from other member states, wanting to study the subjects of their specialisation.

Oceanographic research should also be carded out on a regional or sub- regional cooperative basis using collectively-operated research vessels which are well equipped and well staffed for all types of oceanographic research and for the on-board training of marine scientific and technical staff. To start with one or two such vessels should be adequate for each of the sub-regions i.e. Eastern and Western Africa. The co-ordination of research on a regional scale, the exchange and dissemination of research information and the storage of research data are important support activities in the protection and development of coastal and marine areas of the African region.

### **4.2 Public Awareness**

The African governments need to increase public awareness through education. The public should be informed of long-term ramification of coastal development. At present the general public is generally unaware of problems associated with the development of coastal and marine areas. In Madagascar for example, the wide beaches which previously attracted many tourists to 'the island have already disappeared. In spite of this, many structures are still being constructed on the eroding beaches. Campaigns should be instituted on a national basis to create greater public awareness of national and regional issues in the protection and development of coastal and marine resources of the African region. Education oriented towards protection and development of marine resources should be provided as part of the ordinary educational curriculum at the primary school, secondary school and university levels. This can be achieved through training of special instructors or specialised training of general educators, as well as through seminars and courses offered to the general public.

In the western Indian Ocean for example, a marine science association has been formed with the secretariat at the Institute of Marine Science in Zanzibar. The aims of the Western Indian Ocean Marine Science Association (WIOMSA) are: (1) to promote and advance the educational, scientific and technological development of all aspects of marine science in the region, (2) to provide a forum for discussion and dissemination of information and organise meetings, seminars and workshops for the presentation of information, findings and experiences on all subjects related to marine sciences, (3) to encourage the support of marine science research, and the development and educational activities by government agencies and

private sector, and (4) to collect and disseminate scientific, technical and other information on marine sciences.

#### **4.3 Environmental Legislation**

African states urgently need to review and where necessary expand, update or strengthen national legislation and regulation pertaining to the protection and development of the coastal and marine areas. The enforcement of national regulations related to coastal and marine resources protection and development needs to be improved. Equally there is an urgent need to expand the accession to and ratification of international conventions, i.e. the Law of the Sea, and institute mechanisms at the national level to ensure their application. For example, groundwork has been prepared over the last two decades under the aegis of UNEP to establish legal framework to manage regional seas. African governments should intensify their efforts to implement legislative measures and other policies at national levels so that the environmental problems of coastal and marine areas are effectively tackled. Governments of the African countries should also be encouraged to settle their marine environmental and other related disputes by peaceful means, making use of the existing and emerging agreements and conventions.

#### **4.4 Management Planning**

The value of treating coastal and marine areas as planning entities within the overall framework of national development planning is not always fully recognised in the African region and very often countries lack the administrative and legislative basis for implementing such an approach. To solve these problems, the countries of the African region need to develop an integrated interdisciplinary and multi-sectoral approach in their management plans for coastal and marine areas. Pilot coastal sites can be selected in one or two countries in each sub-region and intensive interdisciplinary planning programme conducted, involving several resources and scientific personnel from various institutions in those countries, including universities, government agencies and non- governmental organisations. In addition, training courses, workshops and conferences should be organised, and publications and educational materials disseminated as part of the integrated coastal and marine resources management planning.

#### **5. Summary and Conclusion**

The coastal and marine areas of the African region have some of the world's richest ecosystems that support a wide diversity of plants and animals. The economic benefits derived from these areas are essential for the survival of a rapidly growing population. As in many other coastal zones elsewhere, the balance of the ecosystem is threatened by unplanned industrial development, exploitation of marine resources, shore erosion, expanding coastal tourism, etc. As stated in Chapter 17 of Agenda 21 of the Earth Summit in Brazil, coastal and marine management must play an important role if resources are to be exploited in a way that ensures sustainable development to a growing population.

To implement sustainable development of coastal and marine resources of the African region, there is an urgent need to: (1) build human resources by undertaking short-term and *ACP-EU Fisheries Research Report (10) – Page 216* academic training to strengthen existing capabilities; (2) promote public awareness by producing educational materials on the ecological and socio- economic contributions of the marine resources and the consequences of unsustainable exploitation, (3) organise policy workshops, seminar and/or conferences involving relevant policy and law makers to increase their understanding of and commitment to the sustainable use of the resources in their coastal and marine areas, and (4) implement integrated coastal zone management

programmes by establishing case studies in pilot sites in selected countries of the African region.

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