Oil pollution - the reality and the threat

It has been calculated that, on anyone day, about 225 tankers move through the waters of the Eastern African Region, one of the busiest oil tanker routes in the world. There are two main transport patterns: one route, served mainly by medium sized tankers of 20,000 - 100,000 tonnes, is from the Middle East to the oil refineries of Eastern and Southern Africa, providing them with a total of 22 million tons of crude oil annually. A few tankers travel to the Comoros, the Seychelles and Mauritius, which import refined oil from the Middle East. After the tankers deliver their oil, they return to the Middle East in ballast, and it is likely that their tanks are cleaned out on the return journey.

The second route is via the Cape of Good Hope to Europe and America, using very large crude carriers of more than 200,000 tonnes. This trade is over 500 million tonnes a year.

The posssibility of an oil spill from one of these huge tankers is the biggest single threat to the marine environment of the Eastern African Region. Spills also occur accidentally during loading or discharging operations in a port, as happened at Dar es Salaam in January 1981, when up to 100 tonnes of crude oil destroyed an area of mangrove forest, and at Mombasa in July 1988, when 4,800 tonnes of heavy fuel were lost when a fuel tank was accidentally pierced by a crane close to the Mombasa Oil Refinery.

Oil threatens the marine environment in many ways. Oil slicks can poison marine mammals, turtles and fish, and smother bottom-living corals and other organisms. As oil breaks down, its chemical components, like aromatic hydrocarbons, affect feeding and reproduction of many organisms, including crustacea, molluscs and fish. Chemical dispersants, used to break down oil slicks, can create another form of pollution.

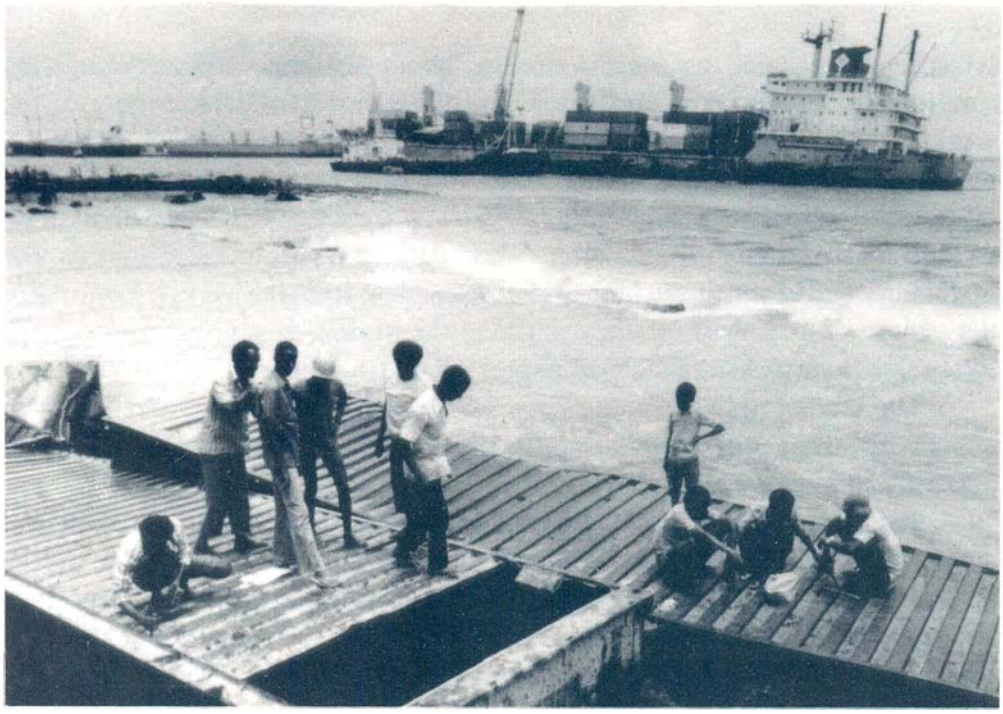
Liquid oil is found on Comoran beaches every day, probably discharged as ballast or through tank washing activities. But tar balls on beaches are the most visible form of oil pollution in the area. Though they vary in size, most balls weigh about one kilogram.

Oil refineries also contribute to pollution. Of the five in the region-at Mogadishu, Mombasa, Dar es Salaam, Matola near Maputo, and Tanatave (Malagasy)-the largest, at Mombasa, handles about three million tonnes of crude oil a year and Matala processes one million. .

Commercial deposits of gas have already been discovered at Songo Songo Island off the Tanzanian coast, and exploration for oil continues in many countries of the region. If some is discovered, a likelihood in the near future, pollution from oil drilling machinery, and possible spills from wells will pose an additional hazard to the marine environment.

Accidental pollution

SIeve Jackson



The accidental break up of the Ariadne at Mogadishu. Somalia. could have caused serious pollution to the marine environment. Notice the containers in the foreground.

To areas close to a marine highway, there is the ever-present threat of accidental pollution. Such a problem arose in August 1985, in Mogadishu, Somalia, when a
cargo vessel, the 16,000 tonne MV Ariadne ran aground close to Mogadishu harbour. The Ariadne was carrying about 650 tonnes of hazardous chemicals in mixed cargo of 650 containers. Of these, a consignment of seven containers of t traethyllead (TEL) and sodium pentachlorophenate (SPCP), both very toxic to marine life, caused most concern. Malathion, sodium sulphide, hexane and DDT were among other hazardous chemicals on the vessel.

Had a large quantity of this dangerous cargo leaked into the harbour, the consequences for the marine environment could have been catastrophic. As it happened, through the concerted efforts of the Somali government, various United Nations agencies, experts from embassies and professional salvage companies, most of the cargo was successfully salvaged before it could cause serious contamination.

Huge cargoes of hazardous materials being transported large distances by sea continue to pose a very real threat to marine life and ecosystems, and the incident highlighted the need for a plan - for management guidelines to assist in such cases of emergency.

Other problems confronting the marine environment

Health problems

Malnutrition of children and adults is one of several conspicuous health problems in the Eastern African Region. It is found where unemployment is high, where land resources are inadequate and where the fish catch is too small to sustain fishing families. A clinic in Kilifi town, Kenya, deals with over 50 cases per day of protein deficiency in infants. These children are from the local fishing community, where the head of the family has to sell his small catch of protein-rich fish or octopus for cash to purchase enough of a low-protein staple like cassava to feed his family.

Among other regional afflictions are the mosquito-borne diseases such as malaria, which causes a heavy loss of life, particularly among children. All species of the malarial parasite are becoming increasingly resistant to the available drugs. Filariasis (elephantiasis) is particularly prevalent in low-lying and swampy areas like the north Kenya coast; and dengue, or breakbone fever, was recently brought to Eastern Africa from the Far East.

Measles is one of the major killers of children in the region, as are the diarrhoeal diseases which can be spread by houseflies or by contaminated food and water.

Whereas in the urban areas of the coastal zone, about four-fifths of the population have access to water of reasonable purity, in the rural areas, twothirds of the population lack potable water, and cholera, associated with impure water supplies, is widespread. As noted earlier, raw sewage is discharged directly into the sea in many areas, with" consequent contamination of seafood and occasional outbreaks of typhoid and paratyphoid.

Arthropod-borne diseases are another feature of the Eastern African Region, with tick-borne East Coast fever and sleeping sickness, transmitted by the tsetsefly, both affecting cattle.

High levels of methylmercury have been found in many fishing populations around the world and a long-term project is underway in the Seychelles, where fish consumption is very high. There is a child development study which aims to determine the possible effect of methylmercury on the development of

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the foetal brain and to prepare guidelines for the monitoring of child growth and development.

Methylmercury occurs naturally in fish, and is most concentrated in large predatory species at the end of the aquatic food chain. Ingestion of high doses of methylmercury from fish during pregnancy can lead to motor and neural abnormalities in newly born children, i.e mental and physical retardation, and epilepsy.

Methylmercury levels in the Seychellois population are being monitored by analysis of hair samples from pregnant women, and from newly born babies and their mothers.

As many island and coastal nations of the region are investing in the fishing industry and the consumption of large predatory fish is likely to increase, it is important that the risks from methylmercury in sea fish be properly assessed so that correct measures can be taken to deal with the problem. These will include advice on dietary intake, establishment of maximum limits for mercury in sea-food, and a restriction on the size of fish allowed for consumption.

Over-exploitation of marine resources

Fish, shells, coral, beche-de-mer, dugongs and turtles-all are subject to overexploitation on a massive scale in many parts of Eastern Africa, where agricultural land is in short supply and food is scarce.

This over-exploitation is due in part to burgeoning human numbers coupled with a shortage of land-based jobs. Kenya's population of 23 million for example, said to be the fastest growing in the world, is increasing at unprecedented rate of 4.3 per cent annually, and is expected to double around the turn of the century, with a consequent increase in demand for land, food, housing, water and social services. A similar situation prevails in other parts of the region, straining both terrestrial and marine ecosystems to breaking point.

The shortage of land-based jobs in many parts of the region is attributable not only to rising human numbers but also to degradation of existing lands and widespread use of plantation crops.

Each year, the fishing population increases in size because the young men are unable to find a meaningful livelihood in farming or in other occupations. For those without land or capital, education or training, or for school leavers who have failed to find jobs, there is no alternative to fishing or collecting in the inshore waters, and therefore no respite for deteriorating ecosystems.

Solutions need to be found to this resource depletion/poverty cycle which escalates as populations grow. A place to start would be by giving increased support to artisanal fisheries through better marketing and transport, and by promoting fisheries based on under-utilised species like sharks. In some

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Most marine resources are over-exploited at the present time. Starfish are collected by, or sold to, tourists.

countries the solution may lie in the promotion of employment possibilities that are not dependent on the sea, using resources that are not being fully utilised.

Coconut plantations cover vast areas of the Kenya coast, for example, and the establishment of local industries based on the many products that can be prepared from the coconut tree could do much to improve the lot of coastal communities. Mauritius, for example has recently concentrated on textile production to create jobs while boosting export earnings. Such land-based employment opportunities would take pressure off inshore ecosystems and at the same time, offer a better life to the people involved.

Legislation to protect the marine environment exists in most countries of the region but is rarely adequately enforced. For example, the Fisheries Act of Tanzania specifically bans the use of explosives for fishing yet the law is broken on a daily basis, even within earshot of urban centres, like Tanga. Dynamiting for fish can be found all along the Tanzanian coast and it tragically destroys both marine life and the structure of the reef itself.

For laws to be effective, however, a country requires the resources to enforce them-to maintain patrol boats, for example, and to employ trained, dedicated staff who will not be corrupted. Above all, laws will only be effective where local people are able to obtain sufficient for their daily needs.

Tourism

Jane Mackinnon

Tourists can cause damage without realizing it, by walking on corals or breaking them with flippers.

Most countries in the region have developed, or are in the process of developing, a tourist industry. From Somalia, whose tourist industry is in its infancy, to Kenya with its vast tourist infrastructure, the goals are the same-to bring in foreign exchange, generate employment, and oil the wheels of the economy. But there is a price to pay.

Tourism can change the traditional cultural values of an area and influence young people in particular. It can contribute to depletion of resources, as is happening in Kenya where .tourist demand for lobster has led to an overexploitation of marine crayfish, and it can destroy ecosystems as in the Seychelles, where mangroves are being cleared for tourist-related development projects.

In many parts of the region, tourist activities such as snorkeling, walking the reefs and collecting souvenirs are damaging coral and lagoons.

Linked to the tourist industry is the growth of the trophy trade in marine organisms. Tourists should be encouraged to purchase items that are not destructive, like fabrics, baskets or carvings, as souvenirs of their holiday.

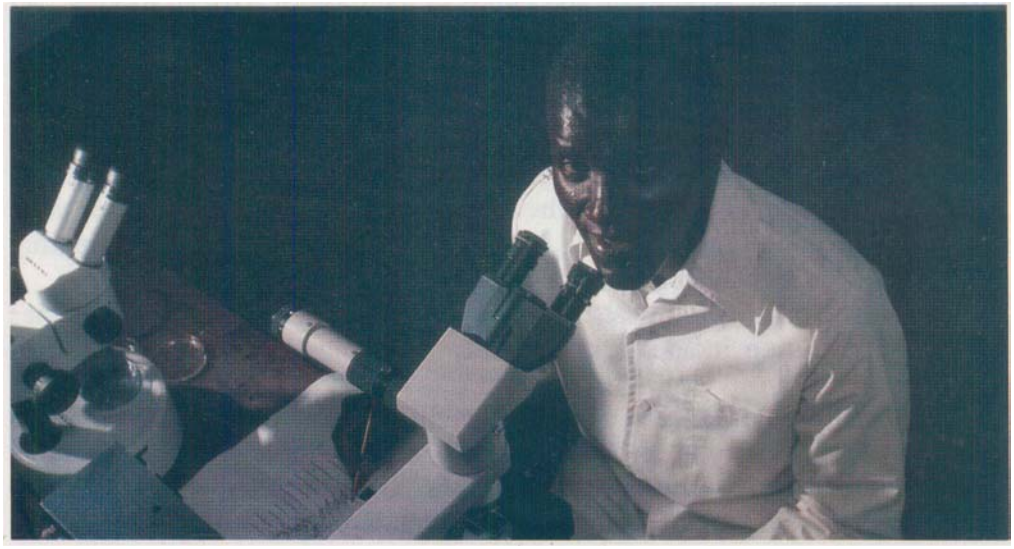
An action plan for the Eastern African Region

Marine problems neither start nor end at national boundaries. Neighbouring countries which share a common sea often face the same marine problems, and it makes sense for them to pool their financial and manpower resources to approach and tackle these common problems on a regional basis.

This is the basis of UNEP's work with oceans. Setting out to address marine problems in a regional way, UNEP initiated the Regional Seas Programme in 1974 and has since established programmes in 10 different areas. These regional programmes concentrate particularly in developing parts of the world.

A plan for the Eastern African Region was developed during the earl)
1980's and in 1985, the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region was adopted by the representatives of Comoros, France, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, Somalia and Tanzania.

Fabby K J N_lsen



The training of local scientists and the strengthening of institutions are priorities of the Action Plan. Above, plankton is being researched at the Kenya Marine and Fisheries Research Institute. Mombasa, by a senior research officer.

A convention providing the legal framework for the Action plan was signed the same year, together with two protocols: one concerning protected areas and wild fauna and flora in the region, the other concerning co-operation in combating marine pollution in cases of emergency.

The Eastern African Action Plan provides a framework for regional cooperation on problems that beset the region. The region's key environmental problem is the inadequate planning for environmentally sound sustainable socio-economic development and the rational utilization of natural resources. Therefore, among the main objectives of the Action Plan is the provision for better planning so that the Eastern African region may look to a healthier future for its marine and coastal environment, its ecosystems, its resources and its people.

The Action Plan has nine major projects of which three are priorities: coastal management, pollution monitoring, and a contingency plan to combat oil pollution. .

The top priority is to promote the protection and environmentally sound development of marine and coastal ecosystems in the region. This is to be accomplished through the establishment of a regional network of institutions or organisations that will co-operate and co-ordinate their activities. The members of this network will carry out a survey of coastal and marine ecosystems and produce information on species, habitats and ecosystems. This will involve onsite ground surveys, aerial surveys and remote sensing techniques. Based on this information, particular coastal or marine areas which require the development of specific management plans will be identified. After a period of training, management plans will be drafted to conform with the Protocol Concerning Protected Areas and Wild Flora and Fauna in the Eastern African Region. At the same time a multimedia public awareness programme will be set up to enlighten the people of the region about their role in the management plan.

The second priority is to monitor pollutants, their sources, levels and effects in the region. This co-ordinated research and training programme will assist national institutions to monitor and combat pollution. A mission to all research centres in the region has already identified suitable laboratories to be involved with pollution monitoring. Monitoring equipment for the participating laboratories has been purchased and is shortly to be installed.

The third priority is to assist countries to respond to maritime emergencies or marine pollution incidents which threaten the environment or the local people.

The Protocol Concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region is a legal agreement by the contracting parties to co-operate to protect the regions' marine environment from marine pollution. Through the development of national contingency plans, a regional contingency plan will be developed. States will then know in what ways they can best co-operate in the event of such incidents.

The countries of the East African Region

Other parts of the Action Plan aim at controlling pollution caused by dumping from ships, land based sources, airborne pollution, and damage from engineering and seabed activities. In addition, environmental impact assessments should be carried out. Law will be enforced relating both to liability and compensation for damage resulting from pollution within the Convention area.

The preparation of **national action plans** within the Eastern African Region Action Plan is an essential component of the plan. In 1984, for example, the government of Somalia requested UNEP's assistance in assessing the coastal and marine environmental problems of the country and in drawing up a national action plan for the protection, management and development of its marine and coastal environment.

In response to this request, UNEP organized, with the collaboration of other international organizations and the national authorities, a multidisciplinary mission to work in Somalia in 1986. The outcome of this mission and of the meetings that arose from it was an action plan for the country's marine environment. In addition, substantial documents have been prepared on marine pollution, marine oil and chemical spills, living marine resources, marine protected areas and reserves, coastal area development and management, and marine environmental legislation. The recommendations that arose from this initiative will enable the government of Somalia to identify and act upon that country's marine environment problems.

Similarly after a detailed survey of the Tanzanian coast and its problems, a national action plan is now being prepared for Tanzania.

Within the general framework of the regional Action Plan a report on the environmental effects of coral sand extraction has been prepared for Mauritius. At the same time a contingency plan for maritime emergencies is also being drawn up.

In Mozambique, a proposal for a management plan for Inhaca Island is receiving outside support as a contribution to the Action Plan.

Support to the Action Plan and the Convention is provided by UNEP, in co-operation with a number of international and regional organizations. This support includes the co-ordination of specific activities which governments have agreed should be carried out, and the provision of training and equipment to national institutions participating in the Plan. In addition, technical and intergovernmental meetings are being organized, as is the management of the Plan's financial resources. In the initial phase, UNEP is providing the main financial support to the Plan, although the Plan is gradually expected to become self-supporting through a special Trust Fund set by the Eastern African Governments

It is hoped that by working together within the framework of the Plan, the countries of the Region will reach a better understanding of their common problems and make progress in the management of their marine resources.

Goals and objectives

The general goals and objectives of the Action Plan for the Protection, Management and Development of the Marine and Coastal Environment *of* the Eastern African Region are:

a) To promote the sustainable development and sound management of regional marine and coastal resources by:

- Enhancing consultations and technical co-operation among the States of the region;

- Emphasizing the economic and social importance of the resources of the marine and coastal environment;

- Establishing a regional network of co-operation on concrete subjects/ projects of mutual interest for the whole region;

b) To establish general policies and objectives and to promote appropriate legislation for the protection and development of the marine and coastal environment on a national and regional level;

c) To prevent pollution of the marine and coastal environment within the region originating from activities within the States of the region or from operations primarily subject to the jurisdiction of extra-regional States;

d) To provide for the protection and rational development of the living resources of the region, which are a natural heritage with important economic and social values and potential, through the preservation of habitats, the protection of species, and the careful planning and manage ment of human activities that affect them.

e) To strengthen and encourage, through increased regional collaboration, the activities of institutions within the region involved in the study of marine and coastal resources and systems;

f) To improve training and assistance at all levels and in all fields relating to 'the protection and development of the marine and coastal environment; and

g) To stimulate the growth of public awareness, at all levels of society, of the value, interest and vulnerability of the region's marine and coastal environment.

The activities of the action plan are expected to result in:

a) Assessment and evaluation of the causes, magnitude and consequences of the environmental problems, in particular assessment of marine pollution and study of coastal and marine activities and social and economic factors that may influence, or be influenced by, environmental degradation;

b) Promotion of methods and practices for the management of socioeconomic development and activities that safeguard environmental quality and utilize resources wisely and on a sustainable basis;

d) Establishment of institutional machinery and adoption of financial arrangements required for the successful implementation of the Action Plan.

NB The goals and objectives contain quotes from the Action Plan adopted by the Governments of the Eastern Africa region in 1985. For more details about the Action Plan contact: Oceans and Coastal Areas Programme
Activity Centre, UNEP, P.O Box 30552, Nairobi, Kenya.

Fabby K J Nielsen

The massive growth of tourism in some parts of the region. like Diani Beach in Kenya. is imposing a great strain on the natural ecosystems of the region. Will the pressure prove to be too great?