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Marine pollution: a threat to the Kenyan economy

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MARINE POLLUTION: A THREAT TO THE KENYAN ECONOMY

BY

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A thesis submitted in fulfilment for the Masters
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This thesis is my original work and has not been presented for a degree in any other University.

Signed ..... Date .....

This thesis has been submitted for examination with my approval as the Course Professor.

Signed ..... Date 28 June 1985

F O R W A R D

The zeal to embark upon a masters degree programme originated in 1980 after attending a course, on port productivity, jointly organized by the Kenya Ports Authority, the Kenya Cargo Handling Services (KCHS) and the University Of Wales Institute Of Science and Technology, at Bandari College, Mombasa, Kenya. I made my wish known to my employer, the K.C.H.S..

It was on June 15th, 1983 that my dreams came true; the Management of K.C.H.S. nominated me for a course on General Maritime Administration in Malmo, Sweden.

Choosing of the topic eventually I decided to write on was not easy and I must stress that the realization that in Kenya, very little has been done in the field of shipping development, other than port development, since independence, was the main driving force.

The more research I conducted the more convinced I became that it would be a more beneficial exercise to select a topic which, if well covered could be a useful source of reference in any young Maritime nation. My interactions with some shipping communities in Sweden, Norway, Denmark, Britain, Holland and Poland had a catalystic role to my conviction.

The topic MARINE POLLUTION: A THREAT TO THE KENYAN ECONOMY is a coinage aimed at stimulating thoughts along the following lines:

- maximum utilization of the natural endowment - the sea.
- issues relating to shipping development
- the administration of maritime activities at governmental level.

In pursuit of the above broad objectives the thesis has been divided into six chapters.

The first chapter looks at Marine pollution - causes and effects, and relates the two to the situation in Kenya.

The next two chapters - two and three - concentrate on relevant international conventions. Chapter two surveys most of the conventions and also touches on a regional arrangement. Chapter three not only suggests ways to implement the conventions but also gives financial implications for and against implementation.

Chapter four offers a comperative analysis of contingency planning with the view to finding basis for improvement of the present Kenyan arrangement.

The marriage between marine pollution and the Kenyan economy is found in chapter five.

True, chapter six, the last one, summarises the major recommendations. Nonetheless, it goes further to state that without an intergrated approach to shipping development neither the identified problem of oil pollution nor the eccnomic problems currently Kenya faces won't be easy to overcome.

To sum up, my fervent hope is that both the Kenya govermment and my sponsors shall find, in one way or another, the recommendations and suggestions offered herein beneficial and practicable.

A C K N O W L E D G E M E N T S

A thorough understanding of the topic under analysis requires original academic in-depth research into the primary sources of information available on the subject. The lack of time on the one hand and that of appropriate written material especially on Kenya's maritime administration and oil as a pollutant in Kenya's marine environment proved to be a lethal blow to the writer.

Professor Stubberud was most helpful in giving advise which was sought from time to time. To him I am very grateful for his understanding and unfailing sense of judgement which was useful in giving shape to this thesis.

Further, I thank the Kenya Cargo Handling Services Limited for granting me two years paid leave, the period within which the thesis was written. I should further like to register my gratitude to Mr. H. H. Midia the Personnel Manager of K.C.H.S. who authorised the release of funds without which the research, typing and binding work would have been greatly hampered.

My depts to Miss Waheeda M. S. for her tireless speedy and accurate typing of the thesis.

Finally, I express my appreciation to family members, especially my son Shaban and my daughter Mwanajuma, who had to do without me while I was in Europe at the time when my late father had just passed away.

MOHAMED K. MWATUWANO

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ABSTRACT

Kenya is a developing country and by this fact alone she needs to make the best use of all the available resources to speed up economic growth. The Kenyan Coast is uniquely suited to support a variety of activities and to serve diverse human needs for food, recreation, transport and even employment. Viewed thus, the coastal area is an integral part of the development process.

Most of the coastal economic activities are interdependent, when one is affected a chain reaction is triggered off. Therefore, any activity that acts to reduce the potential value of one or more of the coastal economic activities has to be identified in good time. The author has attempted to identify one such activity as oil pollution resulted by sea transportation.

Since marine activities are many, and in order to maximize the benefits accrued there-from, proper planning and coordination is essential. In turn, proper planning and coordination presupposes the existence of efficient organizational arrangements, trained personnel, etc.

Like in many developing countries, in Kenya the marine related activities are not well developed due to a variety of reasons e.g. shortage of funds, unawareness, and lack of trained manpower.

The broad objective of this thesis then is 'towards the development of the marine and coastal environment of Kenya'. It is hoped in the final analysis, a framework for an environmentally sound and comprehensive approach to the development of most of the maritime activities will be achieved. The approach used to attain the objective is to regard oil pollution problem as a mirror which will reflect all the existing shortcomings which need urgent attention.

With the above paramount considerations in mind, this thesis seeks:

a) To show that so long as ships ply on Kenyan and adjacent waters some oil is bound to find its way into those waters.

b) To survey and discuss some international measures taken to avert the imminent danger of oil pollution damage with the view to encouraging the Kenyan government to actively support such measures.

c) To examine the existing organizational arrangements in Kenya aimed at minimizing the damage in question with the view to suggesting improvements.

d) To show, in summary, the marine activities and resources found in the Kenyan Coast which are in constant danger of being adversely affected by the pollutant.

e) Finally, to propose a means of raising funds necessary for the accomplishment of the various national development strategies arising out of all the above, a to d.

At this point the following information is provided to assist in understanding some of the discussions to follow:

- In Kenya there is a Merchant Shipping Act which was last revised in 1968 and at the moment the Merchant Shipping office is manned by only one qualified person.
- A Governmental oil spill response capability does exist.
- Kenya is not a party to Marpol 73/78.
- Most current oil pollution impact on Kenyan beaches is caused by passing traffic.
- Bandari College is the only Maritime institute and it offers courses mainly on Port Productivity. The College is not fully developed to train senior personnel.
- In the Ministry of Transport and Communication there is no one who is trained in any field of Maritime Affairs and therefore the shipping division remains unstaffed.
- Kenya does not produce oil though the search for oil has been intensified in recent years.
- There are no elaborate and up-to-date pollution control laws.

- Kenya does not have a shipping (line) company.
- The East African region is in the process of formulating a regional agreement aimed at oil pollution control.

Equipped with above background information the need for a lengthy introductory chapter was not seen.

C O N T E N T S

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CHAPTER I

MARINE POLLUTION

I. GENERAL

1.1.0.0: From time immemorial man has used the sea as a place where wastes of all kinds could be disposed off. Until mid this century this usage was permissible because the quantities of wastes dumped were negligibly small. And also the hazardous nature of some of the wastes were unknown. Populations were relatively small and industrialization was at an infancy stage. In the field of agriculture man-made fertilizers were not in much use. At almost the turn of the twentieth century that usage is no longer permissible; enormous quantities of sewage from densely populated cities, large waste materials from an increasing number of factories and industries world over, tons of man-made fertilizers are used in place of natural manure resulting in streams of agricultural run-offs getting into the sea.

1.1.1.0: Industrial development and its spread in different corners of the world resulted, in early fifties, to the construction of oil refineries. The building of oil refineries was not restricted to the countries of origin of oil but also in the consummer countries. From then henceforth the oil age set in.

1.1.2.0: In shipping transportation oil is one of the most important cargoes carried. Very large crude carriers, tankers, coastal tankers and even barges are daily cruising around the oceans and seas carrying oil. This position is unlikely going to change in the near future despite the global struggle in search of an alternative source of energy. The single objective for the movement of oil from its sources to numerous destinations is to power the economic functions of nearly every nation of the world. Oil transportation is therefore, a phenomenon that is there to stay.

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1.2.0.0: SOURCES OF MARINE POLLUTION

1.2.1.0: The Sources of Marine Pollution are many and varied but hereunder four categories are mentioned:

1.2.2.0: Natural Sources e.g.

(i) Sediment erosion
(ii) Offshore exploration and explortation of seabed resources

1.2.3.0: Municipal And Industrial Wastes and Run Offs e.g.

(i) Refineries
(ii) Municipal wastes
(iii) Ocean dumping
(iv) River runoff
(v) Urban runoff
(vi) Industrial wastes

1.2.2.0 and 1.2.3.0 above are land based sources.

1.2.4.0: Transportation

(i) Tanker operations
(ii) Dry docking
(iii) Bilge and fuel oils
(iv) Tanker accidents
(v) Marine terminals
(vi) Non-tanker accidents

1.2.5.0: Resource Exploitation

(i) Offshore production
(ii) Dredging

1.2.5.1: Sources of pollutants are largely associated with population and industrialization centres (FAO 1971, UNEP 1982, GESAMP 1982). In support of this statement, despite the fact that there are 150 sewage treatment plants in Kenya, more than half the population still lacks adequate sanitation. Only 20 towns, Nairobi and Mombasa included, have sewage systems, and in the 20 towns only half of the population is served.

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Mombasa, the second largest town in Kenya, has a 26 year old sewage system that discharges 1.2 million gallons per day of sewage into the ocean; 80 per cent receive mechanical treatment, and 20 per cent biological treatment. (1)

1.2.5.3: In Kenya few serious studies have been undertaken to assess the degree of industrial pollution, but the major sources - such as the discharge of effluents from coffee and sugar factories into rivers and stream - have been identified. Several reports have shown that effluents from factories in the sugar belt in Western Kenyan manage to find their way directly into rivers and their tributes. (2)

1.2.5.4: Kenya is predominently an agricultural country and farmers seem to increasingly use fertilizers and pesticides. The amount of fertilizers that passed through the Port of Mombasa in 1982 was 106,000 dwt, 1983 152,000 dwts and the forecast for 1988 is 273,000 dwt. Insecticide figures for the same period are 3,000 dwt, 6,000 dwt and 10,000 dwt respectively (3). It has been claimed that some farmers apply fertilizers and insecticides in very high concentrations.

2.0.0.0: Oil Pollution From Marine Transportation

2.1.0.0: How ships may pollute seas with oil:

2.1.1.0: Ships - be they tankers, passenger ships or dry cargo vessels - when not carrying their respective cargoes or when partially loaded, they lose stability at sea. To overcome this danger the normal practice is to take in sea water to compensate for the required difference in weight to achieve adequate stability. Such weight is called ballast.

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2.1.2.0: In dry cargo ships this ballast is pumped into fuel tanks which become empty in the course of a voyage. At the time of refuelling the ballast which has now mixed with oily waste, traditionally, is pumped back into the sea.

2.1.3.0: Tankers' fuel tanks when filled with ballast are inadequate for the purpose of maintaining stability. After discharging her cargo a tanker emerges so high in the water that her propeller and rudder are half-immersed. In such conditions a tanker cannot withstand sea stresses which can easily cause structural damages. Consequently, sea water ballast is pumped into the empty cargo tanks to lower the tanker to the safe depth level. The amount of water ballast carried by tankers ranges from a third and a half her cargo carrying capacity depending on weather expected conditions.

2.1.4.0: Unlike when water is poured out of a glass only tiny drops remain, when oil is discharged in the traditional way an amount of cargo and sediment remain in the cargo tank. Oil is lighter than water and after sometime it will float on top of the taken ballast water. Should the tanker be in crude trade and is proceeding to a loading port which lacks reception facilities to receive the oily mixture before arriving at that port tanks have to be cleaned. The oily mixture will have to be discharged to the sea and clean sea water taken in so as to have clean ballast to discharge before loading.

2.1.5.0: While at ports tankers, other cargo ships and fishing vessels discharge oily bilge - water from machinery spaces. When handling petroleum some may escape to sea due to pump failures, pipe leakages and pipe bursting.

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2.2.0.0: Growth Of Tankers

2.2.1.0: In order to appreciate the extent to which marine transportation causes oil pollution to marine environment analysis of growth of oil tankers in the world and tanker traffic in the East African region in general and Kenya in particular is essential.

2.2.2.0: Upto the second world war the capacity of tankers averaged about 10,000 dead-weight tonnes. The largest tankers then had a dead-weight of 23,000 tonnes. A sudden change started in the 1950s. As earlier stated demand for oil rose sharply and refineries were being built all over the world. In Kenya the refinery was built in 1963.

2.2.30: The growing flows of crude oil (250 million tons in 1954 to more than 17,000 million tons in 1977) sparked the construction of bigger oil tankers to make savings in the cost of freight. In 1950 a 28,000 tonnes tanker was launched. Tankers of 32,000 tonnes, 45,000 tonnes and 60,000 tonnes came to being in quick succession. The 1956 closure of the Suez Canal was a major incentive for the development of tankers of over 100,000 tonnes. The first oil tanker of over 100,000 tonnes was commissioned in 1959. From then on the increase in tanker tonnage rapidly gained pace: VLCC's and ULCC's appeared on the oceans. 1968 saw a 327,000 tonnes tanker enter the scene, followed in 1973 by two 477,000 carriers and in 1979 by a 565,000 tonnes ship. Since the oil crisis period when OPEC raised the crude oil prices, the growth of tankers has stagnated. But the very large tankers have firmly established themselves.

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2.2.4.0: This historical account is intended to give an impression of an oil pollution damage in the event of an accident to one of the large oil tankers spilling out its crude oil cargo. The most vivid example is the accident involving the British registered tanker ALVENAS which occured on 31st July 1984 (at the time of writing this chapter) at the Gulf of Mexico spilling one million gallons of Venezuelan crude oil.

2.2.5.0 Geographically, Kenya is situated in the Eastern part of Africa where together with Somalia in the north and Tanzania and Mozambique to the south lie along the heaviest tanker traffic route in the world. Approximately 475 million metric tons of oil from the Gulf of Arabia is transported through the East African Region to Europe and America every year. This tonnage figure is likely to significally increase anytime the Suez Canal is closed. From the Kenya's Coastline this tanker traffic route, commonly known as Tanker Bay, is some 200 miles away.

2.3.0.0:: Calculations* of oil tankers and possible Oil Pollution They cause in the East African Region

2.3.1.0: Of the 475 million metric tonnes mentioned above about half is carried on VLCCs averaging about 200,000 dwt., the remainder is transversed on tanker averaging about 60,000 dwt. In terms of approximate number of voyages per year for VLCCs is

$$\frac{475,000,000}{2 \times 200,000} = 1,187.5$$

This is about 1200 VLCC voyages per year.

Voyages for medium - sized vessels are

$$\frac{475,000,000}{2 \times 60,000} = 3,958.333$$

This is about 4,000 medium sized vessel voyages per year.

* Calculations will be based on certain assumptions and estimates as it is next to impossible to get exact figures.

.../...

To get the number of ships entering the Region per day

$\frac{1200}{365}$ VLCCs and $\frac{4000}{365}$ medium sized vessels

which is about 3 and 11 respectively. The average length of the Region is 2,700 miles and the distance covered per day is 360 miles. The average length of the voyage through the region $\frac{2,700}{360}$ = 8 days. It is therefore, safe to assume that at any given time there are (3 x 8) VLCCs laden with oil and (3 x 8) VLCCs in ballast, and 11 x 8 medium sized tankers loaded and 11 x 8 in ballast voyage which together add up to 224 tankers, (coastal trade excluded). Estimated other cargo ships number 220 and fishing vessels 200 every-day in the Region. Therefore, daily there are 644 (224 + 220 + 200) ships in the Region. How much oil do they discharge to the sea? This is the next step to be examined. Before this is done it is opportune to see how much oil is supplied to the Region.

2.3.2.0: There are five refineries in the Region: Mombasa (Kenya), Mogadishu (Somalia), Dar-es-Salaam (Tanzania), Matola (Mozambique) and Toamasina (Madagascar). In Kenya alone the overall picture is shown in Table 1 below:

Table 1: Ship Arrivals, Net Registered Tonnage and Handled in Kenya

YEAR	SHIP ARRIVALS	NET REGISTERED TONNAGE (NRT)	PETROLEUM BULK OILS	
			IMPORT	EXPORT
1978	1,597	6,297,886	2,732,424	99,545
1979	1,493	5,932,990	2,761,334	173,805
1980	1,449	6,551,229	3,387,339	361,323
1981	1,407	6,525,022	3,491,773	937,537
1982	1,308	5,972,615	2,616,062	400,069

Source: Kenya Ports Autherity Development Plan 1984 - 1988

.../...

2.3.2.1: Of the estimated 6.550 million metric tonnes imported to the refineries in the East African Region, half goes to Mombasa, Kenya. See table 1 and also the crude oil imports in the Region below:

a)	Mombasa	yearly	average	3million	from	Middle East
b)	Dar-es-Salaam	"	"	1.6 m tons	"	" "
c)	Tamatave	"	"	650,000 tons	"	" "
d)	Mogadishu	"	"	300,000 tons	"	Iräq "
e)	Maputo	"	"	1 million		
	TOTAL			6,550,000		

Source: UNEP Regional Seas Report and Studies No. 10 p. 23.

2.3.2.2: Meanwhile about 13.5 million metric tons of crude oil went to South Africa. This (6.5 mt. + 13.5 mt.) 20 million metric ton total is carried by tankers that range between 20,000 dwt and 100,000 dwt. On their return trip to the Middle East the tankers' cargo tanks are cleaned and oil is pumped over-board. The total oil discharged into sea due to cleaning operations from the SUPPLY TANKERS adds to 20,666 metric tonnes per year (see page 10)

2.3.2.3: TANKERS IN TRANSIT carry 450 million metric tons per year through the Region.

2.3.3.0: To calculate the amount of oil which may get into the sea the existing regulations have to be cited because they are the formulars to be used in the calculations.In this respect the discharge criteria of Marine Pollution Prevention Convention of 1973 which entered into force on the 2nd October 1983 applies.

2.3.3.1: The 1973 Convention states that any discharge into the sea of oil or oily mixture is prohibited except when all the following conditions are satisfied:

.../...

(i) "The tanker is not within a Special Area" (i.e. the Mediterranean, Black and Baltic Seas, Red Sea and the Gulfs area).

(ii) "The tanker is more than 50 nautical miles from the nearest land (The term "from the nearest land" means from the baseline from which the territorial sea of the country in question in accordance with the applicable International Law Of The Sea).

(iii) "The tanker is proceeding on route".

(iv) "The instantaneous rate of discharge of oil content does not exceed 60 litres per nautical mile".

(v) The total quantity discharged into the sea does not exceed for existing tankers 1/15,000 of the total quantity of the particular cargo of which the residue formed a part, and for new tankers 1/30,000 of the total quantity of the particular cargo of which the residue formed a part".

(vi) "The tanker has in operation an oil discharge monitoring and control system and a slop tank arrangement". (For existing tankers this requirement will apply three years after the date of entry into force of the convention).

The above six requirements are aimed at controlling discharge of oil from Cargo tank areas of oil tankers. But the Convention further states that oil or oily mixtures may only be discharged from machinery space, bilges of tankers and other ships of 400 tons gross tonnage when the following conditions have been fulfilled:

.../...

(i) The ship is not within a special area;

(ii) The ship is more than 12 nautical miles from the nearest land;

(iii) The ship is proceeding on route;

(iv) The oil content of the effluent is less than 100 parts per million; and

(v) The ship has in operation an oil discharge monitoring and control system, oily-water separating equipment, oil filtering system ... (4)

2.3.3.2: Coming back to the actual calculation several assumptions shall be made.

(a) First assumption: 50% of the tankers supplying oil to East and South Africa meet MARPOL 73/78 discharge criteria of 1/30,000 of the total carrying capacity.

(b) Second assumption: 25% would discharge 1/15,000 of the total carrying capacity (which is twice of MARPOL 73/78 criteria).

(c) Third assumption: 25% of the vessels may not practice the Retention-On-Board/Load-on-Top (CBT, SBT, Slop tanks) procedures and would in consequence discharge 0.4 per cent of tonnage carried.

2.3.3.3: Hence crude oil discharged in the Supply Tankers in the Region annually can be estimated thus:

$$20 \text{ million tons} \times 0.50 \times \frac{1}{30{,}000} = 333 \text{ tons}$$

$$20 \text{ million tons} \times 0.25 \times \frac{1}{15{,}000} = 333 \text{ tons}$$

$$20 \text{ million tons} \times 0.25 \times 0.004 = 20000 \text{ tons}$$

Sub-Total = 20666 tons

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2.3.3.4: To get the quantity of oil discharged in the Region by the TANKERS IN TRANSIT the following assumptions are made:

a) 75% of those tankers meet the MARPOL 73/78 discharge criteria of $\frac{1}{30,000}$ of the tonnage carried.

b) 25% of them meet the OILPOL 54/69 discharge criteria of $\frac{1}{15,000}$ of the tonnage carried.

c) That a quarter of the tankers' voyage time is spent in the Region.

2.3.3.5: Therefore, the estimation for the annual discharge of crude oil into the sea as a result of normal operation of the crude oil TANKERS IN TRANSIT is as computed below:

$$450 \text{ mt} \times 0.75 \times \frac{1}{30,000} \times \frac{1}{4} = 2,812.5 \text{ tons}$$

$$450 \text{ mt} \times 0.25 \times \frac{1}{15,000} \times \frac{1}{4} = 1,875 \text{ tons}$$

SUB TOTAL: 4,687.5 tons

2.3.4.0: Bilge And Fuel Oil

2.3.4.1: With respect to bilge and fuel wastes the following assumptions and estimates have been made.

a) It has been estimated that an average tanker generates an average quantity of bilge oil of 10 gallons per day. (a steam tanker generates 5 gallons while a motor tanker generates 15 gallons for the same period. Steam and motor tankers constitute approximately one half of each of the tanker fleet).

b) It is further assumed that 10% bilge oil is discharged into the sea per day.

c) It has already been seen (page 7) that there are 224 tankers in any day in the region.

.../...

2.3.4.2: Hence the annual discharge of oil is computed thus:

$$10 \text{ gallans} \times \frac{1}{200} \times 224 \times 365 \times \frac{10}{100} \times \quad = 408 \text{ tons}$$

2.3.5.0: Pollution By Cargo Ships Other Than Tankers

2.3.5.1: Cargo ships other than tankers too do play a part in letting petroleum hydrocarbons into the sea. The discharge of oily bilge from the engine rooms, fuel oil sludge and oily ballast from fuel tanks are but examples. Within the two months research time allocated to this project it was not possible to get figures of dry cargo vessels serving the region under discussion.

Nonetheless, a number of estimates have been made, viz:

a) The East African seaborne trade is about 20 million tonnes.
b) 5000 ships are required to transport the cargo.
c) Every ship spends about 16 days in the region.
d) At any given time there are about 220 ships in the Region.
e) The quantity of slop oil generated per day, in the average, is 3 gallons.

How much of the 3 gallons of bilge oil is discharged into the sea depend on the availability of oil/water separators in the ship and shore reception facilities. Further estimates (UNEP 1982) have it that half of the world's non-tanker vessels are fitted with separators. This position should have shifted to about 75% with entering into force of MARPOL 73/78.

f) Ships with separators would discharge into the sea 10% of bilge oil and ships without separators $\frac{2}{3}$ of bilge oil.

.../...

2.3.5.2: Therefore, the quantity of oil discharged into the sea by this method per year from cargo ships other than tankers serving the East African trade route can be computed thus:

$\frac{3 \text{ gallons}}{200} \times 220 \times 365 \times 0.75$(with separators) $\times 0.1 = 90$ tonnes

$\frac{3 \text{ gallons}}{200} \times 220 \times 365 \times 0.25$(without separators)$\times 0.66 = 200$ tonnes

Total 200 + 90 = 290 tonnes

2.3.6.0: Pollution By Fishing Vessels

2.3.6.1:: Fishing vessels spend longer periods at sea and it is estimated that 75% of the bilge oil is pumped to sea. An estimate of 200 fishing vessels in the Region at anyone time has been made (J. Ferrari 1983). But this figure is expected to rise as a result of the outcome of the Third United Nations Conference On The Law Of The Sea (See part V article 62). The new estimate can be regarded as 250 fishing vessels at any one time in the region. Viewed thus, the amount of pollution can be estimated as shown below:

$\frac{3}{200} \times 250 \times 365 \times 0.75 = 1026.5$ tonnes

2.4.0.0: Further Evidence of Oil

2.4.1.0: The few records available on oil pollution along the Kenyan coast go along way to support the foregoing calculations. Two celebrated studies one by the East African Oil Refinery (E.A.O.R.) in 1973 and the other by the Kenya Marine and Fisheries Research Institute (K.M.F.R.I.) in 1979 are worthy citing.

2.4.2.0: The survey by the E.A.O.R. revealed the following:

a) Generally, the oil on the beaches arrived as solid, black, tar-like lumps.

.../...

b) At one instance only was liquid oil reportedly seen 15 km from the shore.

c) Tar balls were of different sizes the biggest being similar to a football size.

d) 19 pollution cases were reported and further analysis showed that 13 cases occured between April and November i.e. during the South East Monsoon season. The remaining 6 cases took place between November and March, a time when there is the North East Monsoon (More studies ought to be conducted to conclusively establish if this pattern always follows).

e) The E.A.O.R. survey concluded that the oil found on the beaches originated from "large" spillages of crude or fuel oil.

2.4.3.0: Some Results of a monitoring project that involved making observations on the incidence of tar on Kenyan beaches at some randomly chosen stations concluded in 1979 by D. Munga of the Kenya Marine and Fisheries Research Institute are shown in table 2 below.

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Table 2: Average Concentrations of tar on some Beaches along the Kenya Coast (All figures are in g/m^2)

SAMPLING (STATION)	MARCH	APRIL	MAY	JUNE	JULY	OCT.	NOV.
English point	26.4	10.4	4.4	7.9	5.0	6.3	3.7
Nyali	13.6	16.7	5.2	2.7	3.2	3.2	2.9
Mombasa Beach Hotel	7.3	13.5	-	10.5	0	2.1	3.2
Malaika	37.5	8.4	-	-	8.4	7.4	4.9
Whispering Palms	5.0	-	-	16.6	2.1	2.1	6.3
Kikambala Cottages	5.2	-	-	10.4	4.2	6.3	3.2
Harris Ranch Kilifi	-	-	3.2	4.2	6.3	4.9	2.1
Bota Kilifi	-	-	2.1	0	3.2	6.3	0

Source: KENYA AQUATIC (A Bulletin No. 1 Sept. 1983 Of Kenya Marine & Fisheries Research Institute) P. 13

2.4.4.0: The Study also revealed the following:

a) High concentrations of tar on the beaches.
b) That the nearer to Mombasa the sample stations were the higher was the tar concentration.
c) Some individual tar lumps weighed over 3 kg.

2.4.5.0: While the two quoted Kenyan studies should suffice, on the whole, there is very little work being undertaken on marine oil pollution assessment. Manpower and equipment shortages are the major constraints. It may be mentioned here that tarring of beaches and shorelines is the form of oil pollution most obviously noticeable to the public.

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2.5.0.0: ACCIDENTAL OIL POLLUTION

2.5.0.1: Static situations are rare in life. For the first time in the Arab world history in 1973 they unanimously decided to hike the price of oil. The resultant "oil crisis" changed, to a larger extent, the petroleum economics. This phenomenon is thought to have reduced deliberate oil pollution from ship-source.

2.5.0.2: Technology too has not been at a stand-still. New tankers are technologically equipped with systems designed to reduce operational pollution e.g. COW, SBT.

2.5.0.3: Laws against oil pollution have been made more stringent in many nations. What remains to be solved is the subject of this section - accidental oil pollution.

2.5.0.4: Until very recently (1983) figures on accidents involving vessels carrying pollutants and major tanker disasters in many parts of the world showed no reduction. The survey, undertaken by the Steering Group on Casualty Statistics of the Maritime Safety Committee, the IMO's Senior Technical body, involved 3,100 deep sea tankers of 6,000 grt. and over. It shows that the tanker casualty rate for 1983 is the second lowest since 1968. The survey further shows that 1.87 in every 100 tankers were involved in a serious casualty in that year. (5)

2.5.0.5: For the purpose of this project accidental oil pollution will be categorised into three as follows:

a) Major accidental oil pollution.
b) Recognizable accidental oil pollution.
c) Minor accidental oil pollution.

At this juncture it must be stated that serious and catastrophic spillages from tankers due to whatever cause may occur anywhere along the already discussed tanker route and within the port area.

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2.5.1.0: Minor Accidental Oil Pollution

These are caused namely by fractured pipelines, leaking joints and flow back in hoses. In the Kenyan example, this happens during loading and unloading of oil and also during the loading of bunker oil. At the Mombasa port bunkering facilities are readily available at all the 18 berths.

2.5.2.0: Recognizable Accidental Oil Pollution

2.5.2.1: This is an accident involving a tanker, an oil barge etc. releasing a quantity of oil not exceeding 100 tonnes. Such quantity of oil can be comfortably be contained by the present anti-pollution arrangements (see chapter 2). Kenya has already fallen a victim of this category of pollution. The BRITISH CAVALIER, in 1975 grounded on the reefs as she approached the Mombasa harbour and an estimated 100 tonnes of crude oil leaked overboard. A 50 metre long oil barge ALPHA GENERAL sunk at 9.30 a.m. (local time) *at on 27th December, 1983*the Southern Engineering Company Dock (6). About 60 tonnes of oil found its way to the sea.

2.5.2.2: In the period between 1978 and 1982 several accidents to ships which may or may not have led to marine pollution occured in the major Kenyan port. See table 3 below.

Table 3: Accidents in the Port 1978 - 1982

ACCIDENT TYPE	1978	1979	1980	1981	1982
Accidents to ships	28	42	24	20	31
Accidents (Damage) to cargo:					
i) On board	392	107	68	72	60
ii) In shore storage	51	121	111	115	95

Source: KPA: Annual Bulletin Of Port Statistics 1982. P. 45

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2.5.3.0: Major Accidental Oil Pollution

2.5.3.1: Where a marine accident results in a loss of over 100 tonnes of oil. So far there has never occured any major accident in the Kenyan waters nor has there occured any, which has affected the Kenyan authorities, nor the neighbouring countries.

2.5.3.2: Only very few people, if any, would like to see the figures for marine casualties to increase while the over-whelming majority wishes the same to significantly be brought to a negligible level. But as table 3 shows accidents still happen. Any effort to institute measures to curb this trend must begin with investigating the causes.

2.5.4.0: Possible Causes of Recognizable And Major Accidental Oil Pollution

2.5.4.1: That no in-depth study on this subject has been carried out in Kenya is a fact. Investigation in other parts of the world enlist a number of causes for marine incidents some of which are: Fire, explosions, capsizing, leakage, machinery damage, collisions and groundings.

Table 4: RECORDED INCIDENTS AND POLLUTION INCIDENTS ATTRIBUTABLE TO COLLISIONS AND GROUNDINGS OCCURING AT SEA IN 1976

PRIMARY CAUSE	NUMBER OF INCIDENTS	
	TOTAL	OF WHICH LED TO POLLUTION
Collisions	44	1
Groundings	121	14

Source: Lloyds Weekly Casualty Returns, 1976 P.2

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2.5.4.2: To establish that collisions and groundings of ships at sea may cause oil pollution, as can be inferred from table 4, does not in itself throw enough light which may lead to taking appropriate measures to reduce the number of casualties. What is more relevant here are the casual factors. The casual factors can, to some extent describe the chain of events upto just before the accident happened.

2.5.4.3: Rear Admiral G. Ritchie in his paper NAVIGATION AND SOCIETY observed that "some of the more recent accidents which have been so devastating to the marine environment have come about from human errors in navigation of a very elementary nature" (7). But the current Secretary General of IMO had explicitly at an IMO Conference on training in July 1978 stated "that it had been recognized that over 80% of maritime accidents are caused by human error". Examples are bound to substantiate the two statements but two should suffice.

2.5.4.4: The TORREY CANYON (120,000 grt.) was stranded in full daylight and clear weather in an area well provided with navigational aids. It would seem that the disaster occured as a result of aberration on the part of the master and his complete disregard of tidal stream information which he could have deduced from the chart or the Sailing Directions.

2.5.4.5: VLCC METULA, which grounded on the 9th August, 1974 on a chartered reef in the Strait of Magellan close to land and in sight of a light-house with two radars operating normally, is the second example. An extensive oil spillage occured.

2.5.4.6: From the verdict of the Admiralty Court of the Netherlands which considered the second case, it would appear that the master made little planning preparation for commencing the complex task of taking a large tanker through that Strait. He plotted no courses or tracks on the chart in advance. (8).

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2.5.4.7: Causal factors and situations dependent factors related to collisions and groundings vary considerably. An extensive analysis on the subject by the Det Norske Veritas, the Norwegian Classification Society, came up with the findings in table 5 on page 21. The purpose of the analysis was to unearth the causes of accidents with the view to proposing remedial measures. A total of 2742 collisions and groundings involving Norwegian ships within the period 1970 - 78 were analysed.

2.5.4.8: Further analysis of the findings revealed the following large causal areas:

Causal Area	Occurance Frequency
External Conditions	27%
Navigational Error	25%
Non-Compliance	20.6%
Other Ship	11.4%

Table 5: Causual Factors

CAUSAL AREA	CAUSAL GROUP	FREQUENCY	
			(%)
External Conditions	a) External condition which influence the efficiency of navigational aids.	86	1.5
	b) Fault, deficiency or misleading information from lights, marks etc.	114	2.1
	c) Reduced visual conditions.	797	14.3
	d) External influences, channels and shallow water effect	539	9.7
Technical failure/ ergonomics	a) Fault in the ship's technical systems.	143	2.6
	b) Serviceability of navigational aids.	74	1.3
	c) Remote control of steering and propulsion.	130	2.3
	d) Failure/deficiency in communication equipment.	22	0.4
Inadequate navigational factors	a) Bridge design and arrangement.	48	0.9
	b) Error/deficiency in charts or nautical publications	113	2.0
	c) Bridge manning and organization	111	2.0
	d) Poor communication internal	35	0.6
	e) Inadequate knowledge and experience	152	2.7
Navigational error	a) Navigation and manoeuvring factors	936	16.8
	b) Misinterpretation or incomplete utilization of information from fixed objects (lights, marks etc.)	256	4.7
	c) Operating of equipment	119	2.2
	d) Wrong appreciation of traffic information	101	1.8
Non-compliance	a) Inadequate coverage of the watch	758	13.7
	b) Special human factors	389	7.0
Other ship	a) Fault or deficiency related to other ship.	62	1.1
	b) Navigational error on other ship	575	10.3

Source: Det Norske Veritas Report No. 80 - 1144 P.7

2.5.4.9: Of course, Norway differs in many aspects from Kenya. But the analysis just referred to and the lessons learnt there-from give some guidance on what steps to take to avoid accidents. On this regard local conditions, as a matter of course, are of supreme importance.

2.5.5.0: Pilotage is compulsory in Kenya except for pleasure boats and small fishing vessels. Cases of grounding while pilot was on board ship are many (9). More than one qualified navigator on the bridge does not make a ship accident free. It should be noted that the maximum depth of Mombasa channel is 13.14

2.5.5.1: Recently some pilot and berthing boats were acquired. (10) Kenya Ports Authority has budget K.shs. 1.3 million for navigational structures and this project is expected to be completed by 1985. (11)

2.6.0.0: Observed Behaviour of Hydrocarbons in the Marine Environment

2.6.1.0: A lot has been documented on this subject by chemists, bio-chemists etc. Only those facts that go along way to assist in bringing out the theme of this project will be here considered.

2.6.1.1: The reason to know what happens to oil once it enters an ocean is two-fold; to enable the development of better clean-up plans to control and recover oil spills. Secondly, for long term purposes, it is necessary to understand the processes on the oil at any given time after its release into the sea.

2.6.2.0: Spreading, Evaporation and Dispersion

2.6.2.1: Oil spreads rapidly over the sea surface after discharge. The spreading process is controlled by the physical and chemical properties of the oil and the environment into which it is released. In the rough seas, wind and wave action play an important role in the spreading of an oil slick. The spreading rate is lower in cold water. (12)

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2.6.2.2: The spreading process may begin a few hours after discharge and continue for several days. The volatile components are in the meantime lost due to evaporation and dispersion in the marine environment. For accidental spills the quantity of oil which evaporates varies from roughly 10 per cent for heavy oils to 75 per cent for light fuel oil. (13)

2.6.2.3: Through evaporation some of the most toxic hydrocarbons in oil e.g. benzene are reduced and by implication their removal decreases the toxicity to marine life of that segment of the oil that remains in the sea.

2.6.2.4: The Amoco CADIZ disaster resulted in a discharge of 223,000 tons of light Arabian and Iranian crude oils. The oil spread along 300 kilometers of the coast of Britain due to on-shore wind and high spring tides. Beaches, estuaries and marshes were not spared by the oil. (14)

2.6.2.5: The three processes spreading, evaporation and dispersion depend on the physical properties (density, viscosity etc) and chemical properties (composition) of the oil. Another factor is the amount of energy available in the marine environment. There is mechanical energy (wind, waves, currents) and/or thermal energy (water, air temperatures).

2.6.3.0: Emulsification

2.6.3.1: Currents and waves disperse oil-in-water emulsion that is formed on the surface. Water-in oil emulsion (mousse) contains upto 80% water. Either type of emulsion can be induced by surface active substances - natural or added. Water-in-oil emulsification will occur from a few hours to a several days after a spill. An emulsion may form tar balls or lumps, or it may fragment and disperse as extremely small particles. Tar balls can persist for many years. (15)

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2.7.0.0: Effects Of Oil Pollution

2.7.0.1: The consequencies of oil pollution to marine environment, both long-term and short-term, are basically two-fold: ecological and economic. The two are closely related, for example, if an oil spill kills organisms which fish feed on this may affect the fish stocks and subsequently the incomes of the fishermen.

2.7.1.0: Ecological Impact

2.7.1.1: Oil in the marine environment may be absorbed by marine organisms. Because of smothering, toxity and dogging the organisms may suffer biological effects. In this connection it has to be remembered that aquatic life is so diverse and inter-dependent. Further more many marine organisms undergo complex development stages e.g. egg and larvae before getting to adulthood. It is therefore, apparent that biological effects due to oil can vary from one organism to other as well as from one development stage of an organism to another.

2.7.1.2: The extent of ecological damage is dependent on many factors. Type of discharge, for instance, one-off oil spill, successive small spillages (common in a port) or continuous oily effluents e.g. refinery effluents.

2.7.1.3: Another important factor is the type of oil. There are a variety of crude oils and oil products most of which have been studied in many ways. Most such studies have proved that both crudes and products differ considerably in toxicity. Experiments have established that lighter crudes and products such as gasoline have a higher immediate toxicity. Heavy oils on the other hand have blanketing effect which have devastating effects on marine organisms through smothering.

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2.7.1.4: The state of oil at the time it comes into contact with marine organisms is yet another factor. Thin oil films, oil-in-water emulsions, water-in-oil emulsions or thick oil films may each have a different effect when it comes into contact with marine organisms.

2.7.1.5: From the above factors, it is not difficult to see the possibility of life cycles of different marine organisms being affected. A chain reaction may, as a result, be triggered off particularly in the food chain which may lead to extinction of some species.

2.7.2.0: Ecological Monitoring

2,7.2.1: Ecological monitoring is essential for fair prediction of the consequences of an oil spill on a marine environment. The exercise must, however, be based on the following data:

(i) Properties of the compounds spilled (quantity and chemical composition).
(ii) Oceanographic and meteorological conditions (i.e. energy supplies which in turn pushes the oil in various forms away from the original place of spill).
(iii) The site's geomorphological nature.
(iv) The state of the polluted ecosystem (in terms of geomorphological nature and biogeographical situation).

2.7.2.2: The four series of data can be regarded as variables and may serve to explain the variability of effects of oil spills either in the same marine environment or different ones. In trying to expound on this notion Mitchel and others observe: "the 9,000 tons of diesel fuel (containing a high proportion of aromatics) spilled in March 1957, after the wreck of the TAMPICO MARU off Baja California, Mexico, produced immediate and nearly total devastation of intertidal and subtidal life over some 10 km of coast, whereas the 10,000 tons of crude oil spilled by the ARGEA PRIMA in July 1962, in the port of Guayamilla, Puerto Rico, ... caused much less damage".(17)

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One other deduction from this observation is that it is not always true that the larger the oil spill the larger the damage to marine environment.

2.7.3.0: Economic and Social Impact

2.7.3.1: Fishing

a) Where an oil spill has spread over a fishing zone during a fishing season fishermen will be forced to look for an alternative source to earn a living. Fishing resources will be rendered useless by oil. An oiled fishing gear for example is not easy to handle.

b) The demand for fish is likely to fall following serious pollution incident(s) though such fall has never been quantified. Among others, the fall in demand for fish can be attributed to tainting of fish. In response to this fall in demand there is likely reduction in fishing effort by fishermen. In France, after the TORREY CANYON incident, it was estimated that there was three - month reduction in fish sales, amounting to almost 40%. (18)

c) There are resources relating to pleasurable aspect of the marine environment. Sandy beaches, pleasure - crafts, beach and tourist hotels are examples. Whenever an oil incident occurs and damages the shorelines the users of the above amenities tend to back away from them.

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2.7.3.2: Loss Of Productive Man-Hours

a) Man-hours spent on clean-up operations are man-hours lost from other direct economic activities. Calculating the exact number of productive man-hours lost is no easy task. Snags range from who should be included in the calculations e.g. those on the clean-up spot and/or the administrators and politicians to volunteers from many sectors of the economy. Clean-up volunteers may be up-set by red - tape formalities and decide to commence and end work as and when they please. To-date there is no study that has scientifically examined this problem.

2.7.3.3: Cost/Benefit Analysis Of Pollution Incidents

a) Most likely, a cost/benefit analysis of a major pollution incident will give a special understanding of what costs are involved. No such example can be drawn from Kenya because there is none. A classic example is that of the most quoted disaster, the Amoco CADIZ super-tanker oil-spill of March 16th, 1978, which occured off the coast of Brittany, France. An estimated spillage of oil was 220,000 tonnes.

b) The costs can be approached as follows:

   a) loss to Brittany
   b) loss to France (e.g. from shipping activities, fisheries, tourism).
   c) loss to the world (cargo, vessel).

c) Clean-up Costs:

   (i) expenditures on equipment and navy operations at sea.

   (ii) army - biggest supplier of man-power. They were given a small pay increase for the clean up exercises. Generally inexpensive although about 5,000 to 6,000 army personnel were involved for (5) five months.

.../...

(iii) volunteers - few thousand man-days.
About 2,000 to 3,000 turned up mainly during holidays.

d) Cost summary (estimated 1980)

- clean-up	$ 100 - 125	million
- fisheries	" 30	"
- tourism	" 30 - 40	"
- miscellaneous	" 20	"
- dead organisms	" 10	
	" 175 - 225	"

Plus psychic damages (disruption of life style).

N.B. Each of the cost items above can be further broken down.

e) Net effect to Brittany is possible gain. Sell of provisions, accommodation, transportation, booming business and compensation could have led to the possible gain.

f) When a major oil spill does occur the costing picture is not as simple as depicted above. The complexity is due to the following reasons:

- the international nature of the shipping industry.
- the large sums of money involved.
- the number of players of the shipping game.
- the intricate legal issues that arise when an incident occurs (who is to compensate who?)

g) The Amoco Cadiz example involved only one ship but could have involved the following:

Those who control the ship

(i) Flag state

(ii) Owner

(iii) Charterer

.../...

(iv) Operator
(v) Officers and crews

Those who are damaged:

(i) Coastal state(s)
(ii) Vessel owner
(iii) Cargo owner
(iv) Vessel charterer
(v) Cargo consignee
(vi) Vessel operator
(vii) Individuals of the coastal state(s)

Those who attempt to alleviate the damage:

(i) Coastal state(s)
(ii) Salvor(s)
(iii) Contractor
(iv) Individuals of the Coastal state(s)

3.0.0.0: Summary

3.1.0.0: The problem of oil pollution due to sea transport is a universal problem and will remain so, so long as oil is transported by ships.

3.2.0.0: Oil tanker accidents can occur anywhere along the tanker routes. In addition, Operational discharge of oil are almost always taking place at sea while minor accidental oil spills are not uncommon in ports.

3.3.0.0: The behaviour of oil in the marine environment can be predicted when the type of oil, oceanographic, meterological and other factors are known.

3.4.0.0: The effects of a large oil spill can be summarised as biological, ecological, economic and social.

3.5.0.0: Kenya, being a coastal state and operating one of the busiest ports in East Africa faces the risk of a major oil incident.

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C H A P T E R II

MEASURES TAKEN AGAINST OIL POLLUTION

1.0.0.0: APPROACH TO THE MEASURES

1.0.0.1: The effort to minimize oil pollution in the course of transportation of oil by sea has followed a distinct and logical pattern:

(i) Global approach
(ii) Regional arrangement
(iii) National Action

2.0.0.0: Global Approach

2.0.0.1: Shipping is a global industry and therefore, matters appertaining to ship safety and pollution prevention from ships certainly require international acceptance.

Unilateral decisions by any maritime nation will most likely be met with suspicion at best, and strong opposition at the extreme end.

2.0.0.2: Realizing the above problem the United Nations formed the International Maritime Organization (IMO) as a Specialized Agency dedicated exclusively to maritime affairs.

2.0.0.3: Today IMO's acclaimation for universality is justified because it has a membership of over 120 member states.

2.0.0.4: The primary functions of IMO are:

(i) Promotion of maritime safety and efficiency of navigation.
(ii) Prevention and control of marine pollution.
(iii) Facilitation of marine transport.
(iv) Legal matters relating to shipping.
(v) Execution of technical assistance.

2.0.0.5: The outcome of IMO's work should be viewed as a compromise of varying proposals put forth by many maritime nations. The output of IMO's work is in the form of legal instruments, codes, recommendations and resolutions.

2.0.0.6: The conventions and treaty instruments of which IMO exercises function and responsibilities will be discussed

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under the following sub-headings:

- Conventions that prevent pollution from normal shipping operations.
- Conventions that prevent oil pollution from shipping accidents.
- Conventions that minimize damage from shipping accidents.
- Liability and compensation for pollution from shipping.
- Convention which deals with training.

2.1.0.0: Convention Aimed At Preventing Pollution From Normal Shipping Operations

2.1.0.1: The international maritime community identified this source of pollution over two decades ago. In 1954, in London, the International Convention for the Prevention of Pollution of the Sea by Oil (OILPOL 54) was adopted. The main aim of this Convention was to probibit the discharge of oil or oily mixtures within 50 miles of land. By an amendment adopted in 1962 the 50 miles limit was extended to 100 miles in areas regarded as being particularly endangered. Among others the areas were Mediterranean, the Coasts of Australia and Madagascar, the Gulfs and Red Sea.

2.1.0.2: Governments ratifying the OILPOL 54 also undertook to provide reception facilities at ports at which oily mixtures and oil residues could be discharged.

2.1.0.3: The 1969 amendment introduced the load-on-top principle; set a limit to the amount of oil which a tanker may discharge on a ballast voyage to $\frac{1}{15,000}$ of the ship's cargo carrying capacity;

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60 litres per mile travelled was the maximum rate at which oil may be discharged; and tankers were not allowed to discharge oil within 50 miles from the nearest land.

2.1.0.4: The year 1971 brought two further amendments; the first dealt with the size of cargo tanks while the second was designed to provide greater protection to Australia's Great Barrier Reef, an area regarded as very vulnerable to pollution, by extending the prohibited zone.

2.1.0.5: To further strengthen the OILPOL 54 and subsequent amendments, in November 1973 the International Convention for the Prevention of Pollution by Ships (MARPOL 73) was adopted. As far as preventing operational pollution is concerned the following measures apply:

a) For new tankers the maximum quantity of oil which can be discharged was halved from $\frac{1}{15,000}$ to $\frac{1}{30,000}$ of the cargo which the residue formed a part.

b) Designated 'Special Areas' in which international oil discharges are completely prohibited (except where the safety of the ship is at stake) are the Mediterranean, the Baltic Sea, the Black Sea, the Red Sea and the Gulf Area.

c) Tankers must be fitted with oil-discharge monitoring and control equipment to ensure that discharge requirements are not flouted.

d) All ships over 400 tons and tankers over 150 tons must be equipped with oil-water separators.

e) For new tankers of 70,000 dwt. and above to be installed with SEGREGATED BALLAST TANKS (SBT).

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(The reason for this requirement is to eliminate the mixing of oil and water which comes about from the carriage of ballast water. To achieve this sufficient tanks to contain adequate sea water ballast, which must not be used for the transport of oil, must be provided).

2.1.0.6: At the 1978 IMO Conference on Tanker Safety and Pollution Prevention (TSPP), which came into force in May 1981, adopted further measures on tanker safety and pollution prevention which were included in a Protocol to the 1973 MARPOL Convention. In order to expedite entry into force the Protocol absorbed the parent Convention. This combined instrument is usually referred to as MARPOL 73/78 and Some requirements are:

a) SBT is extended to new tankers of 20,000 dwt and above. For ships carrying refined products (such as petrol) the requirement applies to ships of 30,000 dwt. and above.

b) Crude oil washing (Cow) - tank cleaning is to be carried out by spraying cargo tanks with crude oil itself instead of using the sea water. This process avoids the mixture of oil and water.

c) Mandatory provision of reception facilities. These must be installed not later than one year after the entry into force of the Convention, i.e. from 2nd October, 1983.

2.2.0.0: <u>Conventions Aimed At Preventing Oil Pollution From Shipping Accidents</u>

2.2.0.1: In chapter one it has been shown that many accidents occur to ships every year. IMO has pledged to minimize the rate of accidents to all ships. Two Conventions are intended to achieve this objective;

.../...

The International Convention For The Safety Of Life At Sea (SOLAS) and The International Regulations for The Prevention Of Collisions At Sea (LL).

2.2.0.2: The International Regulations for the Prevention Of Collisions at Sea (1960) entered into force in 1965. It set out rules for avoiding circumstances that may likely cause accidents to ships. In addition, the Convention has a provision urging the establishment of voluntary traffic separation schemes. The 1972 amendments which entered into force in 1977 made the establishment of traffic separation schemes obligatory. Many other improvements on previous standards which, on the main, were designed for ships of about the same size and manoeuvring capability were effected. For ships such as large oil tankers there are special requirements.

2.2.0.3: The International Convention for the Safety of Life at Sea (SOLAS) was adopted by IMO in 1960. It entered into force on 26th May 1965 and thereafter it was amended several times; in 1966, 1967, 1968, 1969, 1971 and 1973. The basic tenets of this convention were: Construction, equipment safety and operation standards.

2.2.0.4: SOLAS 60 was superseded by SOLAS 74 which entered into force on 25 May 1980. The technical requirements were made more rigid especially those on structure and equipment of ships. A supplementary protocol to SOLAS 74 was adopted by the already mentioned 1978 TSPP. The protocol demands special navigational equipment e.g. radar and collision Avoidance Aids. All ships between 1,600 and 10,000 grt. should be fitted with radar while all ships of 10,000 grt. and above must have two radars, each capable of operating independently of the other. All new crude oil carriers and product carriers of 20,000 dwt. and above must be fitted with an inert gas system (IGS).

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So must all tankers operating with crude oil washing system (COW). On tankers of 10,000 grt and above steering gear control systems must be duplicated.

2.3.0.0: Conventions Aimed At Minimizing Pollution Damage From Shipping Accidents

2.3.0.1: The International Convention Relating to Intervention On the High Seas In Cases Of Oil Pollution Casualties (Intervention 1969) entered into force in May 1975.

2.3.0.2: By this convention, coastal states, which are faced with imminent danger to their coastline or interests from pollution or threats of pollution of the sea by oil following upon a maritime casualty, have the right to take such action on the high seas as may be reasonably necessary to avert or mitigate the danger. However, the right to intervene is subject to certain conditions. Hitherto, governments were unable to take action when the threat occured outside their territorial waters.

2.3.0.3: The 1973 Protocol Relating to Intervention On The High Seas in Cases of Marine Pollution by Substances other than Oil, which entered into force on 30th March 1983, is an extension of the Intervention 69.

2.3.0.4: Measures adopted by IMO aimed at reducing the consequences of pollution following an accident are also found in several conventions.

2.3.0.5: In the 1971 amendments to the 1954 Oil Pollution Convention a limit to the size of tanks which can be installed on oil tankers was set. By reducing the tanks sizes (the maximum size is 40,000 cubic metres) the amount of oil which can escape into the sea in case of damage to the tank is reduced. These requirements are included in MARPOL 73/78.

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2.3.0.6: The sub-division and stability requirements of MARPOL 73/78 are intended to ensure that, in any loading conditions, the ship can survive after being involved in a collision or stranding.

2.3.0.7: The 1978 TSPP introduced a further concept, the PROTECTIVE LOCATION of segregated ballast tanks. What this means is that the ballast tanks are positioned where the impact of a collision or grounding is likely to be greatest. Thus, the amount of cargo spilled after such an accident will be greatly reduced.

2.4.0.0: Convention Relating to Liability and Compensation for Pollution from Ships

2.4.0.1: The purpose of the International Convention on Civil Liability for Oil Pollution Damage (Civil Liability Convention, CLC), which was adopted at a Diplomatic Conference in Brussels in November 1969 convened by IMO, is to put the onus of paying compensation on the shipowner. This measure is to ensure that adequate compensation is paid to those who suffer oil pollution damage.

2.4.0.2: The CLC which entered into force in 1975, set up the regime of a tanker owner's strict liability for pollution damage, his entitlement to limit his liability and compulsory insurance.

2.4.0.3: With regard to pollution damage, CLC applies to damage suffered in the territory (including territorial sea) of a Contracting State. The only criterion for compensation is whether or not pollution damage is suffered within the territory of a Contracting State.

2.4.0.4: CLC does not apply to "pure threat removal measures", that is, when a successful preventive measures results in no actual spill of oil from a tanker.

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2.4.0.5: A supplementary convention to CLC, the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention, FC) was adopted by a Diplomatic Conference in Brussels in 1971. The main functions of the FC are to provide additional compensation (beyond the US$14.6 million payable under the CLC up to US$47 million) for those who cannot get full and adequate compensation for pollution damage, and also to idemnify the owner for a portion of his liability under the CLC.

2.4.0.6: Only those states who have become Contracting States of the CLC can become members of the FC.

2.4.0.7: This compensation scheme has been overtaken by events e.g. inflation and it is being reviewed.

2.5.0.0: Training

2.5.0.1: The International Convention On Standards of Training, Certification and Watchkeeping for Seafarers (STCW) of 1978 is one of the most remarkable measures achieved in the maritime field in recent years. The STCW convention, for the first time establishes global minimum professional standards for seafarers. It entered into force on 28 April 1984.

2.5.0.2: The control provisions in the convention empowers ports state officers to verify seafarer's professional certificates and may detain a ship when deficiencies are discovered and danger is posed to persons, property and/or environment. The deficiencies specifically relate:

a) to the certificates of the master, Chief Engineer and all officers in-charge of navigational and engineering watches, and to radio officers where applicable, and
b) to the failure of navigational or engineering watch arrangements.

.../...

2.5.0.3: The control provisions apply to ships of flags to the extent necessary to ensure that no more favourable treatment is given to ships entitled to fly the flag of a state which is not a party than is given to ships of states which are parties.

2.5.0.4: The STCW is not a manning document i.e. it does not prescribe the number of crews to be assigned to ship type and ship size. Its objective is to raise the professional standards of the crews which man ships. Thus the convention prescribes minimum standards which countries are obliged to meet or exceed. Previously the standards of training, certification and watchkeeping of officers and ratings were established by individual governments. In consequence standards and procedures varied considerably from one nation to another. Now that the convention is in force the standards are expected to be fairly high especially in those countries where hitherto have been lower.

2.5.0.5: Chapter V of the STCW ensures that officers and ratings with duties related to the cargo and cargo equipment of tankers shall have completed an appropriate period of shipboard service or an approved familiarization course and that key personnel shall have completed a specialised training program.

2.6.0.0: Criticisms On The International Measures

2.6.0.1: Despite all IMO's efforts over the last 26 years the accident rate still remains quite high. The mass of international shipping regulations, it has been argued, are proving ineffective in the fight to improve maritime safety standards and prevention and control of marine pollution. The increasing number of conventions, the constant revision of the existing ones and the frequent adoption of heaps of Recommendations and Resolutions together appear to be counter-productive. It is not easy to keep abreast with such developments and training and retraining is required of those in the shipping industry at a substantial cost. In addition, Maritime Administrations need time to formulate national regulations for effective implementation.

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2.6.0.2: No wonder then that the Assembly of IMO came up with the Resolution A. 500 (xii) in 1979. By this Resolution the Assembly requested the bodies of IMO to ensure that proposals for new conventions or amendments to existing conventions are to be entertained only on the basis of clear and well-documented demonstration of compelling need.

2.6.0.3: Regulations are formulated long after nasty incidents have happened. The SOLAS Convention came to being after the TITANIC disaster of 1912 had claimed over 1,000 lives; the TORREY CANYON incident of 1967 brought about the compensation schemes aimed at compensating victims of oil pollution; the Torremolinos International Convention for Safety of Fishing Vessels, 1977, had its birth after many fishermen had lost their precious lives.

2.6.0.4: That some international maritime regulations have been formulated as a result of some events may imply that the same lack in timeliness. As an emphasis to this point, it is noteworthy to observe that the average time between the adoption and the entry into force of a convention has been quite long, about 10 years.

2.6.0.5: Shipowners are not all the same in many respects; some are small with small management teams and small shipboard personnel. To this category of shipowners, generally, international conventions are complex and difficult to assimilate and very costly to implement. (Not to be forgotten is that it takes experts of international stature many years to produce a single convention). To the experts, implementation costs are subsidiary to technical details and this, sometime, has been a source of disagreements between experts and shipowners at international fora.

2.6.0.6: Merchant ships are intended to serve profitably the international commerce. In the struggle for survival in business, among other things, shipowners strive to service new markets or combine existing ones so as to gain operational economies.

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To attain this objective new ship types are ordered. Sometime fault design and/or construction cause tragic incidents. ALEXANDER L. KIELLAND a Norwegian hotel platform capsized after losing only one of its five legs, causing several deaths. Technical error in this classic case, was the cause. After careful investigations of this case technical, legislative and administrative changes were later made.

2.6.0.7: From the shipowners view point compliance with international regulations has its own draw-backs. First, compliance does not automatically produce the anticipated degree of safety; the most recent MONTLOUIS incident is a case in point. In the second place, is the doubt whether or not the marginal improvements made to ship arising from Amendments and Resolutions justify the installation costs.

2.6.0.8: Just to give an idea of the costs involved to upgrade an oil tanker of 100,000 dwt it costs about 1.6 million US dollars to install Cow and Inert Gas System. If a shipowner has four tankers it will cost him 6.4 million US dollars. Meanwhile, as Professor Gunnar Stubberud in one of his lecture notes aptly put it: "While the transport costs in the fifties were approximately 75% of the oil price, in 1980 the cost was down to approximately 3% of the oil price". The oil tanker owner feels frustrated because he is being paid less to develop better ships, keep transport costs down and for keeping the marine environment free from vessel source oil pollution.

2.6.0.9: Not all Regulations eminating from IMO are flawless. In actual fact the Regulations are a compromise of various divergent views. Also it has been observed that many delegates to the IMO Conferences are not the people familiar with detailed practical problems and accumulated technical experience. Whereas some are ministry officials others are London based embassy workers. Such are the circumstances which can lead to taking wrong decisions of practical nature. One quite recent case is the decision taken at the 1978 TSPP Conference to extend the requirements for inert gas systems to all new tankers over 20,000 dwt and all tankers where Cow is fitted. The 1974 SOLAS Convention for the same were limited to new oil tankers over 100,000 dwt and new combination carriers over 50,000 dwt.

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Inevitably the new (1978 TSPP) requirements included chemical tankers. And this is where the problem lies. The normal practice is that after a type of chemical has been discharged from respective cargo tanks each of the tanks has to be thoroughly and manually cleaned to avoid contamination of the next cargo to be loaded. Before anyone enters into an empty tank to clean it, without putting life in jeopardy, inert gas has to be completely ventilated out. Many a crew have lost their lives whilst inside tanks through inihilation of inert gas which is not always easy to free from a tank.

2.6.1.0: Lastly there is the criticism placed on MARPOL 73/78. The Convention is viewed to have shifted the problem of pollution by ship from sea to land and thereby aggrevating the pollution problem on land. The problem of pollution from ships should be tackled from the source by the adoption of pollution efficient technology.

3.0.0.0: REGIONAL APPROACH

3.1.0.0: Much as the regional approach to marine pollution control (oil pollution inclusive) has to a large extent developed within the framework of the United Nations System, alot has been achieved outside it.

3.1.1.0: In the decade since the United Nations Conference on the Human Environment (Stockholm 5 - 16th June, 1972), United Nations Environment Programme (UNEP) has made its Regional Seas Programme an indispensible part of the international scene. UNEP has stimulated the adoption of regional conventions by participating governments designed to protect shared environmental interests. Its monitoring and assess-ment programmes have provided a scientific basis for determination of regional priorities and policies.

3.1.2.0: The fate of the Regional Seas Programme rests ultimately in the hands of governments. UNEP can co-ordinate activities but it is up to governments to honour their pledges to one another. It should be stressed here that the regional approach to marine pollution control regulation is not an alternative but does supplement global actions and widens national efforts.

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3.1.3.0: Recommendation 92 of the Stockholm Conference urges governments to take "effective national measures for the control of all significant sources of marine pollution ..."

3.1.4.0: For each region UNEP has adopted a similar strategy aimed at tackling the causes as well as the consequences of environmental damage in coastal areas. Included in this strategy are:

(i) an action plan setting out activities for scientific research and co-operation, including assessment and management;

(ii) a legally binding convention embodying general commitments;

(iii) technical and specific protocols to deal with individual issues such as dumping, co-operation in pollution emergencies etc.

(iv) financial and institutional arrangements that provide the back-up for the above (i - iii);

4.0.0.0: Reason For Regional Conventions

In part, the main reason for regional conventions is that many global arrangements offer broad guidlines which dont take into account some regional peculiarities. Due to regional interest diversities the same convention may prove more efficient in one region and less efficient in another at the implementation stage. Hence, the over-riding feature of any regional convention is its uniqueness in devicing a suitable formula that takes into consideration all prevailing circumstances in that region.

Article 15 of the Draft Convention For the Protection of the Marine and Coastal Environment Of the East African Region States that "Contracting Parties shall cooperate in the formulation and adoption of appropriate rules and procedures for the determination of liability and the payment of adequate and prompt compensation for damage resulting from pollution of the Convention area". This is an example of the willingness of Mozambique, Comoros, Madagascar, Mauritius, Seychelles, Kenya and the United Republic of Tanzania to fight the problem of marine pollution in all its manifestations.

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4.3.0.0: Other good reasons for regional treaties include:

a) exchange of information among contracting parties which is often obligatory.

b) provision of conciliation or arbitration machinery.

5.0.0.0: Recommendations On Joint Implementation Of IMO And ILO Conventions In East African Region

After the two documents, the Draft Convention for the Protection and Management of the Marine and Coastal Environment of the East African Region and the Preliminary Draft Protocol concerning Co-operation In Combating Marine Pollution Incidents In the East African Region, have been finalised and signed it is recommended that another agreement concerning Port State Control should be formulated. Both the above cited drafts, it is noted, are not elaborate in this subject while most of the International Conventions call for port state control.

6.0.0.0: Reasons for Coordinated Port State Control

6.1.0.0: If Port State Control is done uncoordinated within a region:

a) Substandard ships will threaten the ports and marine environment of the region as safety standards will not increase much

b) Unfair competition between ports carrying out proper port state control and those states which either do nothing at all or do so laxily.

c) Unfair economic competition will develop between shipowners who comply with the costly international requirements and shipowners who don't. A practical example is that the shipowner who does not adopt his ship to the MARPOL 73/78 requirement has 30% more cargo carrying capacity.

d) The maritime authorities carrying out port state control will spend more money to pay a bigger team of surveyors than the authority employing one or two surveyors.

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6.1.1.0: Arising from the above, the following recommendations are put forth:

a) In the East African Region there should be an effective co-ordinated and harmonised system of port state control.

b) A formular must be worked out to assign every member state the duty to annually inspect an estimated number of individual foreign flag merchant ships which enter their respective ports.

c) a & b demand that all the concerned East African states be parties to the relevant conventions.

d) Inspections are to be done without discrimination to any flag by qualified persons.

e) An efficient information system to be developed to facilitate ship inspection.

f) Periodical seminars for the surveyors to exchange their experiences and to be up-dated on any new developments.

7.0.0.0: S U M M A R Y

7.1.0.0: Pollution from ships is a problem which has attracted public attention world over. One way to tackle this problem has been the adoption of legal instruments both at international and regional levels. IMO involment has been very significant in the evolution of most of the conventions.

7.1.1.0: Those affected by anti-marine pollution measures are shipowners, seafarers, governments and the shipping community in general.

7.1.2.0: On the whole, the world is witnessing a reduction of marine pollution by ships - more so in countries where port state control is effectively observed.

C H A P T E R I I I

IMPLEMENTATION OF AN INTERNATIONAL CONVENTION (MARPOL 73/78)

1.0.0.0: NEED TO IMPLEMENT

1.1.0.0: To enable the country participate fully and unhindered in the international industry - shipping.

1.2.0.0: To foster national economic and social objectives.

1.3.0.0: To broadly serve national interests.

2.0.0.0: THE IMPLEMENTATION PROCESS

2.1.0.0: Preparatory Stage

2.1.1.0: Implementation of an international convention can be meaningful and acceptable only if the convention is in conformity with a country's national objectives and constitution. The only way to ensure such marriage is by exerting influence on the fathers of a convention i.e. by participating in the birth of a convention.

2.1.2.0: Kenya, like many developing countries, finds it extremely difficult to fully participate in the deliberations which culminate in conventions. Ideally, the best way would be to have representation in all committees, sub-committees and other working groups of the International Maritime Organization.

2.1.3.0: Qualified and experienced manpower shortage and the cost of sending representatives to London are both prohibitive. These two problems are 'overcome' by making use of London based embassy officials who become jacks of all trades by attending meetings of varying subjects. Heads of delegations from developed countries at IMO sessions are experienced experts in their respective fields while those from developing world are generally inexperienced under-secretaries from ministries of transport.

2.1.4.0: The participants at IMO meetings/sessions must have thorough understanding of their national maritime policies. There should not be any descripancy between law and policy. Lawyers and policy makers have to co-ordinate their work to avoid inconsistence between them. In practice, all concerned ministries, industry, trade unions, politicians, the public etc. have to make their views known to the maritime administration through a consultative machinery.

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2.1.5.0: The subject of a would-be convention should dictate the composition of government delegation to IMO meeting, etc. Generally, a minimum delegation should include the following:

2.1.5.1: - Policy maker

2.1.5.2: - Lawyer - familiar with maritime law

2.1.5.3: - Industry representative, preferably with technical background

2.2.0.0: Second Stage-Before Ratification

2.2.1.0: Evaluation of the impact of convention on the status and development of;

2.2.1.1: National law

2.2.1.2: National fleet, if any

2.2.1.3: Organizational status

2.2.1.4: Industry and trade

2.2.1.5: Administrative set-up

2.2.1.6: General economic consequences

2.2.1.7: Technical status

2.2.2.0: The reason for 2.2.1.0 is because Conventions differ in their objectives and affect shipowners, crew-members, port authorities, government agencies, etc. in different ways.

2.2.3.0: Most conventions have phrases which are rather vague and need interpretation. Examples are:

2.2.3.1: "to the satisfaction of the administration"

2.2.3.2: "of an approved type"

2.2.3.3: "equivalance"

2.2.3.4: "means shall be provided for ..."

The above analysis, when thoroughly conducted should assist parliament to decide for ratification of convention or otherwise.

2.3.0.0: Ratification Stage

2.3.1.0: Ratification without legislation is an empty political gesture not very useful for a country. To illustrate this point in detail and in a more practical manner, the International Convention for the Prevention of Pollution from Ships, 1973 and the Protocol of 1978 related to (MARPOL 73/78) shall be used.

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2.3.2.0: Before ratification, or simultaneously, a number of things need to be done, O. a:

2.3.2.1: Good national legislation on the subject is necessary. In Kenya, as stated elsewhere, there is little legislation on Oil Pollution prevention, therefore, in the course of implementing MARPOL 73/78 preparation of a new and separate bill seem the best choice. Prevention of Pollution from ships Act is therefore proposed. See Annex I.

2.3.2.2: Ships have to be upgraded to meet MARPOL 73/78 requirements. For the time being this is an important issue because Kenya is considering to have her own merchant marine.

2.3.2.3: Crew training and or retraining.

2.3.2.4: Provide shore reception facilities.

2.3.2.5: A permanent body to see that all the above is done. To this end it is suggested that the Merchant Shipping Office at Mombasa be staffed with surveyors and related personnel to do the work. Exclusive reliance on classification society surveyors, for instance, may prove too costly in the long run.

2.4.0.0: An Example Of How To Go About Drafting A Bill Encompassing MARPOL 73/78 Requirements

2.4.1.0: Chapter one: DEFINITION of terms used in the text such as 'convention', 'ship', foreign ship', 'harmful substance', 'discharge', 'incident' etc. is essential.

2.4.2.0: Chapter two: APPLICATION (and exceptions e.g. warships and other ship categories) should be precisely stated and worded.

2.4.3.0: Chapter three:

2.4.3.1: Section I: Discharge conditions (close reference may be made to the text).

2.4.3.2: Section 2: Provision of reception facilities and usage of the same (Refer the discussion under 2.6.0.0. of this chapter). The act to designate the officer to be responsible for the provision of adequate reception facilities. Such an officer in the Kenyan context can as well be the Merchant Shipping Superintendent.

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2.4.3.3: Section 3: Certificates: Conditions of issuance, validity, format, application for the same, authorities responsible, who to meet the administration costs; all these have to be specified.

2.4.3.4: Section 4: Captain's obligations; his duties and responsibilities have to be enumerated.

2.4.3.5: Section 5: Reporting; in the event of a marine casualty there should be an elaborate reporting procedure.

2.4.4.0: Chapter four: ENFORCEMENT - To be included are:

2.4.4.1: Officials to conduct shipping inspections/investigations on board.

2.4.4.2: The criminal procedure code to apply mutatis mutandis to the referred officials.

2.4.4.3: Officials to have access to all parts of the ship while within Kenyan waters.

2.4.4.4: Vesting detention of ships upon the shipping inspectorate. Detention conditions to be specified clearly.

2.4.5.0: Chapter five:

2.4.5.1: Appeals: Procedure

2.4.5.2: Investigation of incidents: Who should do it?

2.4.6.0: Chapter six:

2.4.6.1: Penalties - should be as high as to discourage the would-be offenders.

2.4.6.2: Security.

2.4.7.0: The above legal frame-work incorporating MARPOL 73/78 should enable lower regulatory bodies like Kenya Ports Authority and The Merchant Shippin Superintendent to issue detailed subsidiary regulations, especially those of technical nature.
The above sketch is one way of fitting in an international convention into national law.

2.5.0.0: EXPLANATORY NOTE

2.5.1.0: In almost every case a bill to parliament has to be accompanied by an explanatory note which gives details - economic, political and social consequences for becoming a party to a convention. To note here is that the total input that forms an explanatory note entails alot of costly research work.

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2.6.0.0: ACTUAL IMPLEMENTATION AFTER RATIFICATION AND ITS COMPLEXITIES

(Provision of reception facilities is considered in some details to form an impression of what could be involved)

2.6.1.0: Provision Of Shore-Based Reception Facilities At Mombasa Port

2.6.1.1: The Port of Mombasa, like any sizeable port in the world, is under increasing pressure to serve two masters, viz:

(i) Shipping

(ii) Environment protection (the problem is not merely the reception of waste but storage and treatment of the same).

2.6.1.2: Presently the available reception facilities in Kenya are not adequate but negotiations between Kenya Ports Authority and oil companies to provide same are under way.

2.6.2.0: Why Shore Based Reception Facilities?

2.6.2.1: On board ships space is limited and while at ports ship's time is very restricted. At the same time cleaning of cargo tanks to change cargo, cleaning of fuel tanks and engine-room spaces due to maintenance, each of which generates liquid waste, is essential. Consequently, a series of activities is triggered off; the liquid waste is first given storage on board, then discharged to a reception, given storage ashore and processed. Wastes harmful to the environment should undergo incineration. Essential in this chain of activities is that each activity is undertaken by different people.

2.6.2.2: The degree of consciousness of environmental protection vary from a people to others. For this reason the provision of shore facilities must go hand in hand with change in attitude of those engaged in the 'cleaning chain'.

2.6.3.0: Organizational Problem

2.6.3.1: The organizations involved in the cleaning chain are many with varying interests, they are:

(i) Ships

(ii) Kenya Ports Authority

(iii) Agents

(iv) Refinery

(v) Chemical Industries

.../...

2.6.3.2: Each of them solves its problems in its own suitable way. Co-ordination among them is essential because conflicting approaches to solutions are bound to arise.

2.6.4.0: What Size The Reception Facilities And Waste Processing Plants Should Be?

2.6.4.1: The number and size of crude oil tankers and product carriers calling at Mombasa port give an indication of the size of facilities required. Difficult as it is to quantify in exact terms how much waste flow is generated, ships can only comply with MARPOL 73/78 discharge criteria if reception facilities are available in adequate capacity.

2.6.5.0: Costs

2.6.5.1: There are capital, running and improvement costs to be shouldered Normally, in business the revenues generated, at-least in the long run, must cover capital and running costs and also allow for a profit margin. This profit motive approach has to be pursued with care due to the competitiveness of the shipping industry. A port charging a high rate for the reception of oil wastes may divert ships to neighbouring ports.

2.6.5.2: Some of the visited ports in Europe have solved the problem by:

(i) Including the 'waste fee' in the port dues for all tankers.

(ii) The oil extracted from oil residues is sold to refineries.

(iii) Some oil companies provide reception facilities to their ships.

(iv) The costs of receiving, storing and processing the residues of harmful substances is directly recovered from those discharging such waste.

2.7.0.0: Courts

2.7.1.0: After all the above have been said and done, courts have to be conversant with this particular area of maritime law so as to be able to discharge their duties in accordance with the objective of the international convention(s).

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2.8.0.0: POSSIBLE CONSEQUENCIES OF NON-IMPLEMENTATION AND ENFORCEMENT OF INTERNATIONAL CONVENTIONS

2.8.1.0: When shipowners and operators come to know that in Kenya there is no regard for international regulations and that no inspections to ships are carried out, there is high likelihood that only the old and substandard ships will be routed to this country.

2.8.2.0: If the above happens, the economic implications in Kenya's disfavour are enormous. Experience so far shows that in America where the coast guard are famous for their strictness in the manner they conduct shipping inspections, the most modern ships call there. The fourteen West European countries bound by the Memorandum Of Understanding (MOU), which calls for uniform shipping inspections, have been observing the disappearance of old vessels from their ports.

2.8.3.0: It is thought that the old and substandard ships which cannot be allowed to operate in the United States of America and Western Europe end-up trading in developing countries.

2.9.0.0: IMPLEMENTATION OF INTERNATIONAL CONVENTIONS REQUIRES A SOUND MARITIME ADMINISTRATION

2.9.1.0: A sound Maritime Administration for the purpose of:

2.9.1.1: Providing government with the machinery to enable it to effectively perform the duties and functions specified by the national law e.g. the Kenya Merchant Shipping Act;

2.9.1.2: Formulating policies which are in line with the global maritime developments for government approval;

2.9.1.3: Serving as a link between the country and other maritime nations of the world.

2.9.1.4: Avoiding unrealistic, ad-hoc and upharzard implementation of international regulations.

2.9.2.0: Appropriate environment necessary for Maritime Administration should have, among other things:-

2.9.2.1: Clearly defined maritime policy;

2.9.2.2: Legal foundation for all maritime activities. Apart from the Merchant Shipping Act, for instance, other legislations like Sea Transport Act and Seaworthiness Act may be essential.

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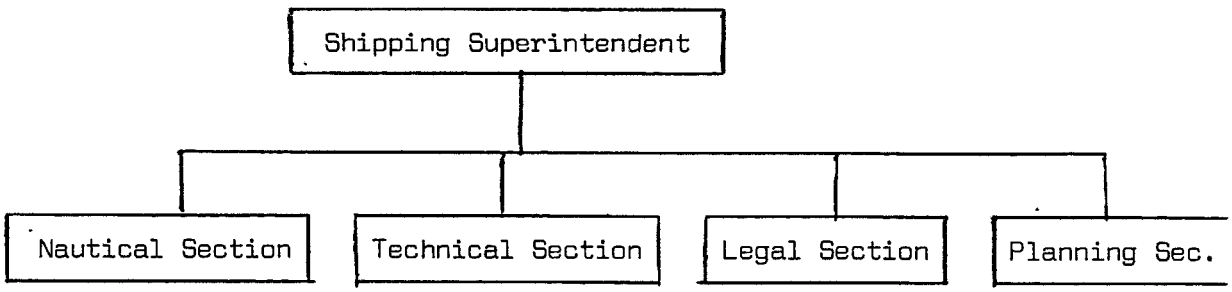
2.9.2.3: The functions of the maritime administration need to be defined.

2.9.3.0: Proposed Structure For The Kenya Maritime Administration



Structure of the nucleus Maritime Administration

2.9.3.1: Within the Kenya Ministry of Transport and Communication, there should be a full fledged maritime affairs section manned with people with the following backgrounds:

(i) Shipping economics
(ii) Maritime law
(iii) Nautical background
(iv) Marine Engineering

2.9.3.2: The major function of this section should be that of co-ordinating the ministries activities with those of other government bodies and agencies. . The present practice of transfering government officers from one ministry to another should highly be discouraged for personnel working in this infant section to let them accumulate experience and ensure continuity of service.

2.9.3.3: The number of staff in the above proposed structure of the nucleus maritime administration should be according to need. Sub-sections can also be created, again, according to need.

3.0.0.0: S U M M A R Y

3.1.0.0: Implementation of international conventions is a must to any maritime nation.

3.2.0.0: Joining IMO is the first step towards the right direction but participation, at meetings/sessions, ratification of conventions and actual fulfilling the requirements of conventions must also follow in that order.

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3.3.0.0: To face and cope up with the challenging problems of implementation is the maritime administration, a government organ which will enhance government maritime policy and give a feedback to the government on the views and expectations of the industry.

3.4.0.0: All having been said and done the government itself has the final say on the matter and at the same time it bears the responsibility for its actions at international settings.

C H A P T E R I V

OIL SPILL CONTINGENCY PLANNING IN KENYA:

A COMPARATIVE ANALYSIS

1.0.0.0: INTRODUCTION

1.1.0.0: This chapter is intended to examine and analyse the above subject with the view to suggesting areas of improvement. To achieve this objective in wider perspective a comparison of three contingency plans will be made; that of Sweden, Norway and Kenya. It is hoped that the analysis will help narrow the gap between the intended purpose of the oil spill contingency arrangement and the actual performance when a considerable oil spill does occur in Kenya.

2.0.0.0: DEFINITION

2.1.0.0: Oil Spill Contingency Planning can be defined as a deliberately planned and co-ordinated state of preparedness designed to provide a timely and adequate response to pollution incidents so as to minimize pollution damage to a marine environment.

3.0.0.0: BASIC TENETS OF AN OIL SPILL CONTINGENCY PLANNING

3.1.0.0: The research for this chapter was very much influenced by a paper entitled OIL SPILL CONTINGENCY PLANNING which was presented at a Nairobi Seminar On Tanker Safety And Pollution Prevention in February 1981 by J. N. Archer, Managing Director of the International Tanker Owners Pollution Federation Limited. According to the paper the basic tenets of an oil spill contingency plan are:

3.1.1.0: Good organization

3.1.2.0: Speedy and accurate assessment of an oil spill incident and rapid response capability are essential.

3.1.3.0: Trained personnel who are readily available.

3.1.4.0: Planning

3.2.0.0: PRE-REQUISITES TO THE BASIC TENETS

3.2.1.0: National Policy

3.2.1.1: A clear government policy aimed at keeping a country free from all forms of pollution, let alone marine pollution is essential.

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All the three countries under discussion have such a policy, at least their respective ministries of environment so suggest. Policy declaration, however, in itself is not enough.

3.2.2.0: Legal Base

3.2.2.1: A legal base is the first step in the process of translating the policy to reality. There are three reasons for this indispensable step, viz:

a) to define the objective, the extent and limits within which the regulations shall apply;
b) to vest authority and responsibilities upon persons and bodies so as to ease implementation work;
c) to define clearly the sanctions to discourage the would be culprits;

3.2.2.2: In Norway the Oil Pollution Act (as revised in 1976 and 1982) was passed in 1970 and the law is quite clear on the three points- a - c above. The law in Kenya is not very direct as it is out-dated. The penal Code and the Public Health Act prohibit any activities the outcome of which may be termed as public nuisance. The Merchant Shipping Act (As Revised in 1968) part IX Section 309 deals with "Pollution of Sea" and states: "(1) if any oil or oily mixture is discharged from (a) any ship into a harbour or into the sea within 100 miles from the Coast of Kenya; or (b) any Kenya ship into the sea within 100 miles of any land, the owner or master of the ship shall be guilty of an offence and liable to a fine not exceeding ten thousand shillings".

3.2.2.3: The Kenya Merchant Shipping Act is an enabling act, Part X Section 313 says: "For the better execution of certain provisions of this Act the Minister may delegate his powers ..."

3.3.0.0: ORGANIZATION

3.3.1.0: To control clean-up efforts and at the same time to co-ordinate various interests when an oil spill does occur an efficient organization is required. When a shipping casualty takes place a compound of emergencies may need to be attended to simultaneously, for example putting out a fire, salvaging a sinking ship, saving life trapped in the inferno. In such circumstance many agencies are involved and the pollution prevention team is only one of them. The effectiveness of an organization during such a trial moment will depend on how simple it is structurally.

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3.3.2.0: The national responsibility for combating oil spills and other harmful substances in Sweden is vested in the Coast Guard (CG). It is organized as follows: At the Apex there is the Coast Guard Headquarters headed by a Commodore based in Stockholm, the capital city. Four Regional Coast Guard Commanders form the second tier. The third rank, the District CG Stations have Local bases under them. The Commodore is entitled to call up or contract without delay ANY resource needed for combating spills of oil or other harmful substances at sea.

3.3.3.0: The organization in Kenya is relatively complicated. First there is the Environment Secretariat which concerns itself with pollution in general. Then there is the NATIONAL MARINE ANTI-POLLUTION COMMITTEE which was formed in 1977 and is composed as follows:

3.3.3.1: Chairman - who is the Director of National Environment Secretariat and he is based in Nairobi.

3.3.3.2: Vice Chairman - is the Deputy Secretary, Ministry Of Transport and Communication - based in Nairobi

3.3.3.3: Secretary - Harbour Master, Kenya Ports Authority - based in Mombasa.

3.3.4.0: Members

- The Provincial Commissioner Coast Province - based in Mombasa
- Navy Commander - based in Mombasa.
- Kenya Police Airwing - based in Nairobi
- Assistant Director Ministry of Environment and Natural Resources (Fisheries) - based in Mombasa.
- From Ministry of Foreign Affairs - based in Nairobi
- From Ministry of Water Development - based in Nairobi
- Merchant Shipping Superintendent - based in Mombasa
- From Kenya Fisheries Research Laboratory
- From Kenya Oil Refineries - based in Mombasa
- From Mobil Oil (K) Ltd., for Oil Marketing Companies - based in Nairobi
- Hotel Keepers Association

3.3.4.1: The functions of the Committee are:

- To develop marine anti-pollution capabilities
- To review improved technology
- To advise on the acquisition of equipment
- To advise the Shipping Industry on implementation of related conventions, etc.

.../...

- To stimulate co-operation and co-ordination for the protection of the Marine environment

3.3.4.2: There is also a COMMITTEE ON OIL POLLUTION CONTROL which consists of Kenya Ports Authority officials and representatives of each Oil Company and its main task is:

- To implement recommendations made by the National Committee
- To find ways and means to minimize marine pollution especially in the port area
- To recommend the equipment needed
- To establish dispersant stock
- To decide on the locations of equipment and dispersants
- To discuss pollution reports and make recommendations for further action
- To discuss disposal of oil recovered from sea

3.3.4.3: To be posed here are two questions: Who deals with a major oil spill in Kenya? And how are the various activities co-ordinated?

3.3.4.4: The Chairman of the National Marine Anti-Pollution Committee who is also the director of the National Environment Secretariat is, too, the National Oil Pollution Executive (N.O.P.E.). He is the person entrusted with the responsibility of co-ordinating all oil spill prevention and control activities throughout the country. The headquarters of the National Oil Pollution Control Centre is based in Nairobi, a distance of 300 miles from Mombasa. In the event of a large spill the Control Centre, it is maintained, will be transferred to Mombasa.

3.3.4.5: Under the National Oil Pollution Executive there is the Marine Pollution Control Officer (M.P.C.O), a marine engineer, who is a Kenya Ports Authority Employee. Among others, the duties of this officer are to administer the provision, custody, maintenance and availability of all clean up equipment. In an emergency, to be responsible of all personnel involved in anti-pollution activities. In the event of an incident occuring outside the Mombasa Area, M.P.C.O. will establish an "On Scene" Headquarters which will be situated strategically to provide immediate control of the clean-up operation.

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In the event of a small spill he will take over the administration of the Control officer at the Port. But when he is required for "On Scene" duties he will hand over the control office to Port Marine Officer.

3.3.4.6: Port Marine Officer (PMO) is to take over control of the Control Office at the Port in the event of large spills. He is supposed to co-ordinate all anti-pollution services and "clean up" requirements to provide a back-up for the "On Scene" controller.

3.3.4.7: To actually combat pollution the above mentioned administrators depend on two oil combating schemes: One is specifically for the Mombasa harbour area called the KILINDINI OIL SPILL CONTINGENCY PLAN. The other, the KENYA COAST OIL SPILL CONTINGENCY PLAN is to cover the entire Kenya Coast.

3.3.5.0: THE KILINDINI OIL SPILL CONTINGENCY PLAN

3.3.5.1: At the Mombasa harbour the most vulnerable areas to oil spills have been identified; these are the Kipevu Oil Terminal and the Shimanzi Oil Terminal. For instant combating, some equipment is stored close to each of these two areas.

3.3.5.2: There are also detailed plans to the use of equipment. Small spills in the rest of the port area are to be dealt with on routine basis as and when they occur.

3.3.6.0: THE KENYA COAST OIL SPILL CONTINGENCY PLAN

3.3.6.1: This plan identifies three levels of pollution to fight against:

(i) Chronic pollution
(ii) Small spills
(iii) Large spills

3.3.6.2: By "chronic pollution" the plan means tarry lumps found on coastal beaches while "small spill" is any amount of oil spilled into the sea less than 50 tonnes. Any spills over 50 tonnes are regarded as "large spills". The plan further states that large spills will be controlled in the following manner:

(i) aircraft will be used to carry out survey flights and monitor the progress of the slick.
(ii) dispersants will be sprayed from aircraft or tugs.

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(iii) booms will be deployed and activated.

(iv) assistance from TOVALOP will be requested if required.

3.3.7.0: THE NORWEGIAN CONTINGENCY PLAN

3.3.7.1: The Norwegian arrangement is similar to that of Kenya. As from 1975 the administrative responsibility for the Oil Pollution Control emergency services came under the Ministry of Environment. Under the general supervision of this Ministry, there are two bodies which are concerned with pollution. First there is the STATE POLLUTION CONTROL AUTHORITY (SPCA) which has an Oil Pollution Department.

3.3.7.2: The SPCA is responsible for ensuring that the necessary action is taken, and has the right to issue instructions in pursuance of the legislation relating to the continental shelf, the Pollution Control Act and the Intervention Convention, with regard to:

a) Limiting
b) Collecting and
c) Removing oil pollution

Furthermore the SPCA functions as the secretariat for the Government Action Control Group (GACG) which is the second body.

3.3.7.3: The GACG is comprised of representatives from:

- The State Pollution Authority (Chairman).
- The Petroleum Directorate
- The Maritime Directorate
- The Chief of Police in Stavanger
- The Defence force

3.3.7.4: In case of an accident which cause or threaten to cause serious oil pollution each of the above first three may demand that the GACG is convened. It must be emphasized that each individual member of GACG carries with him into the Group the total authority possessed by the agency/organization which he or she represents. Thus as a body, the Group possesses the sum of all the powers possessed by each individual member.

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3.3.7.5: According to Section 9 - 13 of the Oil Pollution Act of 1970 and as revised in 1982, the main duties of the GACG are:

(i) to monitor, and if necessary coordinate the measures initiated by expert agencies and those responsible for the accident.
(ii) to advice the different expert agencies.
(iii) to serve as a channel of contact between the responsible for the accident and the Ministry.
(iv) to pass information to the mass media and others.
(v) to collect information from experts.
(vi) to provide additional resources to the polluter over and above those at the disposal of the expert agencies.

3.3.7.6: The condition necessary for the GACG to assume command of an operation is when those responsible for the accident are themselves incapable of directing the operation OR if it is impossible to determine who is actually responsible.

"Peace-time" duties of the GACG are:

- to influence both private and governmental agencies to improve their preparedness to combat accidents.
- to strengthen governmental control in the efficient handling of accidents.
- to be prepared to take over any operative command function by the GACG.

To achieve the above tasks the Group meets 4-6 times a year.

3.3.7.7: The Oil companies have built up their own oil emergency preparedness facilities while the municipalities have their own contingency services.

3.3.8.0: <u>COMMENTS AND SUGGESTIONS ON THE DISCUSSION ON ORGANIZATION</u>

3.3.8.1: Of the three arrangements the Swedish organization seems most cohesive and the chain of command is cristal clear. Also in Sweden the spheres of operation are clearly demarcated i.e. local, district and regional operational units. Hence decisions can quickly be taken.

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3.3.8.2: In the event of a major spill there will be relatively less degree of consultation with other bodies or agencies in Sweden and therefore, less time will be spent in that process because all tasks and responsibilities are assigned to one body, the Coast Guard.

3.3.8.3: By the nature of Coast Guard work, the staff are always 'on the spot' i.e. at sea guarding their waters and this has three main advantages:

a) Shipmasters tend to be more careful in such guarded waters because the risk of being caught violating regulations is high.

b) Assistance to ships in distress is more readily available and this is a protective rather than curative role.

c) The continuous surveillence makes it possible to spot and recover any oil-floating, in good time, before it emulsifies.

3.3.8.4: In terms of financial implications and in comparison with the two other governments, the Swedish government appears to bear the burden of keeping her ocean waters single-handedly. Kenya at the moment cannot afford to copy the Swedish example because too few funds are chasing too many national projects (see chapter V).

3.3.8.5: The Norwegians rely heavily on Public bodies and private Oil Companies and tries to get them deeply involved in setting up their own contingency plans. This is the same direction Kenya tends to follow. But interviews with Mombasa Municipal Council, Kwale and Kilifi County Councils and Malindi Urban Council revealed that they know nothing about the existence of the anti-oil pollution arrangements mentioned earlier. Also interviewed were the District Commissioners of Kwale and Kilifi districts. They too were unaware despite the fact that the Provincial Commissioner, Coast Province who is the boss of the interviewed administrators, is a member of the National Marine Anti-Pollution Committee. The implication is that, in Kenya there has not been serious involvement of the public bodies let alone the general public.

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It is suggested therefore, that the local authorities and the provincial administrators should, as a matter of urgency, be made part and parcel of the contingency plan. Mobilization of masses for onshore clean up work should not be taken for granted. Malindi administrators had a nasty experience in 1982 when the Sabaki River polluted the once clean and beautiful Malindi beaches. It was not easy to mobilize enough people and the available few demanded payments each day they worked.

3.3.8.6: Another significant proposal is that a clear distinction and or separation of control and co-ordination functions ought to be made. The Managing Director of Kenya Ports Authority, who ironically, is not a member of the National Marine Anti-Pollution Committee should, in close liaison with the Provincial Commissioner, Coast Province, assume the responsibility of co-ordinating all major oil spill prevention and control activities within Coast Province. Meanwhile, the National Oil Pollution Executive should remain in Nairobi, the centre of government business, to contact the appropriate ministries as need arise.

4.0.0.0: OIL COMBATING EQUIPMENT AND MANPOWER

4.1.0.0: When there is an oil spill report made verification and assessment of its size constitute the first phase of an oil spill response. The speed and correctness at which this is done determines a great deal, the success or failure of the entire operation to follow. It has been observed that the effectiveness of the existing clean up equipment and techniques is largely dependent on the properties of the spilt oil and the longer the spill stays the more inefficient they become. Another important factor at the time of an incident is the dire need for pre-assembled information on the property of the spill, meterological and oceanographic information. In the light of the above a closer look is made at how Kenya, Sweden and Norway try to overcome the technological set-back. (The main purpose of this sub-section is to show in some detail the numerous type of equipment available).

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4.2.0.0: The Main Coast Guard Oil Combating Resources in Sweden in 1981 were as shown below:

4.2.1.0: Specialized Oil Combating Vessels were:

A - class	4 + 1	planned
B - class	7 + 3	building
C - class	4	
D - class	3 + 1	being refitted
E - class	1 + 3	building
Total	19 + 8	

4.2.1.1: A - class ships are those with a displacement of 250-450 tons and are all-round equipped with all types of stores of all type of oil combating equipment in use by the Coast Guard Services. To note is that these ships have extensive radar and radio equipment, operations room and accommodation for the On-Scene Commander and his staff besides the ship's own crew.

4.2.1.2 The B - class oil combating ships are referred to as Sea Truck model, 200 tons displacement. They are designed to carry either high seas or coastal water oil removal equipment. They are fitted with electric and hydraulic power, dispersant tanks, tanks for temporary storage of recovered oil, pumps and spreading devices for application of sorbents and dispersants.

4.2.1.3: The D - class ships are 25-30 tons catamarans equipped with a skimmer and an endless belt construction. The catamarans have a crew of 3-4 men and are fitted with complete navigational and communication aids and also crew accommodation for temporary stay on board.

4.2.1.4: The C - class ships were formerly old 50 tons mine-sweepers which have been converted into oil combating ships. These are equipped with booms, absorbing and dispersing supplies and equipment.

4.2.1.5: The E - class, the so called Skerry oil combating vessel was recently developed for operations in extremely shallow waters. Its main pick-up equipment consists of two hydraulically manoeuvered grabs.

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4.2.2.0: Other equipment are:

4.2.2.1: Work boats: 18

4.2.2.2: Coast Guard Cutters 45 (all prepared for oil combating operations)

4.2.2.3: Booms: High sea booms 4 Vicoma Sea Pack Systems + 1 Nordan System
Coastal booms 25,000 (different designs)

4.2.2.4: Recovery Equipment

Portable high sea skimmers	6
Portable coastal skimmers	12
Ship-fixed skimmers	4
Endless belt systems	10
Oil collection trawls	9
Hydraulic oil grab systems	16
Oil Mop recovery systems	4

4.2.2.5: Containers

Inflatable containers	15
Stiff containers (1-5m^3)	150
Spec oil collection barges	6 + 2 planned

4.2.2.6: Dispersant Equipment

Dispersants in store 1	500 barrels
Shipborne spraying devices	50
Portable " "	30

4.2.2.7: Sorbents

Sorbents in store	4,000
Shipborne spreading devices	50

4.2.2.8: Emergency Lightering Equipment

Oil transfer and lightering pumps	-	2 capacity 500m^3 oil/hr
		4 small pumps
Fenders for off - shore transfer	-	3 whale fenders
		12 medium sized fenders

4.2.2.9: Miscellaneous

Sea-sleds 1 + 3 planned
Anchoring and towage equipment
Floatable oil hoses
Potable oil heating equipment

.../...

4.3.0.0: Location of Oil Combating Resources in Sweden:

4.3.1.0: About a third of the total oil combating equipment is stowed on board the oil combating vessels ready for immediate use.

4.3.2.0: The remaining two thirds are stored at the Coast Guard Regional, District and also in some local stores as follows:

- 4 Regional CG bases
- 15 District CG bases
- 13 Local stores

N.B. The above equipment is wholly government owned.

4.4.0.0: Oil Combating Resources In Norway And Kenya

4.4.1.0: Oil Combating resources ownership in Norway is by the government, municipalities and Oil companies. The location of these state owned resources is mainly at Sola and Bodø, the main rescue co-ordination centre. Nonetheless some of the equipment is distributed among 12 depots along the Norwegian coastline and is under the care of temporary employees. That owned by the oil companies is found at the Norwegian continental shelf where oil drilling activities are in progress.

4.4.2.0: The Kenyan Pollution control Equipment is as follows:

4.4.2.1: Specialized oil combating work boats:

General purpose boat	21	17 metres
" " "	1	8 "
Mooring tug boats	5	12 "
Skimming "	1	
Dispersant spraying boat	1	
Police patrol	3	
Pilot cutters	2	22 "

4.4.2.2: Dispersant Equipment

Harbour Launches	3
W.S.L. Large Spraying Equipment with pump	1
" Small " " " "	1

4.4.2.3: Recovery Equipment

Vortex Skimmer	1 (20 tons capacity)
Eductors	6
Nozzles	6
Hoses	6

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4.4.2.4: Emergency Lightering Equipment

Dispersant Petrol-Driven Pumps 4
Light aircraft (at Wilson Airport - Nairobi) 2

4.4.2.5: Booms

- high sea Guard Boom 4 x 100 metres
- Fire Guard Boom 3 x 100 "

4.4.2.6: Containers

- waste oil storage lighters 2
- cargo tugs 3
- 1 barge of 200 tons

4.4.2.7: Miscellaneous

- berthings tugs 6
- back packs 28
- stocks of dispersants of different types in over 20 drums.

4.4.3.0: Equipment Location

4.4.3.1: The equipment is, almost wholly, located within the harbour area. Since there are no off-shore activities in Kenya there are no equipment around the Kenyan continental shelf.

4.4.4.0: Equipment Ownership

4.4.4.1: Apart from 200 plastic bags, one Dispersant Spraying Boat and some 200 litres of dispersants that belong to the oil companies, the rest is Kenya Ports Authority owned.

4.5.0.0: COMMENTS AND SUGGESTIONS ON THE POLLUTION CONTROL EQUIPMENT PURVIEW

4.5.1.0: Equipment Ownership Policy

4.5.1.1: The Equipment Ownership Policies of the three countries are evidently different with the Norwegian one appearing to be the cheapest in the sense that the Central government has successfully managed to involve interested parties in sharing the costs of maintaining clean seas. The same trend is in Kenya but the involvement can be said to be partially successful, for example , of the five oil marketing companies operating in Kenya, non (or jointly) has a single boat. The same can be said to hoteliers who stand to be most affected when a major spill occurs. This argument cannot be extended to the Kenya Local authorities because they have a history of shortage of funds.

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4.5.1.2: Another alternative to be considered could be the Japanese example. The Japanese requirements are that all ships in their water have either to carry pollution control equipment or make payment of a stock-piling fee. The repercussing of this policy will very much depend on the amount of fee charged and the criteria used.

4.5.2.0: Location of Equipment

4.5.2.1: Kenya should copy the example of both Norway and Sweden in respect of locating oil combating equipment along the coastline for fast deployment when need arises. Three locations seem ideal, Shimoni, Watamu and Kipini. The suitability of these three places is due to:

a) At Shimoni and Watamu there are marine parks which are, of-course, very sensitive to pollution. There are plans to have another marine park in Lamu district around Kipini. Some Marine Park employees and others from Fisheries Department can be given basic training in the use of oil combating equipment. In doing so reserves of oil combating team will be created. The cost will be minimum because they are government employees.

b) Shimoni is in Kwale district, Watamu is in Kilifi district, while Kipini is in Lamu district. Locating equipment in these strategic places has an advantage of cultivating awareness in the dangers of marine pollution among the local people. The other advantage is the equitable distribution of the resources according to need. Whereas there is justification to have most of the equipment at the port due to the number of ships entering and leaving daily, there is no less justification for locating some equipment in these places in view of the contribution of the beach hotels along the entire Kenya coastline to the national economy.

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4.5.3.0: Equipment Maintainance

4.5.3.1: At all times the oil combating equipment must be in good working condition if it is to serve the intended purpose. The Engineering Department of Kenya Ports Authority performs this role. To be stressed here is the significance of keeping up-to-date record of each equipment's performance. Future selection of equipment and spare parts acquisition will be a matter to be decided by the records. Close supervision to ensure the above is essential.

4.5.4.0: Personnel

4.5.4.1: Misuse of oil combating equipment may prove more harmful to marine environment than the effects of spilt oil. Having untrained individuals to man or make use of the resources defeats the purpose of acquiring the resources.

Kenya Ports Authority is the agency that is responsible for recruiting and training oil combating personnel. As a parastatal organization also responsible for the running of the port, and in view of high costs involved in training and maintaining such manpower, the Authority cannot be expected to have a large size of employees for the spill contingency purpose. An impression of the staff already in employment is given below:

Marine engineers	21 (trainees included)
Coxswains	18
Engine room staff	50
Tugmasters	12
Headboatmen	14
Tugmates	10
Sailors	87
Fire fighting staff	152 (1980 figure)
	364

4.5.5.0: SOURCE: KENYA PORTS AUTHORITY PERSONNEL DEPARTMENT

4.5.5.1: Assuming that each receives a conservative average salary of K.shs. 2,500 per month, other benefits e.g. housing, medical care excluded, the above staff cost the Authority Kshs. 364 x 2,500 = 910,000 per month. This is equivalent to US$ 65,000 per month.

4.5.5.2: To enlarge the above quoted staff figure during crisis the following organizations are suggested to have some of their employees

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prepared for oil combating missions:

- Kenya Oil Refineries
- All the 5 oil marketing Companies
- Southern Engineering Company
- African Marine And General Engineering Company Ltd.
- Hoteliers

4.5.5.3: Kenya Ports Authority marine engineers are to design suitable oil combating courses to be attended by employees from the above organizations and also by employees from the suggested Kwale, Kilifi and Lamu districts. Thereafter regular joint exercises should be carried out to keep the personnel in shape on the one hand and on the other to exercise the equipment. The main objective is that the personnel have to be familiar with the available equipment.

4.5.6.0: BEHAVIOUR OF SPILT OIL VERSUS THE EFFECTIVENESS OF OIL COMBATING EQUIPMENT

4.5.6.1: As a concluding remark to the subject of oil combating equipment and manpower, and in support of subsequent suggestions and proposals, brief observations on the behaviour of spilt oil is considered vital.

4.5.6.2: Oil at sea is, at the present time, dealt with principally by two methods: First is by chemical dispersant treatment and secondly, is mechanical recovery,.

4.5.6.3: Chemical dispersants, it has been observed, can be more effective on relatively fresh oil if the viscosity is not too high. Nonetheless, the Torrey Canyon experience reveal that direct treatment of treated shores resulted in the death of a large number of shore organisms of many different kinds.(19) Two things happen to spilt oil each of which significantly increases its viscosity. The lighter parts of the oil evaporate; the rate of evaporation can be expected to be higher in warmer climatic conditions like in the Kenyan Coast. The remaining oil absorbs water to form emulsions which do not respond positively to dispersants.

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4.5.6.4: The mechanical recovery operations suffer from the low rate at which oil can be recovered. The seriousness of this draw-back should be seen in the light of the speed at which spilt oil in a large open sea spreads to be fully appreciated. As if this is not enough, the pumping out of collected oil is also no easy task. Hence the proposals for more well trained personnel and strategical location of oil combating equipment both aimed at buying time when the expected does happen.

4.5.7.0: SURVEILLANCE FOR MARINE POLLUTION

4.5.7.1: Seaborne Surveillance

4.5.7.2: Before any action can be taken, oil has to be cited on the sea. Surveillance for oil pollution is necessary to determine the origin of the oil. Qualified personnel to patrol the waters and carry out investigations to establish the origin of deposited oil are essential. Patrol boats and naval ships can be used for the purpose. However, the use of a small aircraft for that reason only may have a wider coverage and cheaper to operate. On the spot observations and more elaborate discussion on this subject follows.

5.2.0.0: Airborne Surveillance

5.2.1.0: The only way to ensure that the sea under the Kenya's jurisdiction remains free from marine pollution is to make sure that it so remains. The Dutch approach is very impressive.

5.2.2.0: The Dutch's Ministry of Transport has a section dedicated for maritime patrol which has a special aircraft that makes regular flights in the morning, mid-day, evening and at night to trace oil slicks and the ship responsible.

5.2.3.0: The writer had the privilege of covering 1,000 kms. in a six hour flight in the MARITIME PATROL AIRCRAFT piloted by 4 navigators. The navigators and observers from the government have nautical background necessary to facilitate communication.

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5.2.4.0: Slar (Site Looking Airborne Radar)

5.2.4.1: Capable of showing very thin layers of oil on water is operational on the aircraft. When an oil slick is observed this way polaride pictures are made using a special camera connected to a Decca Tans Navigation computer. At the foot of the photo the computer registers the time, date, latitude and position of the photographed object.

5.2.4.2: Whenever necessary recording on digital tapes is done to provide further evidence.

5.2.4.3: Ship identification is by flying low and taking photographs of the responsible ship.

5.2.4.4: The photographs and the tape together with the observers statements are forwarded to the authorities for proper action.

5.2.5.0: Costs of the Air-Patrol

5.2.5.1: The Dutch government does not own the six-seater aircraft but charters it under five year contract from a private firm. Maintenance work is done by the firm which also provides a pilot.

5.2.5.2: The same aircraft also patrols Germany waters and the Germany government pays for this service on the basis of the total yearly flight hours.

5.2.5.3: Of the four navigators one pilot is from the chartering firm, the second pilot comes from the police force, the third from the immigration department and the last one is the Ministry of Transport representative. Costs on personnel are shared among the three government departments and because it is not a full time job the personnel perform other office duties.

5.3.0.0: Advantages Of The Air Patrol

5.3.1.0: Notable advantages are:

5.3.1.1: Timely detection of illegal dumping of oil wastes by ships, even in mist or at night and thereby effecting a speedy use of combat equipment.

5.3.1.2: Facilitation of search and rescue operations.

5.3.1.3: Fishing control - to ensure that fishing is done at the right fishing zones and also that the right size of fishing vessels are deployed.

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5.3.1.4: Minimization of smuggling activities.

5.3.1.5: The knowledge by the shipping community that such air patrols are frequent has a deterring effect, a preventive function. Therefore, the more the surveillance missions the better.

5.3.1.6; Policing the anti-pollution regulations governing drilling platforms and floatels.

5.4.0.0: Does Kenya Need Air Patrol?

5.4.1.0: The response to the question should be in the affirmative for reasons discussed above. Nonetheless a detailed study ought to be conducted to establish the practicalities and financial details. The East African region as a whole can copy the Netherlands - Germany co-operation if the struggle to maintain a cleaner Indian Ocean is to be a complete success.

6.0.0.0: WHAT SHOULD BE DONE DURING "PEACE-TIME"

6.1.0.0: More often than not it is stated that no situation is permanent. Global technological development, regional approach to the problem of oil pollution, experiences gained in various parts of the world, etc. may have an impact on any national contingency plan.

At best a contingency plan should be viewed as a guidance. From this view point suggestions aimed at improving the state of preparedness in Kenya are put fourth.

6.2.0.0: Call List

6.2.1.0: At the data collection period for this project it was observed that the existing call list for Kenya was out-dated because it contained names of dead persons e.g. the then chairman and the then secretary of the National Marine Anti-Pollution Committee. Some members had joined other un-related organizations while others had retired altogether.

6.3.0.0: Drills

6.3.1.0: The actual effectiveness of a contingency plan is seen when an oil spill disaster occurs. But during peace time the effectiveness of a contingency plan can be tested by carrying out exercises under simulated emergency conditions.

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The more realistic such exercises are the more the benefit gained from them. An impeding factor is the cost of mobilising physical resources for a complex operation. To minimize such costs table-top scenarios can also be performed. Investigations on this issue revealed that there has never been any single drill organized and supervised by the Kenya National Marine Anti-Pollution Committee.

6.3.0.0: Hire Of Private Owned Equipment, Etc.

6.3.1.0: Some private firms are listed, in the Kenyan Contingency Plan e.g. Bahari Club, "K" Boats and Divecon. From them, it is considered, boats and other equipment can be hired when there is an emergency. First the possibility of doing so must be communicated to the individual firms. Also, the firms may change hands or wind up altogether. Reliability of the to-be-hired equipment should be considered. Names, addresses and telephone numbers of the managers of such firms should be compiled in a list which is to be up-dated from time to time. This list is to be attached to and kept together with the normal call list.

6.4.0.0: Technological And Other Changes

6.4.1.0: Through research new development in clean-up equipment and communication systems come about. Oil spill management, which is relatively a recent phenomenon, is also undergoing some improvements. Publications in form of books, magazines and reports on oil spill combating are increasing in number. Similarly, conferences and equipment demonstrations by experts are no longer rare. To cope up with all these developments monitoring becomes an intergral part of contingency planning.

6.5.0.0: What Should Be Done Soon After The Clean Up Is Over

6.5.1.0: There are three main aspects to be considered, Financial, Judicial and technical.

6.5.1.1: Financial: Collosal expenses will have been incurred after cleaning up a major oil spill and there should be a method to determine the near exact figure. Everyone involved, first and foremost is expected to have kept a record of all the expenses incurred during the clean-up period. After the receipts have been gathered calculations can be made into two parts, one part covering off-shore operations and the other on-shore operations.

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See example below:

EXPENSES FOR OFF-SHORE OPERATIONS

1. KENYA PORTS AUTHORITY

		K.SHS.
a) Personnel		
i.	Ordinary working time	2,000,000.00
ii.	Overtime	100,000.00
iii.	Food supplies) Travel expenses) Legal fees) Surveyors fees)	40,000.00
		2,140,000.00
b) Material		
i.	Boats (tugs etc.)	3,500,000.00
ii.	Oil combating material	72,000.00
		3,572,000.00
c)	Bought or rented material and service rendered	3,000,000.00

2. KENYA ARMED FORCES

a)	Navy	5,000,000.00
b)	Air-force	200,000.00
		5,200,000.00

3. ETC

EXPENSES FOR ON SHORE OPERATIONS

1.	Municipal Council of Mombasa	300,000.00
2.	Ministry of Works	250,000.00
3.	Provincial Administration Etc.	150,000.00
		750,000,00

.../...

In addition some sectors of the economy will have been affected therefore, a sum representing total loss and damage caused by the oil incident has to be calculated.

Example is given below:

a) Fishery damage	50,000,000.00
b) Tourism losses	100,000,000.00
c) Losses to business community Etc.	10,000,000.00
	160,000,000.00

The losses, damages and expenses need to be recovered somehow and this idea leads to the next section, the legal aspect.

6.5.1.2: Legal Considerations

6.5.1.3: All applicable legal regimes must be well understood and necessary action taken during peace-time.

6.5.1.4: Technical Considerations

6.5.1.5: The term technical is used here to mean the evaluation of the performance of the contingency plan in its totality. The set-backs encountered, the losses in terms of material and failures by specific sections of the plan. The objective is to ensure that a similar incident when it occurs in the future, the marine environment will more effectively be protected.

6.5.2.0: Contacts

6.5.2.1: It is a matter, of course, that in many of the above - mentioned activities take place in close co-operation with a great number of scientific institutions at home and abroad. Also exchange of information with relevant private bodies and international organization is vital. Hence any useful contacts must be maintained and new ones established.

7.0.0.0: C O N C L U S I O N

7.1.0.0: When taken seriously, contingency planning is a full time job requiring trained personnel and up-to-date equipment. It is a costly arrangement which calls for total commitment on the part of the administrators to skillfully organize and deploy all the available resources in the cheapest way possible.

C H A P T E R V

THE THREATENED KENYAN ECONOMY

1.0.0.0: INTRODUCTION

This chapter examines the Kenyan economic sectors mostly threatened by marine pollution and goes further to relate that threat to the pronounced national economic strategy. In short the principal question to be answered is what impact does oil pollution have to the present economic situation in Kenya?

2.0.0.0: THE NATIONAL DEVELOPMENT PLAN 1984/1988 THEME

2.1.0.0: The present economic order can be grasped by having a look at the current National Development Plan. The theme of the Plan is "mobilising domestic resources for equitable development".

2.2.0.0: The phrase domestic resources when applied within the confines of the Kenya Coast would encircle, O.a:

- beaches, coral and beach hotels
- fishes
- marine parks
- marine ecosystems
- mangroves
- harbours and channels
- birds
- ocean

2.3.0.0: According to the National Development plan specific policies to be persued by the government, inter alia, area:

2.3.1.0: - promotion of the private sector of the economy to attract foreign investments to increase production of goods and services;

2.3.2.0: - to improve and make an intensive use of existing production capacities in all sectors so as to avoid substantial and new investments in plant, equipment and training;

2.3.3.0: - restructuring of the agricultural sector to achieve rapid growth through higher yields by periodically reviewing and stabilizing prices, aggressive marketing, improving credit facilities etc.

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2.4.0.0: The National Development Plan aims at solving the following economic problems:

2.4.1.0: - unemployment

2.4.2.0: - population explosion

2.4.3.0: - malnutrition

2.4.4.0: - housing

2.4.5.0: - rural under-development (rural - urban dichotomy)

2.4.6.0: - poverty

3.0.0.0: SOME ECONOMIC PROBLEMS DISCUSSED

3.1.0.0: Population Explosion

3.1.1.0: Population growth is one of the economic indicators of economic development of a country. In 1984, the population of Kenya was estimated to be 19 million. The same was projected to clock 26 million in 1990 and 34 million by the year 2000. The present growth rate of 4%, one of the highest in the world, has been projected to average 4.5 per annum between 1984 and 2000. (20)

3.1.2.0: So far government population policies aimed at population control have had negligible effect and the subsequent impact is as follows:

3.1.2.1; - 40% of the national budget is spent on education.

3.1.2.2: - there are 1 million formal paying jobs against an estimated work-force of 7.4 million. The Kenyanization process, which came to being in 1964, aimed at providing jobs to Kenyans in complete (21). University graduates no longer find it easy to secure jobs, both in the civil service and in the private sector, neither of them being able to generate enough jobs. (22)

3.1.2.3: - over 85% of the population leaves in the rural areas and earn their living from land. Meanwhile, the sub-division of large farms once owned by foreigners has ended.

3.1.2.4: - half the population are under the age of 15 and about 11% are over 54 years of age.

3.1.2.5: - rural - urban migration is higher among the school educated people because the expectations of job opportunities in urban areas seem to be higher. Incomes in urban areas are relatively higher and this is also a factor for the migration. The majority of those who migrate are men, 65%. (23)

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3.1.2.6: - About 70% of the rural to urban migrants seem to be the landless. (24)

3.1.2.7: - Mombasa, Malindi, Kwale, Lamu and Kilifi, the districts lying along the Kenya coastline, together have a population of over 1 million.

3.2.0.0: Population Growth Versus Land Availability

3.2.1.0: Against the above information it should be known that as far back as the '50s land issue in Kenya has been regarded as 'sensitive'. About 80% of Kenya's 582, 650 square kilometres land is arid or semi arid. Of the remaining 20% arable land is being affected by soil erosion. In 1965 when the population was about 8 million it was estimated that there were 0.75 hectares of high potential land per head but this figure according to the present estimates will be less than 0.2 hectares by the turn of the century.

3.3.0.0: Population Growth Rate Versus Economic Development Potential And Employment

3.3.1.0: The high population growth rate has officially been perceived as creating a severe burden to the economy; the expanding young population is regarded as consumers instead of emerging producers. This view was expressed in 1974 when the population growth rate was about 3.2. It thus stated: "In a country already suffering from high unemployment, a high population growth rate has only adverse economic effects. First, it will increase the proportion of total income that is consumed, thus diminishing the levels of domestic savings available for investment. Second, the new population requires more capital, schools, houses, hospitals, roads and machines. Only after the new population is provided for will there be any net increase in these amenities per person. Third, when the dependency ratio is increasing, more people will be employed simply providing for the new people, without increasing the real income per person. Fourth, the pressure of the people on land and capital will reduce the productivity". (25) From all such observations and facts the remaining part of the chapter examines the marine related economic activities at the Kenya Coast and their contribution to the national economy.

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4.0.0.0: The Link Between The National Economy And Oil Pollution

4.1.0.0: While recognizing the present economic constraints it is proper at the same time to identify at an early stage all possible actions likely to worsen the economic position.

4.2.0.0: Effort has been made to show that tanker casualty statistics still show that the accident rate is uncomfortably high. What is most important and conscipicous with the accidents is that most of them happen near coasts where the risk of grounding is greatest, and in areas of heavy traffic such as port approaches where the danger of collisions is startlingly high. The contribution of the Kenyan Coast to the national economy, therefore, is the really direct object that is threatened by oil pollution from ships. AND THIS IS THE HEART OF THIS THESIS. And for this reason tourism, fisheries, marine parks and mangroves will briefly be examined in light of their significance to the Kenyan economy on the one hand and the oil pollution threat on the other.

5.0.0.0: COASTAL FISHING IN KENYA

5.1.0.0: Large scale fishing by indigneous Kenyans is not common due to lack of expertise and equipment. Joint ventures with foreign firms in this area has been tried. Nonetheless, of the total Kenyan shelf area of 19,120 square kilometres only 10,994 square kilometres are trawlable (27).

5.2.0.0: The fishing activity is mainly done by artisanal fishermen which number about 15,432 according to 1981 census (28). In addition, the Fisheries Department, Coast Province provides employment to about 1000 people.

5.3.0.0: Estimated income derived from selling of fish for the year 1982 was K.shs, 60 million compared to the 1981 figure of K.shs. 41 million. And the 1982 total fish landings were 7.1 million kilograms. One important feature about these figures is that they are a total of all fish sells and landings from all the districts along the coastline. One can construe this as a natural distribution of income and supply of fish protein. To further emphasize this point, reference is made to figures of one coastal district in table 6 next page.

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TABLE 6: South Coast (Fishing) Production Comparison (1981 & 1982)

MONTH	WEIGHT IN KG. (1981)	VALUE IN K.SHS. (1981)	WEIGHT IN KGS. (1982)	VALUE IN KSHS. (1982)
January	52,808	342,195.60	67,742	433,885.85
February	56,427	301,277.45	59,378	325,173.65
March	62,820	379,393.95	70,754	596,502.55
April	72,139	462,587.25	76,964	601,095.15
May	74,944	472,430.60	71,663	479,438.90
June	61,511	395,696.55	55,685	435,122.75
July	54,899	336,496.65	52,744	502,386.00
August	57,608	350,665.95	53,651	435,122.75
September	69,727	371,496.05	64,838	502,386.90
October	69,219	442,279.50	69,452	513,455.90
November	69,417	441,410.60	84,302	677,922.65
December	80,486	496,686.30	87,305	655,840.30
Total	782,005	4,792,616.45	814,478	6,158,333.35

Source: Monthly Catches 1982 (Kwale District)

5.3.1.0: From the table above, the following inferences can be made:

5.3.1.1: - that the quantity of fish caught is generally on the increase.

5.3.1.2: - that the value of fish in monetary terms has risen - refer to August and September figures.

5.3.1.3: - that fishing is an activity carried out throughout the year.

5.4.0.0: Fishing Boats

5.4.1.0: Fishing boats in the Kenyan Coast are estimated to be over 5,000. In Kwale district alone, the position is as follows:

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Table 7: Number Of Boats and Where They Are Located In Kwale District

LOCATION	NUMBER OF BOATS
Vanga	170
Majoreni	107
Shimoni	334
Msambweni	400
Diani	288
Tiwi	44
T O T A L	1,343

Source: Shimoni Fisheries Office

5.4.2.0: Findings arising out of interviews with some fishermen and some officials in the Fisheries Department Coast Province can be summarised as follows:

5.4.2.1: - that in order to increase fishing yields and at the same time to generate more employment opportunities in the fishing industry as a whole the government has to undertake the following:

(i) to ensure that the sea is not polluted in any manner and that the fishing gear is not rendered useless as a consequence of any marine casualty.

(ii) provision of adequate physical facilities e.g. freezing and cold storage.

(iii) to organize adequate transportation to regional and urban markets.

(iv) to develop existing markets and seek new ones through aggressive promotion activities.

(v) to financially, support artisanal fishermen by organizing a workable financial arrangement.

(vi) to apply proper fishery resources management which should include identification and assessment of under-utilization of the fishery resources.

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6.5.2.0: At the Malindi marine park entrance fee for non - Kenyan visitors was K.shs. 20 and K.shs. 5/= for residents, as at early 1984. Visitors have to hire boats privately operated at an hourly rate of K.shs. 100/= .

6.5.3.0: Table [8] below shows the number of visitors, month by month, from 1977 to 1982. To get the amount of revenue generated per year the total number of visitors per year may be multiplied by K.shs. 20/= assuming that over 90% of the visitors are foreigners.

YEAR	1977	1978	1979	1980	1981	1982
January	3,638	4,632	6,197	5,844	6,209	5,124
February	3,396	3,637	4,646	5,507	4,430	4,869
March	3,606	3,781	4,031	4,537	4,342	4,124
April	3,245	3,059	4,374	4,834	3,727	3,177
May	1,058	1,192	1,277	2,835	4,646	1,209
June	1,188	1,049	1,418	2,424	2,165	1,809
July	2,869	3,403	3,030	3,778	2,479	2,778
August	5,411	5,484	6,854	5,593	5,227	5,170
September	2,273	2,979	2,946	4,247	2,885	3,505
October	2,333	3,201	3,776	4,835	3,139	4,330
November	3.032	3,665	4,010	4,185	3,441	4,676
December	5,208	6,150	6,271	6,499	7,525	5,837
TOTAL	37,257	43,232	48,830	55,118	50,215	46,608

Source: Wildlife Conservation And Management Warden's Office, Malindi, Kenya.

6.5.4.0: Therefore, apart from serving the purpose of protecting marine and coastal habitats, the marine parks generate formal and informal employment and they are also tourists attractions.

6.6.0.0: MANGROVES

6.6.1.0: Mangroves have been described as littoral plants occupying estuarine areas, bays of islands, sheltered tropical and sub-tropical coasts (31). Mangrove forests are reported to occupy about 600 km^2 of the Kenyan coast region.

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6.6.2.0: USES

6.6.2.1: One of the major uses of mangroves is that they serve as habitat for a wide variety of fauna and flora. Mangrove swamps can support commercially important species of fish and shell-fish (32).

6.6.3.0: Throughout the East African coast, mangrove poles are very popular among the low and medium income groups who use them for constructing low cost houses commonly known as swahili houses. Such houses have very rapidly increased in number since around 1965. Had it not been for the availability of such cheap but descent looking houses, Mombasa, the second largest town, would be full of ugly shanties because the Municipal Council of Mombasa has failed to provide accommodation for its increasing number of residents.

6.6.4.0: Other uses of mangroves by local people are: making fish traps, fire wood, making charcoal.

6.6.5.0: To protect the existing mangroves and at the same time planting new ones have an added advantage to protect shorelines from erosion. Prices of different pole sizes are shown in table 9.

TABLE 9

NAME OF POLE SIZE (IN SWAHILI)	DIAMETER AT BUTT END CM.	ROYALTY RATES PER SCORE IN K.SHS. 1980	1984 ROYALTY RATES PER SCORE K.SHS.
Nguzo	Over 14.0	6.00	80
Boriti	11.5-14.0	5.00	60
Mazio	7.5-11.5	4.00	40
Pau	3.8-7.5	3.00	25
Fito	Under 3.8	0.20	10

Source: Shuma, B.R.K. The Status of Mangrove Forest in Kenya (Paper presented to the 1980 Forest Officers Conference) Page 6

6.6.6.0: Besides being of ecological value within the marine environment, mangroves are source of income to many people e.g. the cutters and transporters. The demand for mangrove poles has drastically increased while the supply has remained almost constant and that has forced the prices to rocket sky-high as I found the royal rates in February 1984, compared with those of 1980.

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C H A P T E R V I

MAJOR RECOMMENDATIONS AND CONCLUSIONS

1.0.0.0: INTRODUCTION

1.1.0.0: All the preceding chapters have put forth many recommendations and suggestions, of which to implement, require expending huge sums of money both in local and foreign currencies. As seen in Chapter V, already there are too many sectors of the Kenya economy chasing too few funds. Therefore, this chapter attempts to suggest, as the major recommendation of this thesis, that the same shipping industry responsible for oil pollution, as explained in Chapter I, should indeed generate funds for the purpose of prevention and/or combating marine pollution in general.

2.0.0.0: DEVELOPMENT OF SHIPPING IN KENYA

2.1.0.0: 'Diversification of Kenyan economy' is a statement which has been echoed for over a decade now. When it comes to shipping priority has always been given to port development and increased productivity of port operations. There is fear that this is a false start, though better than no start at all, because it does not benefit the economy substantially. To exhaustively substantiate this statement would require a lengthy analysis, but it has tc be realised that the cost of all imported goods include an element cf transport cost and that shipowners to exist in business must earn a profit each of which has to be borne by the economy. Derivation of maximum benefits from shipping industry therefore, requires development of the same. In this vain the long term objective of the government relating to shipping has to be spelt out clearly.

2.2.0.0: A government body responsible for implementation of government shipping policies is essential. How this body, the proposed maritime Administration in Chapter V, should be structurally organized cannot categorically be stated without a thorough research on the subject being conducted.

2.3.0.0: A comprehensive maritime act should make the distinction among the proposed maritime administration, Kenya Ports Authority and the Shipping Section within the Ministry of Transport abundantly clear.

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2.4.0.0: At its infancy stage, the proposed maritime Administration will require the assistance and advice from many agencies, governments, and most certainly from classification societies of international repute with qualified surveyors spread world-over.

3.0.0.0: PROPOSED KENYA NATIONAL SHIPPING LINE

3.1.0.0: An important element of shipping development in any country is the increasing participation in the carriage of her foreign seaborne trade. Kenya ought to bear this in mind and create her own national shipping line principally because merchant marine development, is an essential requirement at all stages of economic development. Nonetheless, it calls for the adoption of such measures as might be appropriate to make it possible for the national line penetrate and compete in the international freight markets.

3.2.0.0: The creation of a national merchant marine is a realistic proposition, especially at the present stage of Kenya's economic development, among other factors, because:

3.2.1.0: Kenya is increasingly engaged in the effort to broaden and diversify her economy through industrialization so as to stimulate the rate of growth and to raise the welfare of her population. Nonetheless, industrialization and diversification of production, and so is the raising the standards of the people, imply on the one hand increased import demand for capital and consumer goods and the need to expand and diversify exports on the other;

3.2.2.0: Kenya is in the struggle to promote her foreign earnings;

3.2.3.0: Foreign supplier of shipping services require payment in their own national currencies or currencies of their choice; Already the problem of the balance of payments is critical in Kenya;

3.2.4.0: It is generally accepted that because of the relative price elasticities of demand and supply in their export and import trades, developing countries, Kenya inclusive, tend to absorb the greater part, if not the total of the costs of carriage of both their export and import trades. The total effect of this state of affairs has adverse repercussions on the balance of payments of the developing countries; also the repercussions are not better on the overall economic development because it leads to reduced incomes particularly from export oriented production activities, and to increased prices in the domestic markets.

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3.2.5.0: One reasonably expects a national carrier to be more closely linked with the economic and commercial interests vis-a-vis, a foreign carrier.

3.2.6.0: Shipping development can contribute greatly to the diversification of the Kenya economy because it needs a wide range of services and supporting activities such as:

3.2.6.1: Ship repairing industries.

3.2.6.2: Financing and banking services.

3.2.6.3: Marine insurance

3.2.6.4: Ships supplies and equipment.

3.2.6.5: Training facilities for sea-going personnel and managers .

3.2.6.6: Telecommunications, etc.

3.3.0.0: PRESENT OBSTACLES AND SUGGESTED SOLUTIONS

3.3.1.0: Kenya, being a non-traditional maritime nation, does not have a reserve of managerial skills and well trained and experienced sea-going personnel. Marine sciences in general have hitherto been neglected. This position can easily change, should Bandari College, the only maritime institution in Kenya, which has so far given priority to courses on port development and increased productivity of port operation, soon it introduces courses on shipping development as a whole. The second Kenyan University - the Moi University - which is intended to specialize in the teaching of technical subjects should also teach marine sciences, and when doing so, to liaise closely with Bandari College.

3.3.2.0: The second major obstacle facing Kenya is lack of investment capital. Credit and loan opportunities are internationally available provided the following conditions are met:

3.3.2.1: - Consistency and continuity of national policies as to win the confidence for Kenya of foreign finance lending institutions, ship-building yards and large cargo owners.

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3.3.2.2: - National Shipping Laws when adopted to the standards provided by the most commonly applied relevant maritime laws internationally, the access to international sources of finance tends to be easier. The fundamental aim is to assure the bankers and creditors that the applicable laws and policies will remain stable over long period of time.

3.3.3.0: Establishment of joint venture with an established company in a developed country is another way of solving the problem of lack of capital. Easy repatriation of profits by the foreign partner company in addition to the above conditions is an essential consideration .

3.4.0.0: Possible Prospects

3.4.1.0: By establishing national flag shipping (line) to transport cargoes to and from foreign countries and/or between foreign countries can, by all means, become both a foreign exchange earner and a foreign exchange saver. It is this same foreign exchange saved or earned which should be spent on all arrangements aimed at prevention and/or combating of oil pollution from ships.

3.4.2.0: The would-be trained and eventually experienced seafarers would be most suitable persons to take up on-shore-jobs, including those related to marine pollution prevention.

3.4.3.0: Job opportunities will arise out of the supporting activities mentioned under 3.2.6.0.

4.0.0.0: OTHER RECOMMENDATIONS

4.1.0.0: Recommendation On How To Reduce The Financial Burden In Maintaining Clean Sea

4.1.1.0: It is recognized that the complete elimination of pollution in the marine environment by ships requires re-allocation of resources from various sectors of the economy to fulfill the following:

4.1.1.1: - To train scientific and technical personnel;

4.1.1.2: - To supply equipment and facilities for reception and monitoring;

4.1.1.3: - To conduct research;

Each of which can be too big a burden to the economy. To ease such a burden it is recommended that Kenya should become a party to the

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MARPOL 73/78 so that she can enjoy the assistance enshrined in Article 17 and Resolution 22 of that convention.

4.1.2.0: Regional cooperation may result in cost-sharing in undertaking some tasks e.g. joint maritime patrols, sharing of oil combating equipment and many others as need may dictate.

4.2.0.0: Recommentation On The Identification Of Training Needs

4.2.1.0: Shipping development inevitably demands the development of appropriate maritime infrastructure which in turn calls for the availability of trained manpower. Being a young nation Kenya cannot afford the luxury of haphazard, ad-hoc and expensive approach to training personnel in maritime field. For this reason it is suggested that the recommended Maritime Administration be made responsible for the identification and coordination of all maritime training requirements. Doing so would ensure maximum utilization of local training facilities, and, through proper planning, adequate trained personnel would be made available whenever needed.

4.3.0.0: Recommendation On Quick Oil Spill Response By Members Of The Public

4.3.1.0: Quick oil-spill response can only be expected from the members of the public when they are aware of the effects of oil pollution to the marine environment.

4.3.2.0: The vital role of educating the public in the matter, in the Kenyan context, should be performed by the Provincial Commissioner (PC), Coast Province. Through the PC all the District Commissioners (DCs) for Mombasa, Kwale, Kilifi and Lamu should be well informed and involved. And so should all the respective local authorities.

4.3.3.0: One way of passing down the 'oil-spill gospel' is for the above DCs to bring up the matter at the popular District Development Committee (DDC) meetings which are attended by all the local district leaders. Thereafter, the masses can systematically be informed through public meetings which are better known as BARAZAS. This method has successfully been used to publicise the importance of family planning and also, the construction of cattle dips.

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4.4.0.0: Recommendation On Drafting And Revision Of Maritime Legislation

Kenya has inherited the maritime laws of her former metropolitan country, Britain, which are not necessarily conducive to the development of a national fleet and the formulation of appropriate shipping policies. Well - defined maritime policy objectives are essential to the drafting of maritime legislation. Therefore, the drafting team should consist of both lawyers and policy makers to ensure that clear policy objectives are the basis for the legislation. The cooperation between lawyers and policy makers in the drafting stage should facilitate later implementation and enforcement of the law. It must be mentioned that even when it is necessary to use foreign expertise active participation by nationals remains essential otherwise the new legislation will be regarded as 'theirs' instead of 'ours'. Implementation of IMO conventions may also use the same approach.

5.0.0.0: CONCLUSION

Undeniable is the fact that the Kenya government is fully aware of the seriousness of the problem of marine pollution and the determination to solve the problem has abundantly been reviewed. What remains to be said is that there is always room for improvement, always new vigour and always new and better methods of doing the same thing. This is, in addition to the above recommendations, the challenge facing the Kenyan people in general and administrators in particular.

17. UNEP Regional Seas Reports And Studies No. 6, 1982.
18. Ibid No. 12, 1982
19. Ibid No. 10, 1982
20. Ibid No. 38, 1983

PROPOSED ANTI-DAMAGE MEASURES FROM OIL POLLUTION ACT

JULY 1984

Article 1: The purpose of this Act is to prevent, avert and minimize oil damage in the sea, in water-courses and on land. By oil damage is to be understood damage which by pollution or in other ways may be caused as a result of discharge or escape of oil or oily mixture.

The Minister shall determine what is to be understood by oil or oily mixture. Subsequent to more detailed provisions by the Minister, other substances may be deemed equivalent to oil and oily mixture for the implementation of this Act.

Article 2: The Minister may issue regulations to the effect:

a) that it shall be prohibited to discharge oil or oily mixture from ships or any other structures into the sea inside Kenyan sea territory and that such discharge from all ships or other structures shall be prohibited outside Kenyan territorial waters in areas where this is prohibited according to international agreement to which Kenya is a party:

b) that it shall be prohibited to discharge oil or oily mixture into the sea from land or on land when it must be assumed that the oil or the oily mixture may be led into the sea or cause damage in some other way:

c) that separators or similar arrangements shall be installed on board Kenyan vessels for the purpose of separating water from oily mixture and further that measures shall be taken on board to prevent outflow of oil or oily mixture:

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d) that a special oil record book shall be kept on board Kenyan vessels for the purpose of keeping records of the cleaning of tanks, discharge of oil residues etc.

Article 3: The Minister shall appoint a committee, The National Marine Anti-Pollution Committee on Oil Pollution, for a period of 4 years at a time. The committee shall have as many members as the Minister decides. The Minister shall decide who is to be the chairman and the vice-chairman of the committee.

The Committee shall elect among its members a work committee of 5 members which shall include the chairman and the vice-chairman. The work committee shall carry out the functions of the committee when the latter is not in session.

Article 4: The Committee shall plan and co-ordinate the country's preparation against damage from oil pollution, hereunder also work out proposals for regulations and practical measures to be taken and give opinions. The Minister shall issue further instruction concerning the functions of the committee, field of competence and rules of procedure for the committee as necessary.

Article 5: Each local authority (council) shall be under obligation insofar as the possibility of oil damage may be anticipated within its boundaries, to keep in a state of preparation personnel and material which satisfy reasonable requirements for protection against such damage. In cases of doubt, the committee shall decide if a council is under such obligation, and may issue directions as to the extent of the protective measures of the individual council to provide installations or facilities for the reception of such substances.

The committee may decide that several councils shall co-operate on measures as mentioned in this paragraph. Prior to a decision by the committee by virtue of this paragraph, the council concerned shall have had occassion to give its opinion in the matter.

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The council may, with the consent of the committee, order enterprises in the council which handle, deal in or use oil in large quantities, to participate in the protective measures of the municipality, including the keeping in preparation of adequate material.

Article 6: Following more detailed provisions by the Minister, there shall be one or more oil damage protection headquarters in the country, the function of which shall be to assist the council in carrying out their duties as mentioned in article 5 , 1st paragraph.

Each oil damage protection headquarters shall be directed by a committee of 3 members appointed by the Ministry. The Ministry stipulates instructions for the committee and may lay down rules concerning the personnel and material of the oil damage protection headquarters, including the question of whether and to what extent they are to have installations or facilities for the reception of oil residues and oily mixtures.

The committee shall give an opinion in matters under this section.

Article 7: If oil or oily mixture has escaped or has been discharged and there is a danger that it may cause damage of importance, the council threatened or hit by the oil pollution shall without delay take action to prevent or minimize such damage.

Notification of such escape or discharge shall be given to the nearest oil damage protection headquarters and to the committee without delay.

If the oil pollution is of such extent that the protective equipment in the local authority is deemed to be insufficient, other local authorities in the proximity shall be obliged to render assistance upon request from the local council or oil damage protection headquarters concerned. The local council may reclaim expenses entailed by the assistance rendered from the local council receiving the assistance. If the local council fail to reach an agreement regarding such reclaim, the matter shall be decided by the Provincial Commissioner, Coast Province.

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Article 8: In cases of disaster and of oil pollution at sea which represents substantial danger, the committee shall assume command of the work to prevent or minimize damage.

The committee shall notify the Navy, the Air Force, the Army and the Police without delay requesting such assistance as the committee deems necessary. In such case the committee may entrust the operative command to the branch(es) of the armed forces which may be engaged.

In the case of disaster the committee may require the protective equipment at oil damage protection headquarters and in local authorities to be placed at disposal for the measures which are taken.

Article 9: Whoever becomes aware of discharge or escape of oil or oily mixture of such extent that it is liable to cause substantial damage or is informed that such discharge or escape has taken place, is under obligation to forward notification thereof to the police without delay.

The Minister may issue more detailed regulations concerning notification of discharge or escape as mentioned.

Article 10: A fund for protection against damage from oil pollution shall be established which may be used for the following purposes:

a) to cover expenses incurred by measures taken pursuant to approval or decision by the committee in order to avert or minimize oil pollution damage;

b) to cover expenses incurred by the establishment and operation of District oil damage protection station as mentioned in article 6;

c) to cover, in full or partly, expenses incurred by the municipal protective measures according to article 5 or other measures taken by the local council pursuant to article 7;

d) to cover expenses incurred by the development of methods to combat oil pollution;

e) to cover expenses in connection with the activities of the Council on Oil Pollution;

In accordance with the purposes stated in the 1st paragraph,

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ANNEX II

DEFINITIONS

Inert Gas System	-	means an inert gas plant and inert gas distribution system together with means for preventing back flow of cargo gases to the machinery spaces, fixed and portable measuring instruments and control devices.
Marine Pollution	-	the introduction by man of substances, including oil, into the marine environment resulting in such deleterious effects as harm to living resources, hazard to human health, hindrance to marine activities including fishing, impairment of quality for use of sea water and reduction of amenities.
Marine Environment	-	all that is covered by sea and all that surrounds the sea e.g. harbours, beaches, estuaries and the resources found therein.
Oily-mixture	-	means a mixture with any oil content.
On-Scene-Commander	-	the individual on the spot designated to act in-charge of the operations like oil combating and search and rescue.