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WORLD MARITIME UNIVERSITY

Malmö, Sweden

**THE ROLE OF MULTIMODAL TRANSPORT IN
BANGLADESH FOR EXPORT PROMOTION**

By

SYED SHABBIR AHMED

Bangladesh

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

GENERAL MARITIME ADMINISTRATION

&

ENVIRONMENT PROTECTION

1996

DECLARATION

I certify that all the material in this dissertation that is not my work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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ABSTRACT

The exports of Bangladesh have dramatically changed recently due to diversification of items. Traditionally, Bangladesh was known as a jute, tea, leather and frozen fish exporting country. These products are primary agricultural products. More than 60% of the total export share was contributed by jute in the early eighties. This scenario is now totally changed. Non-traditional items, such as ready-made garments, leather goods (shoes), knitwear, handicraft are now dominating factors in the exports of Bangladesh. More than 60% of the export share are now contributed by ready-made garments. Traditional goods are basically transported through break-bulk carrier. Non-traditional goods are basically transported through container.

Due to advent of containerisation multimodal transport has created a new era in international trade. It has two advantages; a) door-to-door service and b) just in time service. Exporters of the Bangladesh take the MT as a strategic logistic tool. With the help of MT they reduce their inventory cost in the port area and at the same time they deliver their goods just in time to the buyer's desire place.

Bangladesh has two sea-ports; Chittagong and Mongla. 80% of the total trade and 90% of the export of the country are now going through these ports. In 1987, by the help of railway, the country's first inland clearance depots (ICD) was established in the Dhaka region, because 90% of the manufactured goods exporting industries are located in the Dhaka region. This ICD links with Chittagong port. Exporters already show their keen interest for using ICD. For minimising the transport cost, Govt. of Bangladesh has a plan to establish another ICD in the Dhaka region with the help of inland waterways. After the completion of this inland container port, the competition will rise between the railway and inland waterway, which is ultimately favourable for the exporter giving a better choice of mode of transport.

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LIST OF ABBREVIATIONS

BG	Broad Gauge
BIWTA	Bangladesh Inland Water Transport Authority
BSC	Bangladesh Shipping Corporation
CBA	Collective Bargaining Agency
CPA	Chittagong Port Authority
EPZ	Export Processing Zone
EU	European Union
FCL	Full Container Load
FY	Financial Year
GATT	General Agreement of Tariff and Trade
GDP	Gross Domestic Products
GOB	Government of Bangladesh
ICD	Inland Clearance Depots
LCL	Less Container Load
MDA	Maximum Draft Allowance
MG	Meter Gauge
MOS	Ministry of Shipping
MPA	Mongla Port Authority
MT	Multimodal Transport
NAFTA	North America Free Trade Agreement
N-B	North-Bengal
NVO-MTOs	Non-vessel Operating Multimodal Transport Operators
SAARC	South Asia Association for Regional Co-operation
SAFTA	South Asia Free Trade Agreement
TEU	Twenty Equivalent Unit
UNCTAD	United Nations Conference on Trade and Development

INTRODUCTION

Non-traditional items are increasingly going to be the dominating factors in the exports of Bangladesh. These non-traditional items are basically manufactured items. Ready-made garment is one of them, which contributes 60% of the export share in the country. Actually, Bangladesh is a place for value-adding activities. Labour cost is relatively cheap in Bangladesh. It is one of the advantage of exporters for reducing the production cost. Transportation is another factor for reducing the total cost. In the case of ready-made garments, Bangladesh at first imports the fabrics, then carries out value adding activities and at last exports the finished goods. Time is very important here. "Just in time" receiving the raw materials and "just in time" delivery of the finished goods is essential for achieving the total trade -off. Only multimodal transport (MT) can provide this type of service. With the help of MT ready made garment exporters import the fabrics phase by phase and export the goods in a group basis. Storage costs in that case are minimal and productivity of the factory is in optimised level.

Natural and man made barriers are the main impediments for trade promotion. Mountain, river, desert, ice are called natural barrier, those are the main obstacles for developing the smooth transport system. Customs, tariffs and formalities are man made barriers, are indicate by the commercial policy of the country. The natural barriers of Bangladesh are mainly related to the numerous rivers and water courses that fragment the road and rail transport system. Man made barriers in Bangladesh recently has been reduced through the simplification of custom formalities and so

on. Export promotion is now one of the objective of the commercial policy of Bangladesh. Flexible exchange rates, import liberalisation and simplifying the formalities are the strategies of the commercial policy for export promotion. More over the country recently established a rail based ICD in Dhaka region, where 90% of the ready-made garment industries are situated. It is the only leg of multimodal transport in Bangladesh. For competing in the world market, the export policy has been designed to help exporters to plan their export market and product development work, so firming up the export base of the country on one hand, and to strengthen the product base of export through diversification of product and expansion of export market on the other.

This dissertation consist of six chapters. The contribution of Multimodal transport in the export promotion of Bangladesh is the main objective of this dissertation. Moreover, this dissertation explores future potential of Multimodal transport in Bangladesh. Chapter-1 provides an over view of Bangladesh foreign trade. An evaluation of the export promotion scenario is also given in this chapter. Govt. commercial policy and strategies are also discussed with in this chapter. Chapter-2 examines containerisation in Bangladesh; when containerisation was first introduced to Bangladesh, how it has flourished and the role of containers in export. This chapter also explains the importance of the inland clearance depots(ICD) for export promotion. Chapter-3 provides cost-benefit analysis of export of Bangladesh; there a comparison is made between the heavy industry and light industry connected with traditional and non-traditional export items. In addition, freight versus time benefit analysis of various combinations of mode of transport are discussed in this chapter. Chapter-4 deals with limitations of Multimodal transport development in Bangladesh; infrastructural, institutional and legal limitations are discussed here. Chapter-5 focus on future trends of trade in Bangladesh. Alternative MT approaches are mentioned here that might fulfil future transport demand. Finally, chapter-6 concludes the paper with some recommendations, that might act as guide lines for the future development of Multimodal transport in Bangladesh.

CHAPTER 1

TRADE OF BANGLADESH

1.1 EXPORT AND IMPORT SCENARIO OF BANGLADESH

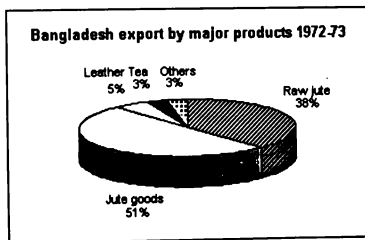
Bangladesh is situated on one of the largest deltaic plains in the world. More than 200 rivers cross the country. Most of the rivers originated from the Himalayas, passing through the country to the Bay of Bengal. Bangladesh lies between 20.34°-26.38°N latitude and 88.01°-92.50°E longitude. It is bordered by the Bay of Bengal in the south and by India in the north, east and the west. There is a small strip of frontier with Myanmar on the south eastern edge. Bangladesh has a tropical monsoon climate characterised by rain bearing winds, warm temperatures and high humidity. The country has mainly four seasons, winter(Dec-Feb), summer(Mar-May), monsoon(June-Sep), and autumn(Oct-Nov). Average temperatures in summer varies from 22°C to 35°C. In winter it varies from 8°C to 14°C. The average rainfall in summer more or less 150 millimetres. In winter it is less than 10 millimetres. Due to this scenario, Bangladesh has a great potential for agriculture. Agriculture plays a vital role in the national economy. About 75% of the total population of the country depends on agriculture directly or indirectly. The agricultural sector contributes

nearly 40% of G D P. Rice and Jute are two cash crops. Other crops are tea, sugarcane, oilseeds, fruits, vegetables, spices, wheat, potatoes, tobacco and cotton. The major industry in Bangladesh is Jute processing followed by cotton, steel, garments, pharmaceuticals, frozen fish and frogs legs.

1.1.1 Export

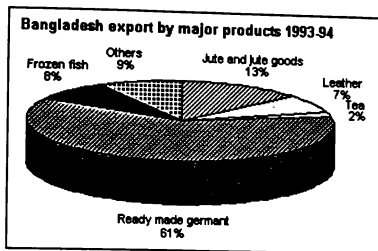
Traditionally Bangladesh was known as jute, tea, leather and frozen fish exporting country. Among them jute was the main dominant item. In the nineteen seventies, jute individually contributed more than 80% of the export share. Today this scenario is totally changed. Jute is now replaced by ready- made garments. More than 60% of the export share is now contributed by ready- made garments. How ever jute is still one of the main export items of the country.

Figure-1



Source; Bangladesh export statistics,1993-94

Figure-2



Source; Bangladesh export statistics,1993-94

In value terms, Bangladesh earned US\$2533.90 million from export in FY (Financial year) 1993-94, which is a 6.34% increase in comparison to the previous FY. A statement of comparative yearwise export earning for six years are given below:-

Table-1 Year wise export earning

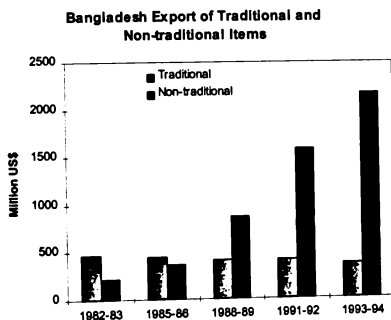
(Value=US\$)

FY	Export earning
1988-89	1291.56
1989-90	1523.70
1990-91	1717.55
1991-92	1993.92
1992-93	2382.89
1993-94	2533.90

Source; Bangladesh export statistics 1993-94

Out of US\$2533.90 million (FY 1993-94), US\$2166.85 million (in percentage 85.51%) is from non-traditional items. In the early seventies, this scenario was totally different. At that time 90% of export earning were contributed from traditional items e.g. jute. These non-traditional items are basically manufactured products rather than primary products. Ready-made garments, knitwear, handicraft, leather goods, naptha, chemical products, electronics, chemical fertilizer, vegetables, furnace oil and ceramic tableware are the presently main non-traditional items of export of Bangladesh at present. Of course, ready-made garments is occupying the leading position among them. Nearly, US\$1725 million is earned by the above mentioned non-traditional items in FY 1993-94. Ready-made garments including knitwear individually has earned US\$ 1556 million in the same FY. So, ready-made garment is the main dominating factor in the export of Bangladesh.

Figure-3



(Source; Bangladesh export statistics -1993-94)

1.1.2 Import

The main import items of the country's are mineral products, iron & steel, transport vehicles, chemicals, animal / vegetable fats and oil, live animals and products, and textile and textile articles. The country's import payment for FY 1993-94 was

US\$4191 million, which shows 60.46% of the export earning. A statement of export as a percentage to import for the period 1982-83 to 1993-94 is given below.

Table-2 Export as a percentage to import

(Value in million US\$)

FY	Export	Import	Export as a percentage to import
1982-83	687	1923	35.73%
1983-84	811	2073	39.12%
1984-85	934	2641	35.37%
1985-86	819	2120	38.63%
1986-87	1074	2260	47.52%
1987-88	1231	2961	41.57%
1988-89	1292	2997	43.11%
1989-90	1524	3759	40.54%
1990-91	1718	3511	48.93%
1991-92	1994	3466	57.53%
1992-93	2383	3986	59.78%
1993-94	2534	4191	60.46%

Source; Bangladesh export statistics 1993-94

In comparison with three consecutive FY (1989-90,90-91, 91-92), the general price index of exports were 101.88, 126.03 and 127.40 respectively. On the other hand the general import price index were 105.13, 123.15 and 147.48. So, the indices of the country's term of trade were 96.90, 102.3 and 86.38 respectively. The contribution of imports in G D P has been almost same in last four years but the export contribution to G D P is little bit increasing.

Table-3 Contribution in import /export in GDP

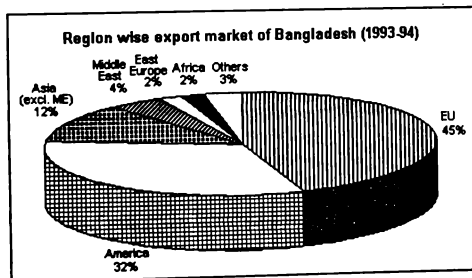
Trade	FY 1988-89	FY 1989-90	FY 1990-91	FY 1991-92
Export in GDP	14	15	14	15
Import in GDP	6	7	7	8

Source; Statistical year book of Bangladesh -1994

1.1.3 Export market

The region wise trend of export reveals that countries of EC region are the highest buyers of Bangladeshi products. Other important regions are the American region, Asia region(excluding middle east), Middle East, East- European region, African region and Oceania.

Figure-4



Source; Bangladesh Export Statistics,1993-94

In country terms, no doubt, U. S. A is individually the largest buyer of the Bangladeshi products. Other than U. S. A, EU countries; Germany, U. K, Italy,

France, Netherland, Belgium are the major importing countries of the Bangladeshi products. In order of monetary value 10 major importing countries of Bangladeshi products are; U.S.A, Germany, U.K, Italy, France, Netherland, Belgium, Hongkong, Japan and Canada. U. S .A , Canada and EU countries import mainly ready-made garments and knitwear, i.e. manufactured products. Hongkong mainly imports leather, Japan mainly imports shrimp and leather, there fore Asia region mainly imports primary products. However, the following table shows the types of commodities which are mainly imported by the above mentioned regions as well as countries.

Table-4 Share of commodities by major importing countries

A) EU region

Sl. no.	Countries	Value in US dollar (FY-1993-94) (In thousand)	Commodities	Share of percentage
1.	Germany	275,213	Ready-made garment Knitwear Shrimp Jute & Jute goods Leather Others	63.68% 22.29% 7.98% 1.98% 1.45% 2.62%
2.	U .K	259,264	Ready-made garment Knitwear Shrimp Jute & Jute goods Leather Others	53.72% 20.08% 8.66% 4.99% 1.35% 11.2%
3.	Italy	170,606	Ready-made garment Knitwear Shrimp Jute & Jute goods Leather Others	63.83% 7.50% 1.90% 1.29% 21.73% 3.75%

4.	France	157,718	Ready-made garment Knitwear Shrimp Jute & Jute goods Leather Others	71.83% 18.49% 0.79% 1.42% 5.03% 2.44%
5.	Netherland	104,898	Ready-made garment Knitwear Shrimp Jute & Jute goods Leather Others	48.86% 26.76% 13.00% 2.55% 1.95% 6.88%

B) America region

1.	U.S.A	734,817	Ready-made garment Knitwear Shrimp Jute & Jute goods Others	75% 5.51% 9.3% 3.02% 7.17%
2.	Canada	57,225	Ready-made garment Knitwear Jute & Jute goods others	73.46% 13.86% 5.64% 7.04%

C) Asia region

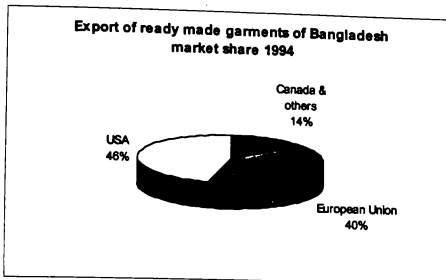
1.	Hongkong	72,097	Leather Dry fish Ready-madegarment Fertilizer Shrimp Others	65.46% 12.35% 7.00% 2.78% 2.02% 10.39%
2.	Japan	61,024	Shrimp Leather Jute & Jute goods Fertilizer Ready-made garment Others	39.55% 18.81% 18.36% 6.76% 4% 12.52%
3.	Singapore	52,898	Jute & Jute goods Furnace oil Fertilizer Naptha	28.69% 17.04% 13.67% 12.50%

			Shrimp/crabs Leather Ready-made garment Others	11.36% 6.11% 4% 6.63%
4.	Pakistan	21,064	Tea Jute & Jute goods Accumulator battery Others	57.10% 29.48% 3.40% 10.02%
5.	India	16,806	Jute & Jute goods Fertilizer Leather Tea Others	56.2% 20.63% 12.70% 3.24% 7.23%

Source ; Bangladesh export statistics 1993-94

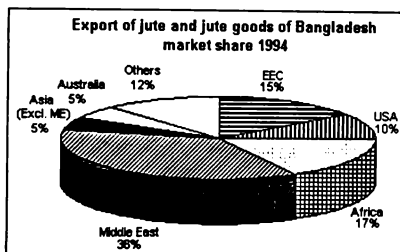
Notice that in 1994, the market share of ready-made garments was 46% in U. S. A, 40% in all European countries and 14% in Canada and others. Moreover, in the same year Bangladesh was the 5th largest and 6th largest supplier of the ready-made garments in EU and U. S.A respectively. In respect of Jute, the Middle East is the largest buyer of the raw jute and jute goods. In the FY 1993-94, Middle East accounted for 35.79% of the total jute and jute goods export share. Syria and Iran are the main buyer of the jute and jute goods from Bangladesh. After that Africa was the second largest buyer.

Figure-5



Source; Bangladesh apparel & textile exposition '95

Figure-6



Source: Annul Jute goods statistics, 1994-95, vol-84.

1.2 CAUSES OF EXPORT PROMOTION

Just after the independence, that means, in the early seventies Bangladesh was follower of the command economy. In that system trade was controlled by Govt. import substitution was more important than export promotion. So, the country's export earnings only depended on the basis of absolute advantage theory. Only for that reason the country exported primary agriculture products, such as, jute, tea, leather and frozen fish. Among them jute was the dominating factor in the exports of Bangladesh. At that time Bangladesh was the main jute exporting country in the world. But after the invention of artificial fibre the world jute demand declined sharply. Consequences of that the term of trade was not favourable. This trade imbalance affected country's balance of payment. The overall macro-economic situation was going down. Inflation and unemployment was increasing, on the one hand, while foreign exchange reserve were going down day by day.

In the beginning of the eighties the country's economic policy was changed. The country switched from a command economy to a market economy. Trade liberalisation is now the country's commercial philosophy. The Govt. is less intrusive with regard to price of the commodities; market will decide prices based on supply and demand theory. Import substitution has now been abandoned and export promotion get more importance in commercial policy.

1.2.1 The Export policy of Bangladesh

In fact, primary commodity prices have been declining since the mid-1970 all over the world. As a traditional primary commodities exporting country, Bangladesh was affected in two ways.(1) Due to invention of artificial fibre, the jute market was squeezed. (2) Due to declining prices, the export-earning also declined in value terms. In order to compete on the world market, an export policy has been planned to help exporters to plan their export market and product development work. This would lead to a stronger export base on the one hand, and to a strengthen product base for export through the diversification of products and the expansion of the

export market, on the other hand. The main objective is to achieve higher rate of export growth and export earning in order to accelerate the overall economic development of the country.

1.2.2 Objectives of the policy

The following objectives have been kept in view while formulating the export policy.

- A) To narrow down the gap between export earning and import payment.
- B) To improve the quality of exportable and expand the list of value added products.
- C) To diversify traditional products in consonance with the requirements of overseas market for securing higher prices.
- D) To create a conducive environment for establishing backward linkage industries in the export- oriented industries sector and thereby contributing toward increasing the value addition margin.
- E) To make the export trade more attractive in comparison to import trade and import substitution industries through rationalisation of existing export incentives.
- F) To expand and strengthen country's position in existing export market and create new markets.
- G) To create employment opportunities particularly for educated unemployed section of population through strengthening of production base of exportable and undertaking vigorous marketing efforts.

(Source; Bangladesh Economic survey 1991-92)

1.2.3 Strategies for export promotion

The world market is now very competitive. There are so many countries trying to enter the same export market with their commodities. The country which provides the required quality of product with the cheap of price, will ultimately conquer the market. Conquering the market is not an easy thing. It needs some strategies. In general there are three strategies essential for export promotion.

(i) Monetary and financial strategy

(ii) Administrative strategy

(iii) Infrastructural strategy

(i) Monetary and financial strategy:- For achieving the export target this strategy plays a key role. Exchange- rate management, income tax rebates and the creation of an export promotion fund (EPF) are the main tools of this strategy. Among them the exchange management is the most important, because exchange rates determine the competitiveness of the commodities in the international market. There are two types of mechanism for exchange rate management. One is fixed exchange- rate mechanism, another is flexible exchange- rate mechanism. In order to strengthen the competitiveness of the exportable goods in the international market and there by improve the current account position of the balance of payments Bangladesh has followed a flexible exchange rate policy.

For the export promotion, the Govt. of Bangladesh provides some financial incentives to the exporters. One of is income tax rebate. At present, there is a provision for income tax rebate up to 60% on income earned from exports of all items other than jute, jute goods and tea. In order to assist the exporters to stay internationally competitive, an income tax rebate up to 100% shall be extended on the income earned from export of any commodity.

For the quick expansion of the export trade, it is necessary to develop and diversify the products and to expand and consolidate the export market. For fulfilment of this object, the Govt. has already created an export promotion fund (EPF). Exporter may take assistance from it for invention of new export item or the creation of a new export market.

(ii) Administrative strategy

Impediments against the growth of exports initially were the innumerable administrative bottlenecks at every stage of import of raw materials and the export of finished products. After realisation of the potential of non-traditional items of exports then Govt. took a number of pragmatic steps to stream line import and

export formalities. The following action by the government acted as encouraging factors for rapid growth of the export.

a) Import liberalisation :- A rational import policy can play an important role in expanding export trade. Owing to present resource constraints, the manufacture of major industrial products of Bangladesh are dependent on imported raw materials. So, the government has introduced a system of opening back to back letters of credit for importing raw materials for export oriented industries.

b) Simplifying the formalities for foreign investors:- The government now trying to attract foreign investors in the country. For that reason the government has established export processing zones (EPZs). From EPZs investors have a opportunity to sent their 100% profit to their home country. There is custom barrier for import of machinery, raw materials and semi-manufactures for subsequent processing in the EPZs. In order to make their visits to and from Bangladesh easy and trouble free, the foreign investors and importers now enjoy the multiple entry visa.

iii) Infrastructural strategy:- Proper development of infrastructural facilities is necessary for expansion of the export trade. There are three basic types of infrastructure.

(a) Land

(b) Transport infrastructure

(c) Tele-communications infrastructure

(a) Land :- Land and land development are included in this group. For the attraction of foreign investors, the government of Bangladesh reserves some special area. These are generally called Export Processing Zones (EPZs). Foreign investors, those with intention of exporting 100% of their products, may enjoy the EPZs facilities. Ownership of the land of EPZs is totally in government hands. The government provide the land to the investors on the rental basis with very simple conditions. Govt. also provide the other facilities, like as, gas, electricity and water.

(b) Transport infrastructure:- For resource mobilisation, transport is essential. If there is not a good transport network, the price of the products automatically rises. Only for that reason the government of Bangladesh has considerably emphasised the transport sector. Especially, the ports and EPZs are now well connected by road and rail. Railway and port authority jointly provide the services to the customer through inland clearance depots(ICD). For minimising the transport cost, Govt. of Bangladesh has a plan to establish another ICD with the help of inland water ways and sea ports.

(c) Tele-Communication infrastructure:- Because of tremendous communication developments the world has become smaller. Now a days buyers and sellers communicate with each other via E-mail, Fax and Telex rather than normal postal procedures. The telephone is most the important media for business conversation. The invention of Electronic Data Interchange (EDI) is a new era in information system. It minimises paper work. So, for competing in the market, exporters needs this type of modern technology. Only for that reason, the government of Bangladesh give sufficient emphasis on the development in telecommunications.

1.2.4 Other important factors for export promotion

Govt. policy and strategy always acts as a catalyst to encourage the rapid growth of exports. The country's macro- economic situation is the main indicator for export promotion. The macro- economic situation is now favourable for local and foreign investors. Inflation has been now within 2 to 6 per cent annually for last 10 years. Foreign exchange reserves are now more than US\$2000 million. The development of physical infrastructure such as, road & highway, rail, ports, telecommunication are now satisfactory for resource mobilisation. Social infrastructure such as ,the eradication of poverty, restoration of law & order situation and political stability are also encouraging to local and foreign investors to invest sectors where they find potential.

The ready made garment industries have high potential in Bangladesh. This industry began to be established from 1978. Up until the end of 1983, there were 47 garment manufacturing units. This number has now reached 2200. One of the main cause of the flourishing of this industry is cheap labour. Bangladesh is a one of the most densely populated countries in the world. There potential work force is large, especially among of woman, who are the main working force in this industry. 90% of the workers of the garment industry are woman. The level of technology of this trade is not very high. Obviously, the existence of such cheap, but easily trainable, labour is one of the advantages of Bangladesh.

Other important factors which pave the way for the fast growth of this industry are:-

- a) Initial capital requirement is relatively low. One only needs to import the sewing machines be installed in rented premise.
- b) The gestation period is low as machinery are available at nominal lead time. Time of installation is small and one can go into production with in a period of 4 to 6 months.
- c) The turnover ratio is high comparatively to the investment
- d) Because of low gestation period and prospect of quick turn over, the commercial banks come forward to finance these enterprises and finance is available quite easily.

1.3 IMPACT OF TRANSPORT IN EXPORT

Transportation is essential for the exploitation or development of economic resources on a national or international scale. It allows articles or materials to be conveyed from areas of low utility to areas of high utility. In the case of exports, it plays a significant role in two ways. (1) If the country is a primary commodities exporting country, that means, country usually exports its main agricultural products or main mining products, then the country only relies upon one way traffic, from the producing country to the consuming country. The mainly importing country bears the transport cost. The exporting country only competes in terms of price with other countries who produce the same raw material. (2) The countries importing the raw

material, add value to the material through labour and technology, and export the manufactured goods to the other part of the world. In this case, transportation plays a significant role, because this transportation cost is one of the factors which determines the price of the products. More over, this transportation is the part of the logistic management of the exporter. It is exporters jurisdiction what type of logistic strategy he would take for competing the market. If there is frequent transport service, he has a opportunity to reduce his inventory cost. Modal choice and vehicle selection also play a very important role in minimising the transport cost. The Product's characteristics influence the exporter's decision. If the product is perishable in nature, it needs short transit time. In that case, exporter has two options. (1) To choose the faster mode of transport or (2) To select refrigerator carrier, which maintain the product's quality for a long time. Other important characteristics are weight, volume and value. Traditionally, tariffs for the transport of goods are based on the nature of the commodity. Basically, there are two methods to determine freight rate.

(a) Value to weight ratio

(b) Volume to weight ratio

The value to weight ratio influences the freight rate, particularly where commodity rates are in existence and very valuable products are being shipped, but it is especially important when considering the cost of freight and associated costs as a percentage of the selling price of the product being carried. Transport costs are most commonly tied to the weight of the product. The value of the commodity is one of the most important factors influencing the selection of air transport. The most modern tendency has been to base the freight rate on weight and volume combination only irrespective of the value of the products been carried. After the innovation of container, "freight of all kinds" (FAK) rate is more and more popular in transport sector.

1.3.1 Overview of transport of Bangladesh

Bangladesh, being an extremely flat and low-lying alluvial plain delta, all the three mechanised formal modes of surface transport; road, inland water transport(IWT) and rail ways, play significant roles in the movement of goods. The relative role of these modes are evolving with road transport growing progressively as well as sharply at the expense of the other two modes. The present overall freight transport output estimates, in respect of the three mechanised modes of surface transport, together with their percentage shares for 1974/75, 1984/85, 1988/89 and 1992/93 are:-

Table-5 Freight share of different mode of transport

Sl. no.	Year	Total Ton-km (billion)	Percentage share		
			Road	IWT	Rail
1	1974-75	2.6	35	37	28
2	1984-85	4.8	48	35	17
3	1988-89	6.3	59	30	11
4	1992-93	9.0	61	32	7

Source; Bangladesh transport sector study 1994

Road transport continues to be the most dynamic mode of transport development in Bangladesh. The paved road network has very vastly expanded from a mere 600 km in 1947 to 15,000kms by the end 1993. IWT contributes about a third of the overall freight transport output. Classified navigable waterways have been shrinking due to siltration and reduced stream flow during the dry season. The length of such waterways declined from about 8,300 km in 1983/84 to around 6,000 km during the dry season. The railways operate a dual gauge rail system. Since independence, the railway totally operated 4400km of track. Of this 4400km, 1528km are broad gauge and 2872km are meter gauge. Basically the country is divided into two railway zone. (1) western zone, where broad gauge is the main dominating factor. (2) Eastern zone,

where all the track is meter gauge. The difference in gauge is no doubt, a major problem because of difficulties to matching both zone. Further more, one of the big river, the Jamuna, which crosses the country from north to south is the main obstacle for unifying both zones. However, eastern zone is the least affected part, because of unhindered to seaport.

Bangladesh's international trade is essentially sea-borne; being more than 90% of the total. This is handled through its two sea-ports-Chittagong and Mongla. Chittagong is the older and the principal sea-port of the country. Situated in the south-east, it handles 76% of Bangladesh's 10 million tons of annual foreign trade by sea. More over, in recent years, the transport demand for the freight traffic has grown faster than the economy in general. Between 1984-85 and 1992-93, the G D P growth rate was 5.5 percent per year compared with nearly a 8.2 percent growth in freight transport demand. This suggest a G D P elasticity of freight transportation demand to be about 1.5. Transport intensities in Bangladesh are expected to increase considerably in the coming years as the country continues to move from subsistence to a more market- based economy and as the major transport barriers (e.g. Jumuna river crossing) are overcome.

1.3.2 Role of transport in export

It has been noted that, Bangladesh is a traditionally jute exporting country. Most of the areas of the country are suitable for jute production. In view of deltaic nature of the country, strewn with many rivers and water courses, the extensive navigable waterways include channels for low draft country boats, and total 13,000kms playing a strategic role in providing accessibility to remote areas of the country side. More than half of the country's land area and three quarters of 10km of a navigable waterways during all seasons. Due to this scenario jute exporting activities are totally depended upon the waterway transportation system. Initially farmer produced the jute and carried it to commercial centres by low draft country boats and then on to seaport, also by inland waterways. From the sea port to the destination(the importing

country's sea port) it is carried by break-bulk ship. So, all the activities utilise the cheapest mode of transport. The transport costs of jute exports are relatively low. This is one of the advantage of Bangladeshi jute in competing on the world market. It occupies the first position among other jute exporting countries, like as, India, China and Thailand.

In the case of non- traditional items, especially ready made garments, this scenario is totally changed. From the beginning of the eighties, Bangladesh entered into this new era. In that case cheap labour is main factor for achieving comparative advantage. Bangladesh has a lot of skilled and unskilled manpower. But this cheap labour is useless if there is no flow of resources. These resources are the raw materials of the industries and proper technology. Technology makes the labour unskilled to skill manpower and increase productivity. Moreover Bangladesh now has a favourable commercial policy for promoting exports. Import liberalization is one of the strategies to promote the ready- made garment industry. So, transportation can now play the role of catalyst to promote the export.

At first exporter has a obligation to import the fabrics in time and then add value to these fabrics through labour and technology, and at last deliver the goods to the importing countries just in time. Time is a very important factor. So, those modes of transport or the combination of transport modes provides this type of services, are of the importance to the exporter. A good and efficient transport network and services also influence the exporter to take the logistic strategy. Transportation is a part of logistic management.

The eastern part of the country has a more favourable transport network to develop the ready made garment industry. It is in that part of the country that the main sea port is situated. This sea port has well connected hinterland facilities up to the capital. Due to this scenario the country's 1800 ready made garment factories are situated in this belt. It should be noted that Bangladesh has 2200 ready made garments industries units.

CHAPTER 2

CONTAINERIZATION IN BANGLADESH

2.1 THE IMPACT OF CONTAINERIZATION ON EXPORT

Containers started coming to Bangladesh in small numbers in the late seventies, when no shore facility was there. In fact Bangladesh handled containers relatively slowly in comparison with other neighbouring countries.

Table-6 Container handling at selected Asian countries

Countries (Port)	(in thousand TEUs)				
	1982	1986	1990	1994	Average growth rate
Bangladesh (Chittagong)	5.9	50.3	103.6	191.1	21.1%
Pakistan (Karachi)	124.2	244.1	339.8	509.9	12.5%
Srilanka (Columbo)	103.2	243.9	583.8	972.6	16.6%
India (Calcutta)	5.3	54.7	75.6	96.0	6.8%
Thailand (Bankok)	259.4	511.2	1018.2	1394.7	9.2%
Malaysia (Keleng)	210.3	242.2	496.5	943.8	22.5%
Taiwan (Kaohsiung)	-	2482.4	3494.6	4899.8	10%
Singapore	1116.3	2042.9	5058.8	10399.4	26.3%

Source; Containerisation International year books

It is remarkable that after the advent of containers in the Bangladesh, their use has grown very rapidly. In 1982 Bangladesh handled only 5,900 TEUs, whereas in 1995 more than 200,000 TEUs of containers were handled by the country's two sea- ports.

Table-7 Containerisation in Bangladesh

Financial year	Containers handled (in TEUs)	Growth rate
1984-85	29,453	
1985-86	49,993	69%
1986-87	64,303	28.6%
1987-88	69,589	8.2%
1988-89	91,478	31.4%
1989-90	120,419	31.6%
1990-91	120,975	0.5%
1991-92	134,964	11.5%
1992-93	163,163	20.8%
1993-94	190,186	16.5%
1994-95	243,178	27.8%

Source; CPA, MPA

2.1.1 Role of container in Export

In early seventies, no single shipment for export was transported by container. Now 54.9% of export cargoes are transported through container. Due to the diversification of export items, this change has happened. Except for raw jute, the other main export items are now exported through container. In commodity wise; 100% of ready-made garments are exported through container, and jute goods and leather goods are rapidly shifting from general to container cargo. The total volume of frozen fish, especially shrimp is exported through refer container. A significant volume of tea is now transported through container. One thing that is very remarkable in recent years is the small portion of raw jute also transported through container.

In comparison with import, the containerization process in terms of export is faster. In the early eighties, nearly 6% of imported cargoes were containerized. At the same time nearly 19% of the exported cargoes were containerized. In recent years, the volume of both import and export containerized cargoes has risen very rapidly. However, containerization of exports is quicker than of imports. In fact it depends upon the nature of the cargo. Those cargoes which have a possibility to convert to containerization, ultimately will do so. In case of import, petroleum product and cement can not possibly be carried in container. So, the containerization in imports will be rather slow in the near future. But in the case of export, all commodities can be carried within container. So, in the near future all exportable items will be exported through container.

Table-8 Ratio of containerized cargoes in import & export

FY	Import	Export
1983-84	6%	17%
1989-90	18.80%	42.1%
1990-91	18.15%	46.7%
1991-92	26.05%	48.47%
1992-93	20.6%	50.45%
1993-94	33.00%	54.90%

Source; CPA, MPA.

2.1.2 Impact of containerization in port

The overseas trade of Bangladesh is funnelled through two sea ports; Chittagong and Mongla. Chittagong is situated on the right bank of River Karnafuli at the distance of 9 nautical miles from the shore line and Mongla is located at the confluence of the river Pussur and Mongla Nulla about 43 nautical miles from the estuary of River Pussur. Chittagong port is the principal port of Bangladesh. 80% of the import cargoes and 70% of the export cargoes are handled by this port.

Table-9 Share of cargoes in Chittagong and Mongla ports

FY	Total cargo (unit- tons)	Chittagong port		Mongla port	
		Export	Import	Export	Import
1984-85	9,821,293	329,968	6,828,187	577,087	2,086,051
1985-86	8,675,353	338,033	5,814,148	762,003	1,761,169
1986-87	8,547,609	403,835	5,855,838	730,793	1,557,143
1987-88	10,630,836	638,648	7,128,729	627,691	2,235,768
1988-89	10,475,483	834,320	7,122,310	637,105	1,881,748
1989-90	10,081,179	695,510	6,798,822	694,989	1,891,858
1990-91	9,701,449	918,512	6,322,362	556,770	1,903,805
1991-92	9,687,764	770,389	6,267,437	597,655	2,054,283
1992-93	9,995,093	1,120,082	6,496,301	620,783	1,757,927
1993-94	9,828,200	1,169,186	6,728,118	467,478	1,463,418

Source; CPA, MPA

Mongla actually handles more break-bulk cargo than containerized cargo. Only 15% of the total cargoes are containerized in Mongla. On the other hand Chittagong handles more than 50% of the containerized cargoes of its total volume. In fact more than 80% of the country's total containers are handled by Chittagong port.

Table-10 Containers handled in Chittagong and Mongla port

FY	Total containers (Unit-TEUs)	Handled by Chittagong port	Handled by Mongla port
1988-89	91,478	77,522	13,956
1989-90	120,419	103,940	16,479
1990-91	120,975	105,772	15,203
1991-92	134,964	121,326	13,638
1992-93	163,163	150,497	12,666
1993-94	190,186	174,938	15,248
1994-95	243,178	225,248	17,930

Source, CPA, MPA

Chattagong specialises in container. Mongla is better for break-bulk handling. Accordingly the imports and exports of both ports are different. Mongla has more or less the same ratio (15% to 17%) of containerized cargo in imports and exports. But in the case of Chittagong, this scenario is totally different. In 1983-84, the ratio of containerisation in imports and exports as 6.2% and 27.1% respectively. In 1993-94, these figures changed to 43.30% and 90.60%. So, Chittagong port now exports almost all exportable items through container.

projected container traffic and furnished plans for building up an interim facility in the existing break-bulk cargo handling area of the port along side plans for construction of a new 2 berth multipurpose terminal. It was then estimated that by 1985 the port container operations could shift to the new terminal entirely. A project was accordingly taken up for implementation with IDA's assistance and later in 1984 Finish assistance was made available for the interim container handling developments. The first lot of container handling equipment was put into operation in May, 1985 and from then onwards container throughput started growing at a very fast rate and the actual throughput in 1989 was 100,529 TEUs against Mainsail forecast of 80,000TEUs. One of the cause of this rapid growth of containerization was flourishing export of ready-made garments.

While the ready- made garment industry flourished very rapidly, the exporter required safe and reliable transport service to his desire premises, which would reduce his inventory costs. The exporter also expected such type of transportation, which would give him assurance to deliver the goods just-in-time. At the same time CPA also felts the need to reduce the congestion of containers in the port area. The exporter's expectation and CPA's motives were fulfilled by multimodal transport. Containers played a vital role at that time. It has already been mentioned that most of the garments factories are located in the Dhaka region. So, all most of the exportable ready-made garments come from Dhaka. Dhaka is well connected by road, rail and inland waterways to Chittagong port. But problem is that except for rail the other two modes of inland surface transport are not able to carry the containers. Road haulier are only capable of carries 5 tons of weight. The inland waterways has no vessel to carry the container and moreover there is no shore facility to handle the container. So, the only viable option is rail. Rail is capable of carrying the container with little change of wagon. Due to the advantages of containers, the rail way agreed to provide a reliable and safe transportation service. Only for that reason, the country's first inland clearance depots (ICDs) was established in Dhaka in 1987.

2.2.1 Role of ICD in export

Multimodal transport is based on door-to-door transportation. Containers require an appropriate physical infrastructure not only for the inland carriage of containers but also for the handling and positioning of the containers at inland points.

The concept of multimodal transport requires the establishment of inland clearance depots (ICD), permitting consignments to remain unbroken from a place close to the consignor to a place close to the consignee. The main purpose of the ICD is custom clearance of the goods in the inland area rather than at the port. In that case ICD is considered as a gate way. It is a total transportation system. The only difference is that two or more modes of transport are used, but it is considered as one part of a chain of transportation.

As a ready-made garments exporting country, Dhaka is rail based ICD meets the manufacturer's requirement. Most of the garments industries are located within the 20 km radius of the Dhaka ICD. It now has 25,093sq.m area with a daily holding capacity 250FEUs/500TEUs. There are 3 Nos. Of container Freight Station (CFS) in the ICD area. At present two container express trains operate daily between Chittagong port and Dhaka ICD(except on govt. holidays). These facilities encourage the exporter to adopt new logistic strategies for his export promotion. At present exporter/ manufacturer enjoys the following direct and indirect benefits from ICD.

- (1) Low inventory cost
- (2) Minimum transit time
- (3) Reliable and safe transportation
- (4) Optimum use of worker in the factory
- (5) Save the installation cost in port area

(1) **Low inventory cost:-** Due to ICD, the exporter/manufacturer does not now need to store goods for a long time. After the completion of production, the exporter sends the exportable items to the CFS. CFS compiles all LCL cargoes. Because of a daily train service, the cargoes loaded to the train on the same day. If the cargo is

FCL in nature, then the exporter/manufacturer load the cargo into the container on his factory floor.

(2) Minimum transit time:- If the exporter use the Dhaka ICD, there is little transit time in the Chittagong port, because the rail leg part of the total transport system. If the exporter does not use the ICD, then he may carry the goods by road or other mode of transport, but the cargo should reach in the port area a minimum of three days before of shipment.

(3) Reliable and safe transportation:- Rail always provides reliable and safe transportation. Insurance cost of rail transportation is comparatively low than other modes of transport, because of the low risk of damage and pilferage.

(4) Optimum use of workers in the factory:- In the case of the garments industry, the manufacturer depends upon imported raw material. If the manufacturer use the Dhaka ICD, then he use the worker in optimumally, because ICD provide just-in-time delivery of raw material at the nearest point of the factory. So, there is no idle time for workers.

(5) Save the installation cost in port area:- If Dhaka ICD did not exist, the exporter would bear the agent's cost in the Chittagong port area. Not only when the imported raw materials come into the port, he would physically or through agent clearing the custom and other formalities on the port area. It bears some cost. Due to ICD, this cost is now at a minimum level.

Due to the above circumstances, Dhaka ICD is flourishing rapidly. It has already reached saturation point. An interesting point, based on Dhaka ICD statistics is that exporters are more interested in ICD than importers, because exporters have tighter schedules than importers.

Table-12 Container handled by Dhaka-ICD

(Unit=TEUs)

Year	Import	Export	Total
1987	24	57	81
1988	178	200	378
1989	1164	685	1849
1990	1174	2051	3225
1991	1901	2330	4231
1992	2747	4025	6772
1993	5317	9195	14512

Source; Dhaka, ICD, 1994

2.3 IMPACT OF FORMALITIES AND DOCUMENTATION IN MULTIMODAL TRANSPORT THROUGH CONTAINERIZATION

How fast cargo moves to its destination does not only depend upon the speed of carrier or effectiveness of cargo handling but also depends upon the quickness of documentation. Modern container vessels are relatively speedier than break-bulk carriers. Container handling is quicker than break-bulk cargo handling. Documentation and formalities in the port are almost the same for any kind of cargo. Documentation is totally paper work. It is evidence of contract and a reflection of cargo movements on paper. If anything happens, especially loss and damage of cargo, then document acts as evidence for fixing the liability. Formalities are also essential in the port area for the security of cargo and the prevention of smuggling. So, because of the several agencies involved in the port area, formalities are another cause of delay.

2.3.1 Documentation

Processing an export consignment involves extensive documentation. However, there are four basic types of contractual document which play vital roles in international trade. Other auxiliary documents are generated on the basis of these documents. These four contractual documents are:-

- (1) The export sales contracts
- (2) The contract of carriage
- (3) The financial contract
- (4) Contract of cargo insurance

After introducing the multimodal transportation the traditional terms of conditions in the contract has been changed. INCOTERM'90 is the new version of the contract of carriage.(Appendix-1)

2.3.2 Bill of lading

Containerization creates the demand in shipping to change the bill of lading. Due to the flexible character of a container, it is used to the consignee's door. In that case container may be transported by two or more different modes of carrier. To avoid the complexity, shipping lines now issue a combined transport bill of lading or a through bill of lading.

Due to containerization another document, "Groupage bill of lading" is a new invention in shipping sector. It plays very significant role in export. Forwarding agents are permitted to group together particular compatible consignments from individual consignors to various consignees, usually situated at the same destination(country/area), and dispatch them as one consignment. At the destination, another agent working in close liaison with the agent forwarding the cargo with break-bulk consignment and distribute the goods to the various consignees. This practice is now very popular in Bangladesh, because the garment industry in Bangladesh is basically a small industry. Individual manufacturers do not have enough cargo for shipment as single unit consignments. This practice will increase

with the development of containerisation and it is ideal to the shipper who has small quantities of goods available for export. The advantages of groupage include; less packing, lower insurance premiums, usually quicker transits, less risk of damage and pilferage, and lower rate when compared with such cargo being dispatched as an individual parcel/consignment. Moreover the exporter has an opportunity to avoid the extra burden of documentation.

2.3.3 Formalities

Customs and security formalities are the main formalities in the port area. Due to containerization, custom formalities are now easier than ever before. Local export control(LEC) procedure are now increasing day by day. Those exporters who regularly ship goods as unit loads e.g. in secure container(FCL) can have their goods cleared for exportation at their own premises provided that certain specified conditions are satisfied. Apart from unit loads, other containerized cargo can be cleared by custom in ICDs area rather than the port area.

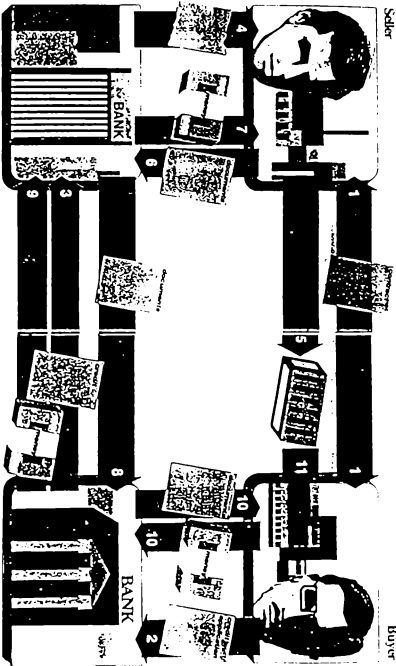
The assurance of security of container cargo is easier than for break-bulk cargo, because only one security seal in the container is sufficient. But in case of break-bulk cargoes more security efforts are needed. So, container's security formalities are easier than other types of cargo. It is one of the reason that container are allowed to be carried out side port.

Figure-7

1. The Buyer and the seller conclude a sales contract providing for payment by documentary credit.
2. The Buyer issues the credit, stating that he will issue a credit in favour of the bank, usually in the country of the seller, to advise or confirm the issuing or confirming bank, usually in the country of the seller, that the credit has been issued.
3. The issuing bank asks another bank, usually in the country of the seller, to advise or confirm the issuing or confirming bank, usually in the country of the seller, that the credit has been issued.
4. The advising or confirming bank informs the seller that the credit has been issued.
5. As soon as the seller receives the credit, and is satisfied that the credit meets its terms and conditions, he is in a position to deliver the goods and documents to the bank.
6. The seller then sends the documents to the bank, requesting the bank to issue the credit in favour of the issuing or confirming bank, usually in the country of the seller, to advise or confirm the issuing or confirming bank, usually in the country of the seller, that the credit has been issued.
7. The bank checks the documents against the credit requirements of the credit. If the documents meet the requirements of the credit, the bank issues the credit in favour of the issuing or confirming bank, usually in the country of the seller, to advise or confirm the issuing or confirming bank, usually in the country of the seller, that the credit has been issued.
8. The bank issues the credit in favour of the issuing or confirming bank, usually in the country of the seller, to advise or confirm the issuing or confirming bank, usually in the country of the seller, that the credit has been issued.
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12. The bank issues the credit in favour of the issuing or confirming bank, usually in the country of the seller, to advise or confirm the issuing or confirming bank, usually in the country of the seller, that the credit has been issued.

Advising / confirming bank

Issuing bank



Seller

Buyer

CHAPTER 3

COST BENEFIT ANALYSIS IN EXPORT

3.1 COMPARISON OF INVESTMENT APPRAISAL OF JUTE AND GARMENT INDUSTRY

There are a number of items which are now listed in the export list of Bangladesh. However Jute and ready- made garments are still the main contributors in the export of Bangladesh(80% of total exports). For this reason, only Jute goods and ready-made garments are considered in the investment appraisal. In fact both the commodities are fibre related. Jute products comes from jute fibre, ready- made garments basically come from cotton fibre. The basic instruments of jute industry and ready- made garment industries are weaving machines and sewing machines respectively. The jute industry totally depends upon local raw materials i.e. raw jute. Ready-made garments depends upon imported fabrics. Usually, jute mills process raw jute to fibre and then make the jute products, such as, hessian, sacking, C B C, carpets and so on. The ready-made garment industry does not process cotton to fibre. The textile mill usually does this job. Unfortunately, Bangladesh does not have enough textile mills to produce the fabrics to fulfil the demand of the ready-made garment industry. So, 80% of the fabrics are imported from abroad.

Jute mills are considered to be a large industry, on the other hand, the ready-made garment industry is treated as a medium or small industry. The initial investment in a jute mill is relatively higher than in a ready-made garment factory. The gestation period of the jute mill is also longer than the ready-made garment factory. All jute

mills are not same, the capacity of production depends upon how many weaving machines are installed and how many workers are employed in the mill. However, on average a minimum of 2000 to 5000 workers are needed to operate one average size jute mill. On the other hand, 50 to 300 workers are enough to operate one small size ready-made garment factory. The pay back time of the ready made garment industry is comparatively shorter than jute mill.

For the better understanding, the following presents two examples. A jute mill has 2000 employee with average wages per employee per month is US\$40. The gestation period of this mill is 2 years. On the other hand, a ready-made garment factory has 250 workers with average wages per worker per month US\$20. The gestation period of the factory is 5 months. On the basis of above scenario, the initial capital cost, per month labour cost and production per day of both industries are:-

	Ready-made garment	Jute mill
(1) Initial capital cost	US\$ 12,500	US\$ 125,000
(2) Labour cost per month	US\$ 5,000	US\$ 80,000
(3) Production capacity per day	1,500 pieces	25 ton

80% of the raw materials of ready-made garments i.e. fabrics, are imported. On the other hand 100% of the raw material of the jute mill i.e. raw jute, is locally procured. So, the ready-made garment industry bears extra import related costs. However the profit margin of both industries are reasonable.

Cost per shirt (Flannel)	US\$ 3.00
Export price per shirt	US\$ 4.00
<hr/> Profit margin	<hr/> US\$ 1.00

Cost per ton jute goods(CBC)	US\$ 350.00
Export price per ton	US\$ 600.00
<hr/> Profit margin	<hr/> US\$ 250.00

A Jute mill is a comparatively large establishment and the pay back time of a jute mill is relatively longer than of a ready-made garment industry.

Pay back time of ready-made garment industry ---- 3 years

Pay back time of Jute mill ----- 5 years(minimum)

3.2 ROLE OF TRANSPORT IN LOGISTICS MANAGEMENT OF EXPORT

Logistics is an optimisation process of the location, movement and storage of resources from the point of origin, through various economic activities, to the final consumer. Again we consider the ready-made garment and jute export logistic management, because these two kinds of commodities contribute 80% of the export share of Bangladesh, and one is import based another one is local resource based.

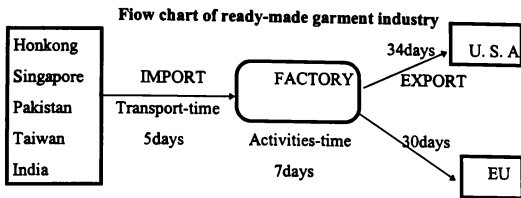
3.2.1 Logistic strategy of ready- made garment industry

It has already been mentioned that the ready- made garment industry depends upon imported fabrics. Bangladesh normally import fabrics from Asian countries; principally Hongkong, Singapore, Taiwan, Pakistan and India. On the other hand, the ready made garment exports to the U. S. A. and EU countries. So, the point of origin and the point of destination are two different part of the world. In the middle, Bangladesh is a place for value-adding.

Transportation is very important here in the total logistic cost, because transportation is involved twice in such kind of industry. Firstly, fabrics are needed to be transported transport from the point of origin to the factory, then in the factory, fabrics are converted into garment, and finally garments are transported to the final destination. Time is very important here. Usually, the procurement time of fabrics is 5-7 days. Value-adding activities occur over 7 days and the final transportation time depends upon the location of the destination and what mode of transport or

combination of modes of transport are used. Usually, it takes 30 to 34 days for EU countries and U. S. A., if main transportation is occurred by sea.

Figure-8



This industry emphasises just-in-time receipt and delivery, because the industry tries to avoid the storage of raw materials and finished goods. The ready-made garment industry is interested in procuring the fabrics in small lots rather than in larger quantities. Production activities take 7 days. After 7 days another shipment is needed at the factory floor. In this way the industry save the storage costs of raw materials. On the other side, after 7 days finished products are ready to export. So, frequent transportation is essential for this type of industry. Multimodal transport can act as a catalyst. With the help of MT the exporter can minimise the storage cost and receive the imported raw material just-in-time and deliver the finished products also just-in-time.

3.2.2 Transport cost benefit analysis in ready-made garment

It is already mentioned before that international transportation is involved twice in ready-made garments. For simplicity, value considered here is the average value rather than exact value.

Transport cost of imported fabrics

- | | |
|----------------------------|-----------------|
| 1. Freight (Port to Port) | (20' container) |
| a. Singapore to Chittagong | US\$ 600 |
| b. Hongkong to Chittagong | US\$ 900 |

c.	Taiwan to Chittagong	US\$ 900
d.	Pakistan to Chittagong	US\$ 1100
e.	India to Chittagong	US\$ 700
2. Container handling charge		
a.	F. C. L Container	US\$ 43.40
b.	L.C.L Container	US\$ 130.00
3. River dues		
a.	F. C. L Container	US\$ 10.20
b.	L. C. L Container	US\$ 13.64
4.	L. C. L Container unstaffing charge	US\$ 36.8

Total cargo related transport cost of imported fabrics through Chittagong port are:-

	Import from	F. C. L	L. C. L
1.	Singapore	US\$ 653.60	US\$ 780.44
2.	India	US\$ 753.60	US\$ 880.44
3.	Hongkong	US\$ 953.60	US\$ 1080.44
4.	Taiwan	US\$ 953.60	US\$ 1080.44
5.	Pakistan	US\$ 1153.60	US\$ 1280.40

Cargo related transport cost of export of ready- made garments (from Chittagong port to various destination) are:-

1.	Freight	(20' Container)
a.	Chittagong to New York	US\$ 3,000
b.	Chittagong to Los Angles	US\$ 2,500
c.	Chittagong to Rotterdam(EU Countries)	US\$ 1,300

2. Container handling charges		
a.	F. C. L. Container	US\$ 43.40
b.	L. C. L. Container	US\$ 130.00
3. River dues		
a.	F. C. L. Container	US\$ 4.60
b.	L. C. L. Container	US\$ 6.12
4.	Staffing charge for L.C.L container	US\$ 36.80

Total cargo related transport cost of export of ready- made garment (from Chittagong port to nearest port of destination) are:-

	Export to	F. C. L	L .C .L
1.	East cost of U . S . A	US\$ 3048.00	US\$ 3172.92
2.	West cost of U . S . A	US\$ 2548.00	2672.92
3.	EU Countries	US\$1348.00	US\$ 1472.92

Here we are assuming that the factories are situated within 5 km radius of the port area. So, other cargo related costs are neglected here. In fact, most of the ready-made garments factories are situated in the Dhaka region, which is by road 264 km, by rail 346 km and by inland water ways 307 km away from Chittagong port. Only rail is capable here of carrying a full container load from Chittagong port to the destination i.e. Dhaka ICD. the two other modes are not capable enough of carrying the fully loaded container. However road haulage is capable of carrying the container's cargo in a break-bulk form, that means, the cargo of one container is carried by two 5 tons capacity trucks.

Inland waterways are not capable of carrying container's cargoes in any form. The following is a comparison of the cost of road haulage and rail carriage from

Chittagong port to Dhaka ICD and vice-versa. One mode is related to multimodal transport and the other is not. For road haulage, import and export freight are same.

Road transport cost(For one 20' container's cargo equivalent)

Freight	US\$ 200.00
Loading charge	US\$ 40.00
Others	US\$ 15.00
Total	US\$ 255.00

For rail carriage there are two different freight rates for export and import.

From Chittagong port to Dhaka ICD(For import cargo)

(Applicable for 20' Container)

Freight	US\$ 150.00
Container handling charge	US\$ 40.00
Others	US\$ 10.00
Total	US\$ 200.00

From Dhaka ICD to Chittagong port(For export cargo)

(Applicable for 20' Container)

Freight	US\$ 75.00
Container handling charge	US\$ 40.00
Others	US\$ 10.00
Total	US\$ 125.00

So, regarding cargo related transport costs using ICD, it is more economical than non-using ICD. If we accumulate all related cost of ready-made garment, its share of transport costs is within 8% to 10% of the total cost.

3.2.3 Logistic strategy of jute export

Jute is a seasonal plant. July to September is the harvesting time of jute. So, jute mills normally procure the raw jute within these three months. So, an adequate storage capacity is needed in the jute mill. Another cause of raw jute storage in the mill premises is that in the harvesting season the price of raw jute is relatively cheap

compared with the off season. Because of CBA, the wages of the workers of the jute mill are relatively higher than workers of the ready-made garments industry. In ready-made garment industry there is no CBA activities yet. Time is not very important here. Minimising the total cost is more important here. Initial capital cost of this industry is relatively high. So, minimising the variable cost is one of the logistic strategies of this industry. Due to the nature of the industry, the inventory cost is also relatively high. So, to compete in the export market, this industry relies on low cost transportation system. The products of the jute mill are of a comparatively high volume. It is up to the jute mill to choose the transport in their own way for export. They avoid the liner shipping, because of fixed freight rates. For this reason, jute and jute goods are always exported by tramp shipping. Usually the shipper goes to the charter market to select a suitable freight rate. Normally, they choose the voyage charter for the following reasons:-

(1) It is based on a unit of weight ton, or a cubic meter, or it may be stipulated as a lump sum for the entire cargo.

(2) In a voyage charter a ship carries out the entire operation just as under a single voyage charter it carries the entire quantity.

Another reason for using tramp shipping is that destinations almost in the same country with the same port of discharge. This industry also prefers the inland water ways for local transportation, because inland water ways are cheaper than other modes of transport. Most of the jute mills are concentrated in three zones; Dhaka, Chittagong and Khulna. Except for Chittagong, the other two zones usually use the Mongla port.

Virtually 70% of jute and jute goods are exported through Mongla port. One of the cause of using Mongla port is the hinter land connection of this port by rivers. Those rivers are navigable virtually year round. Another advantage of these navigable routes is that local vessels make their journey by inland way, there is no need to cross the bay. If these vessels have an intention to use Chittagong port, extra safety measurement are required, because of the bay crossing.

3.2.4 Cargo related transport cost- benefit analysis of jute and jute goods export

Jute related transportation is one way, that is only for export. Jute and Jute goods are usually exported through voyage charter. So, there is no fixed freight rate. Following is a comparison of the freight in break-bulk form and freight in container form. Here the Middle East is considered as a point of destination, because the Middle East is the main jute export market of the Bangladesh.

Cargo related transport cost(From Mongla port to port of Latakia-Syria)

	<u>In Break-bulk form</u>	<u>In Container form</u>
1. Ocean freight	US\$ 52.00/Ton(Value from voyage charter)	US\$ 100 /Ton (Value from liner shipping)
2. Cargo handling charge	US\$.038/Ton	US\$ 2.6/Ton

It can be seen that break-bulk transport costs are cheaper than containerised transport costs.

Now lets compare some of the main tariffs of the Mongla and Chittagong port

SL. no.	Tariffs heading	Tariffs base	CPA 's rate	MPA 's rate
1.	Port dues	Per unit of GRT	US\$ 0.241	US\$ 0.241
2.	Pilotage	Per 000 GRT	US\$ 35.75	US\$ 51.07
3.	River dues	Per 000 kg	US\$ 0.852	US\$ 0.825
4.	Jetty crane use	Per 8 hrs period	US\$ 42.00	US\$ 45.00
5.	Berth occupancy	Per GRT/day	US\$ 0.002	US\$ 0.030
6.	Berth shifting	Per movement	US\$ 88.50	US\$ 88.50

Source;CPA,MPA

Although some major tariffs of Mongla port are comparatively higher than Chittagong port, jute exporters are interested in using this port because store related and break-bulk cargo related tariffs are comparatively cheaper than Chittagong port.

Sl. no.	Tariffs head	Tariffs base	CPA's rate	MPA's rate
1.	Wharf rent	Per 000 kg	US\$ 0.154	US\$ 0.116
2.	Warehouse rent	Per Sq. meter	US\$ 1.250	US\$ 0.938
3.	Landing(bagged)	Per 000 kg	US\$ 1.150	US\$ 1.000
4.	shipping(Jute)	Per 000 kg	US\$ 0.900	US\$ 0.525

Source; CPA,MPA

Now look at the three mode of transport approach to the two different ports regarding cargo related transport cost compare with time.

A) Dhaka to Mongla port

Sl.	Items	Inland water way/Ton	Time	Road	Time
1.	Freight	US\$ 6.12	24	US\$ 25.00	48
2.	Loading /unloading	US\$ 3.00	hours	US\$ 3.00	hours
3.	Total	US\$ 9.12		US\$ 28.00	

Mongla port has no rail linkage with the hinterland. So, there is no scope to compare the rail freight.

B) Dhaka to Chittagong port

Sl. no.	Items	Road Per ton	Time	Rail Per ton	Time	IW Per ton	Time
1.	Freight	US\$17.3	7	US\$11.6	13	US\$7.20	17
2.	Loading/unloading charge	US\$3.00	hours	US\$3.00	hours	US\$3.00	hours
3.	Bay crossing charge	-----		-----		US\$1.00	
4.	Total	US\$20.3		US\$14.6		US\$11.20	

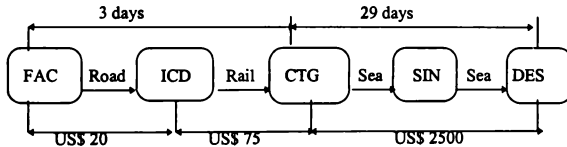
3.3 FREIGHT -BENEFIT ANALYSIS IN VARIOUS COMBINATIONS OF MODES OF TRANSPORT

It is necessary to make it clear in the beginning that only the rail and sea-leg combination of multimodal transport is exists now in Bangladesh. So, there is no point in comparing the other combinations of multimodal transport freight rate. However, here we try to compare the various combinations of transport freight rates with time, which are usually used by the exporters.

For simplicity here we consider (a) Dhaka is a point of origin, (b) the West coast of U S A a point of destination, (c) Unit load of ready-made garments in 20'container is cargo, (d) Port of discharge is Chittagong port, (e) Transit port is Singapore and (f) All values are considered in US dollars.

(1) Combination of transport:- Rail-Sea

This is the existing combination of multimodal transport. Here the exporter use Dhaka ICD. ICD act as a clearance port. The exporter only has liability to carry the goods from the factory to ICD.

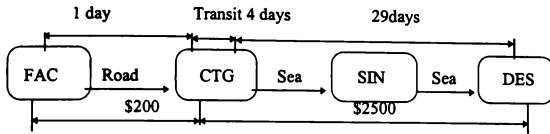


Total cost = US\$ 20+US\$75+US\$2500 = US\$ 2595

Total time = 3+29 = 32 days

(2) Combination of transport:- Road- Sea

Here the exporter does not use the multimodal transport in Bangladesh portion. The exporter transports the cargo by road with total risk. The shipping line has no liability of cargo damage or pilferage up to Chittagong port.

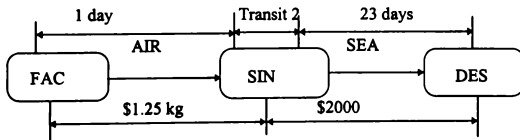


Total cost = US\$ 200+US\$2500 = US\$2700

Total time = 1+4+29 = 34 days

(3) Combination of transport:- Air-Sea

If exporters miss the feeder vessel for connection with the mother vessel, he can use the Air-Sea combination. Here the exporter has a responsibility to carry the cargo from the factory to the airport.



Here it is difficult to calculate the cost in a uniform way, because the measurement of an air container is not same as sea container. Air freight is calculated on a weight Basis. However, here we assume one 20' container, which is loaded with read-made

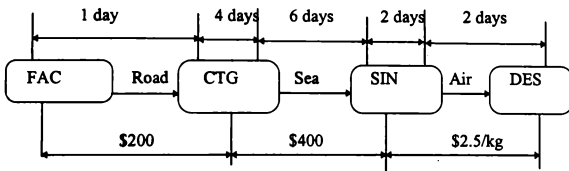
garment, usual weight of this cargo is 10 ton. In that way per container freight cost is US\$ 12,500.

So, Total cost = US\$ 12,500+US\$ 2000+US\$ 20 = US\$ 14,520

Total time = 1+2+23 = 26 days

(4) Combination of transport :- Sea-Air

Usually the exporter does not use this type of combination of transport. Only for the fulfilment of contractual demand, the seller uses this type of combination. Here the seller tries to delivery the goods in exact time.



Total cost = US\$ 200+US\$ 400 +US\$ 25000 = US\$ 25600

Total time = 1+4+6+2+2 = 15 days

It is noticed here that there is no combination of inland waterways, because ready-made garments are not yet transported through inland water ways, although it is a comparatively cheaper mode of transport. The main reason of this situation is that there is no presently available vessel, which is capable to carry the container.

CHAPTER 4

LIMITATIONS OF DEVELOPMENT OF MULTIMODAL TRANSPORT IN BANGLADESH

4.1 INFRASTRUCTURAL LIMITATIONS

One of the objective of the Multimodal transport is carrying cargo from a seller premises to buyer's desired place, i.e. door-to- door service. This objective will not be fulfilled if there are enormous physical barriers. Infrastructural limitations are one of the constraints for Multimodal transport. Infrastructure may be classified in three main groups.

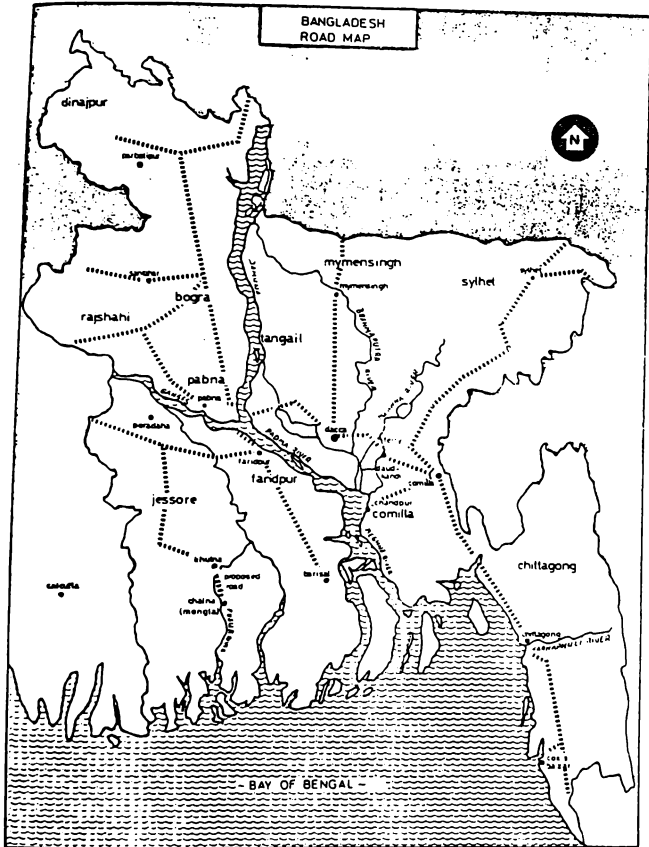
- (1) **Immobile infrastructure:-** Those installations that are basically fixed and provide the facilities to the super-structure, and the main economic activities are going on around this infrastructure. We define them as static infrastructure. Ports, Roads, Rail, Navigable aids belong to this group.
- (2) **Super-structure/ equipment:-** These infrastructure may be power generating or not, but play the key role for moving the cargo through them. We call them mobile infrastructure. Containers, Container handling equipment, Vessel, Rail wagon Road haulage etc. belong to this group.
- (3) **Auxiliary infrastructure:-** This type of infrastructure may not be directly involved in the carrying the goods. But with the help of this type of infrastructure, objective of the business is fulfilled faster than through existing systems. The main role of this infrastructure is as a catalyst. Telecommunication infrastructure, and computer network systems belong to this group.

Limitation may be occurred in any one of the above mentioned groups, but the consequences are that if any one of the above group suffers limitations, it affects the others groups simultaneously. Bottlenecks of the transport system of Bangladesh are mainly related the numerous rivers and water courses that fragment the road and rail transport systems, and heavy silt loads carried by the rivers which result in extensive dredging requirements to maintain the waterway net work. However the road transport network has boomed rapidly in recent years compared to the other two mode of transport. In 1973 Bangladesh had a 4,265 km road network but in 1993 it had reached 15,000 km. Railways have 4400 km of track, which is more or less same since 1973. In the case of inland water ways, it is shrinking 300 km per annum, in 1973 Bangladesh had 12,000 km long navigable network, but in 1993 it had fallen to 5,968 km.

4.1.1 Road infrastructure limitations

Although the road transport network is increasing rapidly it has some infrastructural limitations, which act as a barrier to implement the Multimodal transport concept. Due to the deltaic plain, bridges and culverts are very frequent in the road net work of Bangladesh. Where river width is relatively wider in nature and construction cost of the bridge is not yet economically viable, in that case ferry plays the vital role to link the fragmented sections of the roads with in the same network. According to the recent survey, there are 5,000 bridges and 11,000 culverts in the road network of Bangladesh. On average there is a bridge every 3 km in the existing road net work. At the same time 70 minor and 3 major ferry services also exist in the same road network to link the fragment roads. The country's three big rivers, namely Padma, Jamuna and Mehgna divide the country into four basic parts; north-west, south-west, north-east and south- east. The interesting thing is that they meet each other around the Dhaka region. The Padma and Jamuna confluence is 80 km north -west of the Dhaka region. The Padma and Megna confluence is 50 km south of the Dhaka region.

Figure-9



Jamuna is a main barrier for the smooth connection of the north to the south-east via the capital. In recent years, all the ferries on the Dhaka- Chittagong highway(south-east region) which is main cargo carrying corridor of the country have been replaced by bridges. The ferry of north-south corridor takes a minimum 3 hours for the Jamuna crossing. Due to heavy traffic, transit time in this segment is 3 to 4 days. Ferry is usually delayed in the dry season due to siltration problems in the channel. In the wet season, due to heavy water flow, siltration does not affect the ferry service, but in the dry season, due to the decreased water flow, siltration is one of the main causes of ferry delay. Due to the frequent course changing tendency of the rivers, terminal shifting is another problem in the road network of Bangladesh. No doubt, the bridge is more acceptable approach for development of road network rather than maintaining the ferries, although bridge construction is expensive. Only for that reason, GOB(Govt. of Bangladesh) decided to built a bridge over the river Jamuna. It is now the biggest on going project in Bangladesh. The proposed bridge will be 4.8 km long, 18.5 ms wide. Estimated cost of this bridge is US\$696 million. Hopefully it will be commissioned in mid 1998. After completion of the Jamuna bridge, the north part of the country will have a direct access to the Chittagong port.

It is necessary to mention here that the country's roads are classified in four groups; national high way, regional high way, feeder road and local road. The national high ways connect the national capital with district head quarters, port cities and international high ways. Regional high ways connect different region and district head quarters, not connected by national high ways. Type A feeder roads connect the thana(administrative unit) head quarters to the arterial road net work, and type B feeder roads connect growth centres with thana head quarters or to the arterial road net work. Local roads include municipal road and rural roads. Standard of specification of the above mentioned classified roads are:-

Table-13 Standard of specification of the classified roads

	National high way	Regional high way	Feeder road	Local road
Crest width in meters	12.20	10.98	7.32	4.88
Pavement width in meters	5.50-6.70	3.66-5.50	3.66	3.05
Shoulder width in meters	2.75-3.36	1.83-2.75	1.83	0.91

Source; Planning commission of Bangladesh, 1989

It has been mentioned that Bangladesh now has a 15000 km long road network. These comprise of 9000 kms of paved roads, 2500 kms of partly or brick paved roads and 3500 kms of earthen roads. The Dhaka- Chittagong high way is classified in the group of national high way. More or less the average width of this high way is 6.00 meters. A 20-Foot container can be transported over this high way, but a 40-foot container can not be transported over this high way, because of curvature restriction of the bridges. Moreover the road haulage of the Bangladesh is still of the conventional type. The maximum capacity of this type of haulage is 5 tons. Generally, the weight of a 20-foot container loaded with ready- made garment is 10-12 tons. So, the existing road haulage is not capable to carry any type container.

4.1.2 Rail infrastructure limitations

The Bangladesh Railway (BR) is a comparatively small system having a total track length of 4,400 kms. Out of this 2872 kms of MG(meter gauge) track is located both in the eastern and western part of the country, and 1,568 kms of BG(broad gauges) track is located in the western part of the country. This inherent weakness in the railnet work stems from partition of the original net work created by the British in India; the concept then was to establish broad gauge net work within the core business and meter gauge net work on the periphery. In 1947, what is now inherited a part of the core broad gauge net work; however these broad gauge lines were cut off from their main traffic generating centres including the port of Calcutta. In addition to the mix of gauges, the rail net work suffers from the difficulties of the trans-Jamuna ferry crossing.

In fact BR plays a minor role in the freight market of Bangladesh. Only 7% of the total freight is carried by railway. Due to the rapid growth of the road transport BR can not compete with the road sector because of high operational costs. However the country's only multimodal transport network is accomplished with the help of railway. The existing Multimodal transport net work consists of rail and sea legs, but it is still operating on 346 km, i.e. Dhaka- Chittagong corridor.

Nearly 60% of the container traffic received at Chittagong port is meant to be delivered in Dhaka area, where business and industries are largely concentrated. In practice, however, less than 10 per cent of the Dhaka containers are transported by rail. The remaining containers are treated as break-bulk, being de-stuffed and delivered at Chittagong port.

To deal with Dhaka bound containers, Chittagong Port Authority in collaboration with Bangladesh Railways, opened an inland container depot at Dhaka in 1988 with a capacity of 490 TEUs. As against the existing potential of receiving nearly 100,000 TEUs meant for Dhaka area, BR has achieved a level of only 13,709 TEUs in 1993. The continuing constraint in growth has been the inability of BR to provide an adequate number of locomotives and container wagons to transport containers from Chittagong. While the requirement is 600 new bogie type wagons to meet the full demand for transporting 40-foot containers from Chittagong port only 80 new wagons have been procured. Technical limitation is another cause of inefficiency of BR for transporting the containers in a productive way. The Dhaka- Chittagong railroad is dominated by MG track. It is possible to load only one container on the each wagon. Technically is not possible to operate double-stack container on this track. Dhaka area has become the centre for generating export in garments, leather and other miscellaneous products. The Bangladesh government is also developing a large Export Promotion Zone (EPZ) at Dhaka, similar to the EPZ at Chittagong. The success of these expanding export activities very much depends on an efficient transport infrastructure to bring materials into Dhaka and dispatch finished exports to Chittagong port, both packed in containers. BR can be a productive participant, if it can develop an efficient transport services.

4.1.3 Inland water way infrastructure limitations

Bangladesh, a flat alluvial delta, is a land of three mighty rivers, Jamuna (272 km long), Padma (224 km long) and Meghna (220 km long) and their tributaries and distributaries. A dense net work of many big and small rivers, canals, creeks (beel) and large water bodies (haors) covers major parts of the country and provides a relatively cost-effective means of transport. The length of the IWT net work is about 13,620 kms and 50 percent of the land area and three-fourth of the economic activities in the country are located within a distance of 10 kms from the nearest navigable waterway in all seasons. Out of the total navigable net work, the classified

navigable net work, where larger- sized mechanised vessels can ply, was 5,968 km in the wet season and 3,000 km in the dry season in 1991/92. (as per records of BIWTA). The inland waterway net work can be divided into four classes of routes defined on the basis of maximum draft allowance(MDA) for a vessel. It may be noted that class-1 routes in the table are arterial waterways mainly connecting to the sea ports at Chittagong and Mongla to the Dhaka area.

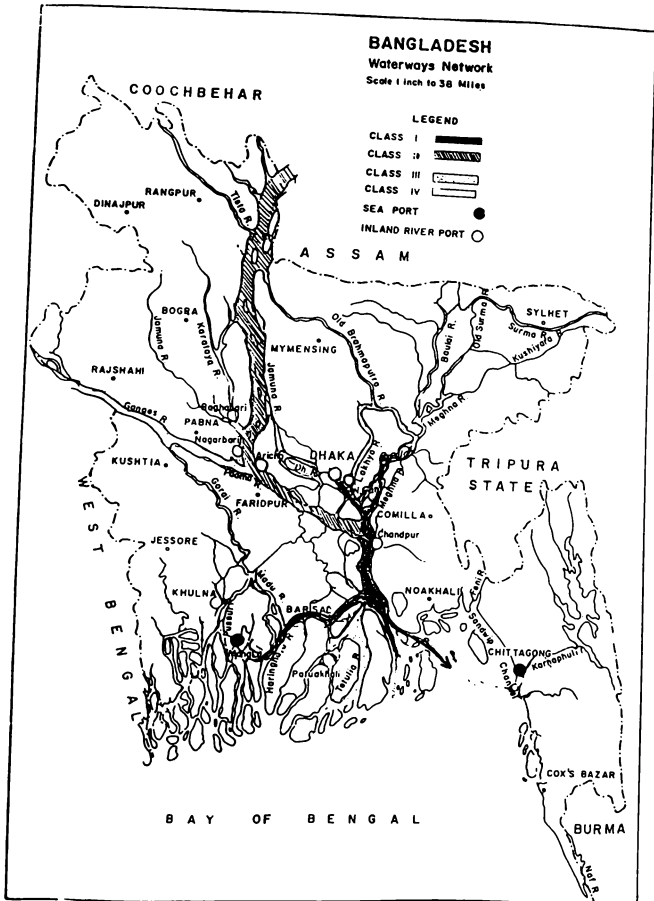
Table-14 Inland water way classified net work

Class of Route	MDA (Feet)	Length (Km)
Class-1	12	683
Class-2	6	1,000
Class-3	3	1,905
Class-4	Less than 3	2,380
Total		5,968

Source; BIWTA, Annual Report, 1991/92

Siltation is a major problem confronting the net work of classified navigable water ways including the approach channel to the ports. Nearly 2.4 billion tons of sediment per year are carried by the whole river system of the country. According to BTSR (Bangladesh transport sector study report) navigational dredging requirements for the inland waterway network at the main sea ports is around 10 million cubic meters per year. IWT net work has about 1,400 landing points on river banks. These points consist of major inland river ports with good and moderate port facilities, pontoon launch stations located in rural areas, coastal and off shore terminals and the remaining landing stages. The facilities at principal ports consist of pontoons connected ashore with movable walking bridges which are permanent or semi-permanent (wooden/bamboo) consolidated walking and can be adjusted to fluctuations in the water level.

Figure-11



RCC jetties with some back up facilities are available only in Dhaka, Narayanganj and Khulna. Most of these ports are impaired by inadequate facilities for mooring and unloading vessels and for storage of goods. Container movement through inland water ways is not possible due to following reasons.

1) Discharge, loading, shore handling and warehousing facilities still do not exist in the inland water port.

(2) Inland water way vessel is not constructed for carrying the container.

(3) Institutional framework including customs clearance and documentation are not available yet in the inland water way port.

However the inland water way still carries 32% of the total freight of the country. It has a high potential, especially the class-1 navigable waterways, which are mainly connected to the sea ports. In a recent transport sector study, carried out by the World Bank it was noted that if the above limitations are overcome, the cost per TEU by IWT will be twice lower than road transport and 1.5 times cheaper than rail transport.

4.1.4 Port infrastructure limitations

At present both the sea-ports are suffering from several operational bottlenecks caused directly or indirectly by the port transit system constraints. More specifically, these bottlenecks arise due to a) the need to stuff and un-stuff containers at the ports for customs examination, due to the low capacity of the inland transport system to carry full containers from / to the port only about 10 percent of the containers leave the ports with out stuffing / unstuffing; b) shortage of adequate equipment to handle containers from ships and in the storage area; and c) complex customs and port formalities for clearance of cargo etc. As a result of these limitational factors, port handling of containers has become expensive. Based on case studies of actual container handling costs, in 1993, the cost of handling a 20-feet container(of about 10-12 tons of cargo) through Chittagong port was about US\$640 as against comparable cost of US\$220 equivalent in Colombo, US\$214 equivalent in

Singapore, and US\$360 equivalent in Bangkok; (Source; Bangladesh transport sector study report,1994), these costs include all handling stuffing /unstuffing and clearing costs (including custom's and clearing agent's commission and official and informal payments) borne by the importers/ exporters(but excluding customs duties and cost borne by the ship). The Chittagong port costs relate to containers which are stuffed/unstuffed in the port, which is done for 90 percent of the container traffic. The comparable cost in Indian ports (Bombay and Calcutta) was about US\$480 equivalent, but this is not a valid comparison for assessing potential for reduced costs. The cost in Bangladesh is higher than cost in Singapore and Colombo by a margin exceeding US\$400 per container of 10-12 tons cargo. This is truly prohibitive and reflects the various constraints in handling containers through Bangladesh ports. In addition to these port terminal costs import / export traffic incurs other avoidable costs due to pilferage and loss of cargo which would be less if containers are directly taken to consignees premises for stuffing / unstuffing.

4.1.5 Tele-communication infrastructure limitations

Documentation is a very important factor in multimodal transport. It is one of the causes of delays of cargo delivery to the consignee in proper time. Paperless documentation is the best alternative for the faster movement of the cargo, but it needs modern technology.

Documentation in Bangladesh is still done in a traditional way, which is basically time consuming and error prone. Back-dated telecommunication technology is one of the limitation to introduce paperless documentation in Bangladesh. A remarkable numbers of telephone lines still use the analogue system. However, in recent years digital lines have increased very rapidly. Recent statistics show that the people per telephone ratio is relatively high In Bangladesh compare to the other countries, which indicates the inadequate telephone net work system in the country.

Table-15 People per telephone of selective countries

Sl.no	Country	People per telephone
1.	Japan	1.5
2.	China	36.4
3.	Singapore	2.0
4.	Srilanka	88.1
5.	Bangladesh	380.0
6.	Pakistan	62.7
7.	India	85.0
8.	Vietnam	156.7

Source; Asia week, August, 9, 1996, vol.22

Inadequate facility of computerization:- Of course, computer technology already exists in several organisations in the country, but basically they use the computers for internal management purpose rather than data exchange purposes. Chittagong port introduced computer in its organization in the mid-eighties. Billing and container stacking is now done by computer. Chittagong port has a plan to provide information facilities by computer to its users. But Dhaka-ICD, which is consider as an extention of the port still is not equipped with computer. It needs to be bare in mind that only one organisation is not enough, other organisations like customs, railway, MTOs etc, those related to the Multimodal transport also need to be well equipped with computers at the same time. Otherwise, in the long run customer will not be benefit from the multimodal transport concept.

4.2 INSTITUTIONAL LIMITATIONS

Most of the international trade related institutional organisations of Bangladesh are publicly owned. Public owned institutions are bureaucratic in nature. The decision making process is in general a time consuming matter. Although GOB is a now follower of the open market policy, some of the commercial sectors like as ports, rail ways and shipping company are still owned by the Govt. These commercial institutions can not take commercial decisions quickly due to institutional limitations. In the recent years, Chittagong port has face the problem of having an inadequate amount of container handling equipment. The existing container handling equipment is not enough to handle the containers. Due to a lack of container handling equipment the turn around time of Chittagong port is relatively higher then other neighbouring country's ports.

The average turn around time of container ship (in days) of some selective ports are:-

YEAR-1993

Chittagong	Colombo	Bangkok	Kelang
2.13	1.05	1.37	0.55

Source; CPA

A minimum 5 Straddle carrier, 3 Forklift track (28 ton Capacity), 14 Terminal trailer (40') and 1 Quay Granty Crane are immediately necessary to reduce the average turn around time of the Chittagong port. Of course CPA has a capability to meet the procurement cost of the above mentioned equipment from its own revenue. But as a publicly owned organisation CPA has no right to do this. It should go through government purchase procedure formalities. At first CPA takes the decision through its Board meeting. Then CPA sends the proposal to the concern Ministry in that case Ministry of Shipping (MOS) in the form of TAPP (Technical assistance project proposal). After receiving the TAPP the Ministry of Shipping examines it. If there is any inquires CAP is supposed to meet up the inquires. If the Ministry approves the proposal, then CPA send the PP (Project proposal) to the Ministry again. This is

nothing more than self explanatory paper of the basic proposal. Again after completion of the further examination, MOS send the proposal to the planning commission for approval. With in the Planning commission there is a committee to examine the proposal and sanction the money against the proposal. After that the approved proposal is ready for implementation. All these formalities takes a minimum of 1 (one) year. These formalities are not only for CPA's equipment procurement project; all other government development projects have same fate.

Customer quality service is another objective of Multimodal transport. It may be possible to deliver cargo quickly to the consignee's premises, if there infrastructural facilities are already exist. But if the cargo clearance process is rather slower than the physical movement of the cargo, then object of multimodal transport can not be achieved. So, custom formalities are the crucial factor in the development of the multimodal transport. As a developing country, Bangladesh customs formalities are based old and archaic system. Customs generally insist on a one hundred percent inspection of export cargo before it is loaded into containers. Likewise, they conduct a full inspection of imported cargo before it can be cleared for delivery to the consignee. As a result, the customs examination of cargo may take from a few days to a few weeks and the shipper or consignee may have to arrange for storage this incurring additional and avoidable expenses.

Intensive documentation formalities is another cause of delaying the cargo. It has been estimated that an exporter has to complete 25 forms and returns to make an export shipment and must contend with problems in handling and dealing with various agencies, like port, custom, carriers, railway, agent, etc. In general exporters must obtain six basic export clearances and make 42 separate applications to various authorities for each export.

Another important institutional problem of multimodal transport in Bangladesh is the lack of co-ordination among the involved organisations. The movement of goods in a multimodal transport system is an integrated activity, not individual activities. But areas of responsibility, especially in different transport legs are under the control of

different agencies. A development of road and rail transport, for example, falls under the Ministry of Communication. The development of port and inland water way lies with the Ministry of Shipping. Customs works is under the control of the Ministry of Finance. At the same time, the ultimate responsibility for recommendations on how best to develop the infrastructure to promote exports lie with the Ministry of Commerce. So, if the Ministry of Shipping decides to develop the port for container handling, at the same time the Ministry of Communication has to take the development project of the container carrying wagons. Otherwise the objective of MT will not be achieved. the main problem in this type of integrated work is in deciding who will be the co-ordinator, and who has the main responsibility to develop the multimodal transport net work. From a commercial view point, the Ministry of Commerce will be a main beneficiary group for the development of Multimodal transport. But the Ministry of Shipping has a primary responsibility for paving the way through the developing the port facilities. After that the Ministry of Communication has to build the hinter land facilities to carry the container beyond the port area. At last Ministry of Finance provide the institutional services for promoting trade. So, co-ordination is very important here in order to achieve the total trade off. Proper co-ordination is one of the institutional bottleneck of the country to develop the multimodal transport.

A institutional problem of Multimodal transport in Bangladesh is labour unrest. Of course, this issue has the same weight in any kind of industrial activities, but it affects in multimodal transport more seriously than any other industry, because it has a chain reaction. For example, if dock workers calls the strike in port, suddenly it will affect ICDs, the Customs house, Shippers, agents and so on. The ultimate result is that cargo is not transported in time.

4.3 LEGAL LIMITATIONS

The legal frame work of multimodal transport in the international trade is still in its infant stage. Virtually there is no regulation which exists in Bangladesh to regulate MT. The International carriage of goods is regulated by the following conventions.

- (1) CMR Convention :- This convention is concern with international carriage of goods by roads, which was adopted in Geneva on May, 1956.
- (2) CIM Convention :- The CIM is known as the international convention concerning the carriage of merchandise by rail. It was adopted in February, 1970.
- (3) WARSAW Convention :- The Warsaw convention adopted in Warsaw in October, 1929 is related to air transport.
- (4) There are basically three international conventions are related to the carriage of goods by sea.

- a) Hague rule
- b) Hague / Visby rule
- c) Hamburg rule

The Hague rule is the basic and oldest convention of carriage of goods by sea. Regarding liability regime, commentators say that it is more favourable for ship owners rather than cargo owners. The Hague / Visby rule is a modified form of Hague rules. The Hamburg rule is rather modern and covers more liability matter in favour of the cargo owner in maritime transport sector. The full name of this convention is the United Nations Convention of the Carriage of Goods by Sea`1978. This convention is based on the Hague rules of 1924. In the Hamburg rules, the sea carrier's liability has been significantly raised from Hague rules. The Hamburg rules have not yet entered into force for the simple reason that the traditional maritime countries consider it as not in their favour. The maximum liability limit of the above mentioned conventions are:-

<u>Road</u>	
CMR Convention -----	8.33 SDR / kg
<u>Rail</u>	
CIM Convention -----	17 SDR / kg

Air

WARSAW Convention - 332 SDR / kg

Sea

a) Hague / Visby rule --- 2 SDR / kg

b) Hamburg rule ----- 2.50 SDR / kg

Due to the presence of containers in the transport sector and the growing tendency towards multimodal transport, the determination of liability is a difficult task, because of various modes of transport involved. Every mode has an individual liability regime. Sometimes it is easy to determine the place of loss or damage of the cargo. Most of the time it is difficult to determine the place of occurrence, which creates a legal battle between shipper and carrier. To avoid this type of problem, the MT Convention was adopted in 1980. Although the MT Convention has not yet entered into force it is only a guide line for determining the liability regime.

MT Convention :- The United Nations Convention On International Multimodal Transport of Goods'1980 is a newly adopted convention. According to this convention Multimodal transport is "---the carriage of goods by at least two different mode of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery situated in a different country". The legal structure of the multimodal contract is based on complete freedom of contract between a consignor and a MTO who may sub-contract with others carriers. But MTO has a total liability for loss or damage the goods, as well as delay in delivery. Overall MT convention refers to the uniform liability system rather than segmented liability system

MT Convention

Responsibility coverage ----- door - to - door

Limit of liability ----- 2.75 SDR / kg(with Sea-leg)

8.33 SDR / kg(with out Sea-leg)

Bangladesh is not a party of any the above mentioned conventions. Although INCOTERM'90 exist in international trade, the international trade of Bangladesh is usually done on the basis of previous INCOTERM , that is export F. O. B and import C. I. F. However, an accelerating the multimodal transport, Bangladesh Bank's foreign exchange control department allows the dealers to accept " Through Bill of Lading" in respect of import and export container traffic to and from Dhaka ICD in foreign exchange.

Table-16 Status of International Trade and Transport related Conventions of Bangladesh

Sl. no	Name of the Conventions	Party to	
		Yes	No
1.	Convention on a code of conduct for liner conference`1974	*	
2.	United Nations Convention on the carriage of goods by Sea`1978 (Hamburg rule)		*
3.	United Nations Convention on International Multimodal transport of goods`1980		*
4.	United Nations Convention on the carriage of goods by Sea`1924 (Hague Rules)		*
5.	CMR (International carriage of goods by Road)		*
6.	CIM (International carriage of goods by Rail)		*
7.	WARSAW Convention (International carriage of by Air) <i>communication letter/WIT</i>	✓	*
8.	General Agreement of International Trade and Tariff (GATT) -Article- V	*	

Source; UNCTAD hand book

As a party of the GATT agreement, Bangladesh has a obligation to liberalise her trade on the basis of international competition. Within the GATT agreement, there is no provision for any type of protectionism at any level. So, at the same time being a party to the GATT agreement and UNCTAD liner code conference is contradictory. Deregulation is now one of the popular slogans in the international arena.

However, minimum levels of regulation are necessary to assuring quality control. In case of Multimodal transport some regulations are needed, because of characteristics of MTOs. According to the defination in Multimodal transport Convention, a Multimodal Transport Operator (MTO) is “---any person who on his own behalf or through another person acting on his behalf concludes a multimodal transport contract and who act as a principal, not as an agent or on behalf of consignor or of the carriers participating in the multimodal transport operations, and who assumes responsibility for the performance of the contract”. There are basically two types of MTOs (1) Vessel operating multimodal transport operators-VO-MTOs and (2) Non-vessel operating multimodal transport operators-NVO-MTOs. VO-MTOs operate the vessel by themselves. So, a security bond is not needed for them. But in the case of NVO-MTOs, it may be that they do not operate any means of transport. So, for assuring the quality of transport services a security bond is essential for them.

Another positive impact of regulation is the minimum insurance cost of cargo. Well defined regulations minimize the risk. Shipper receive the reasonable level of insurance premiums, which ultimately reduces the transport cost. So, in conclusion, with out minimum level of regulation shipper do not receive a fair deal and MTOs do not know their status. These are the legal limitations of MT in Bangladesh.

CHAPTER 5

PROSPECT OF MULTIMODAL TRANSPORT IN BANGLADESH

5.1 COMMERCIAL VIABILITY OF MT

Basically there are two types of economy which exist in the world. One is a command economy and the other is a market economy. Up to the mid eighties, the world was basically divided into two on the basis of the above philosophy. One portion of the world was followed the market economy. Other portion of the world believed in the command economy. It created a cold war between the two big super powers. From a commercial point of view, after the collapse of the Soviet Union, the world is now treated as a global village. Now most of the countries of the world are followers of the market economy. In addition, the GATT agreement pushed the world one step forward regarding non-discriminatory treatment between national and non-national traders.

Due to the above scenario, foreign investors now try to find a new place for their investment. Initially they look for the following criteria when investing their capital.

- (1) Cheap labour, which minimises the production cost.
- (2) Favourable investment policy, which encourage them to invest capital in the concern country.

(3) Stable macro-economic situation, which make business profitable.

The above mentioned criteria now exist in Bangladesh. At the same time it faces the competition from other developing countries, who are also followers of the open market policy and provide the same facilities for attracting the foreign investors. So, it is now an investors choice to select the place where he would invest his money for achieving the total trade-off. There is no guarantee that some place is suitable for some commodities for a long time. When investors feel that one of his commodities is no more profitable in the invested place, then he will transfer his capital to the other place suddenly, where it will be more profitable. Due to the flexible nature of the trade country should not rigid on the same strategy in a long term. Diversification is the best alternative for competing in the market. It has been mentioned that Bangladesh was traditionally a primary agricultural products exporting country. This scenario is already changed. Ready-made garments are now main the contributor in the export of Bangladesh.

According to the theory of economic cycle, Bangladesh can not claim that she will keep her position in the long term as a ready-made garment exporting country. So, maintaining the increasing trend of export earning diversification of commodities is the only solution. In recent years Chemical products(chemical fertilizer, pharmaceuticals), handicrafts, camera parts, electric wire, integrated circuit, electronic goods, toys, computer and computer accessories have entered into the export market. In FY 1993-94, these non-traditional items earned nearly US\$75 million, which is 3% of the total export earning. Toy, Computer, Computer accessories, Integrated circuit, Camera parts and other electronic goods have entered the market last year and earned US\$ 679,000. Of course, it is still a very little portion of total exports, but it indicate new potential sector of the total export market, which will be very important for future speculation. It is noticed that all of the newly invented items are manufactured goods as well as high valued. Containerisation plays a very important role here, because these items are totally

transported through container. Due to the advent of container, MT treated as logistic tools.

From a logistic view point, a manufacturer tries to minimise the total cost. Transportation plays a very important role here, especially MT provides a new opportunity to take the appropriate logistic strategy. Now Bangladesh is in a favourable place for foreign investment. Labour is still cheap there. Existing commercial policies encourage the investors to invest their money in Bangladesh.

It is already been mentioned that institutional and infrastructural limitations are the main draw back of MT in Bangladesh. If these draw back are be over come, then Bangladesh is one of the lowest production cost countries in the world. So, in near future, Bangladesh will be a place for value-adding.

Another cause of the commercial viability of MT in Bangladesh is the changing characteristic of international shipping. Due to the advent of container in world trade, general cargo ships are now being replaced by container ships phase by phase. Not only that the container ship pattern is also changing very rapidly. Full cellular ships are now going to dominate the world container trade. The size of the container ships is also becoming larger and larger because of economic of scale. Mega carriers are now appearing in international shipping. It is speculation that in the near future the deep-sea liner trade may be totally controlled by some selective Mega carriers. Developing countries, those that have national shipping will face difficulties in the deep-sea trade due to unbalanced competition. So, there is a possibility to squeeze the national shipping of developing countries. It is better for them to emphasis on the short-sea trade and make a consortia with Mega carriers to ensure their cargo. Feeder service is the best option for short-sea trade. Through feeder services national shipping may extend their services door-to-door rather then port-to-port.

Geographically, Bangladesh is situated between the two commercially important transshipment ports in the Asia. In east, Singapore and in the west Colombo. For the strategic view point, these two ports are very important for liner trade. These shipping lines provide a round the world trip, and they may touch one of these port or

both in covering the South and south-east Asia region. It is necessary to mention here that South-east Asia is now a rising tiger of the world economy. East-West bound trade is only occurred due to this region. Regarding shipping, Singapore plays the significant role in this region. From a commercial view point, Bangladesh should maintain the feeder service between Singapore - Chittagong and Colombo - Chittagong. In fact the Bangladesh shipping corporation operates a feeder service twice a week between Singapore-Chittagong and once a week between Colombo-Chittagong. By the help of MT, these feeder services may extend their services door-to-door. In that case, some of the international liner trade, already specialising in deep-sea trade, will be interested in making a consortia with Bangladesh base MTOs. So, commercially MT is viable in Bangladesh.

5.2 GOVERNMENT INTERVENTION FOR MT

The government has four effective tools for controlling the economy. These four effective tools are:-

- (a) Rules and Regulations
- (b) Taxation
- (c) Expenditure and
- (d) Public ownership

Government economic policy determines the function of each individual tools. If government decides to follow the command economy, then through rules and regulations it imposes high customs duties on import goods in order to protecting her local industries. Usually it encourages import substitution rather than export promotion. Most capital intensive industries are owned by Govt. and so Govt. controls production. Taxation cannot play a significant role in a command economy, because most of the people have the same level of income, which are usually laid within the tax exemption limitation. Demand and supply are totally determined by the Govt. On the other side, in a market economy, rules and regulation pave the way for commercial activities, that means, it does not stop the natural flow of

commodities. The market itself determine the prices of the commodities on the basis of demand and supply theory. Productions is not controlled by the Govt. So, private ownership plays a significant role in this system. Taxation is very important factor in market economy for strengthening the government hand.

It has been already mentioned that Bangladesh is now a follower of the open market economy. Rules and regulation are now favourable for foreign investors. Formalities are already been simplified for attracting the foreign investors. Import liberalisation is one of the philosophy of GOB for encouraging the export promotion. Value added taxes(VAT) are now newly introduced for increasing the Govt. investment. Except power and energy other industries are now allowed to operate privately.

It is not possible to give assurance that particular policies or theories will be worked well in the long term. Uncertainty is a natural phenomena in the trade. External factors usually affect trade. Regional trade agreements are one of the causes of changing the trade pattern. ASEAN, EEC and NAFTA are now powerful regional trade agreements in the world. Due to the geographical position of the above regions East-West bound trade is now a dominating factor in world trade. Regional economic co-operation is now one of the popular slogans in the world trade. Due to the above scenario, Bangladesh also took the initiative to create South-Asia region co-operation organization. In relation to this in 1985, 7(seven) south-Asian countries, Bangladesh, India, Pakistan, Nepal, Butan, Srilanka and Maldives formed a regional co-operation forum, called SAARC(South Asia Association for Regional Co-operation). Within the SAARC, there is a economical co-operation agreement, which is popularly known as SAFTA (South Asia Free Trade Agreement). SAFTA is not so effective yet, due to some bilateral political disputes among the member countries. However, it is now an on going process for improving the co-operation among the member countries in the field of economy. Custom, tariffs and transit are now the subject of on going discussions in SAFTA. Hopefully, SAFTA will be implemented in the year 2001. So, at the beginning of the new century, the trade pattern of Bangladesh may

be changed dramatically. In that time MT will play a very significant role in that region, especially within Bangladesh, India and Pakistan. Because before 1947, when this region was ruled by British Empire, these countries were treated as a one unit. British built a very good rail network, which basically focused on the Calcutta port. After getting independence a significant portion of that railway network was abandoned, because countries got their independence on the basis of religion not on the basis of economy. In that time Bangladesh was part of Pakistan. Due to the cultural and economic discrimination, Bangladesh got independence from Pakistan in 1971 through blood shed. Nearly three million people sacrificed their lives for independence. However, the British built transport network still exists. Hopefully, SAFTA will give the opportunity to reopen the existing rail network.

Another important event, the so called GATT will play a significant role in international trade in the near future. The main philosophy of GATT is the non-discriminatory attitude between national and non-national traders. Within GATT all kinds of subsidies should be eliminated. A country is allowed to protect its domestic industries only through tariffs not through other commercial measure. Bangladesh is a signatory member of the GATT. GATT will affect the Bangladesh economy in two ways. Firstly, due to the liberalisation, Bangladesh has a opportunity to compete in the world market in a cost-effective way. It leads to an increase in the exports in Bangladesh. Because some of Bangladeshi goods importing countries impose quota for protect the entering Bangladeshi goods in that market. So, quota is one of the barrier for achieving the maximum productivity. Within the GATT, there is no provision for a quota system. So, Bangladesh has a chance to enlarge her export market not only in the ready-made garment sector but also in other manufacturing sectors, such as, leather goods, electronic goods and Pharmaceutical and so on.

Table-17 Quota enlargement by Canada and United State

(Unit= Square meter equivalent)

COUNTRY	1994	2004
CANADA	31	84
U. S. A	255	683

Source; UNCTAD,

Secondly, national shipping will suffer because of GATT. The Bangladesh shipping corporation (BSC) has 18 vessels with 266,000 dwt capacity. BSC carried 2.3% of the total export and import cargo by its own vessels. The Bangladesh Flag Protection Act, which is designed on the basis of UNCTAD liner code 40-40-20, helps the BSC for cargo reservation even though BSC is not a profitable organisation. So, it depends on govt. subsidies. In the context of the GATT agreement, all kind of subsidies should be eliminated. So, it is clear, Bangladesh national shipping will face difficulties in the near future, if it does not change its strategy. BSC has already taken some remedies. BSC already closed its U. S. A liner trade and has opened the feeder services between Chittagong - Singapore and Chittagong - Colombo. This is because in deep-sea trade national shipping can not compete with the larger carriers and a more than 187m long and 9m draught vessl cannot be handled by Chittagong port. So, for a new strategic plan, national shipping should emphasis the feeder services and expand their customer service door-to- door rather than port-to- port. If national shipping provide the door-to- door service in Bangladesh region and maintain the feeder service up to transhipment port, Singapore and Colombo, then larger/Mega carriers, who already specialise in deep-sea trade will be attracted to making the consortia with the small liner trade. So, it will create new co-operation between small and large liner trade. Primary responsibility is always going to the government's for creating the above environment through providing the infrastructural and regulatory support. In relation to that GOB has created three projects for encouraging the MT in Bangladesh.

Table-18 MT related on going projects

Sl. no.	Name of the projects	Location	Capital cost (in million)	Objectives/Benefits
1.	Construction of Dhaka port	Dhaka	US\$ 50.2	To establish a modern port in Dhaka area to serve the rapidly increasing need for container transports by inland water between the seaports and Dhaka metropolitan area.
2.	Procurement of container handling equipment	Chittagong port	US\$ 12	To strengthen the physical handling capacity to match the growing traffic.
3.	Construction of multipurpose berth with back-up facilities	Mongla port	US\$ 24.8	To facilitate and develop the container handling to meet the expected increase in demand due to improved land transport connections to Dhaka and development of Dhaka container port.

Source; Planning commission of Bangladesh

5.3 ALTERNATIVE APPROACHES

Average GDP growth of Bangladesh is now around 5%. The country has now macro-economic stability and strong balance of payment, which indicate that country's rising GDP growth rate will be continue. The country's average export growth rate is now 8% and average import growth rate is 1.6%. Due to the accelerated economic reform scenario, the planning commission of Bangladesh has projected that in the year 2010 country's GDP growth rate will be 7.5% and export growth rate will be 10%. Of course the commodity wise growth rate will not be same in the future.

Table-19 Projection of major export commodities growth rate

Sl.no.	Commodities	Average growth rate (1996-2000)	Changing growth rate (2001-2010)
1.	Raw jute	-2%	1%
2.	Jute products	1%	2%
3.	Leather	8%	7%
4.	Garments	15%	10%
5.	Shrimp	15%	12%

Source; Planning commission of Bangladesh

Due to artificial fibre, raw jute export will decline in a couple of years. Hopefully by 2010 this scenario will change, because jute is an environmentally friendly rather than an artificial fibre. Garments and Shrimp growth rate will not be constant in the horizon of 2010, because other competitors will enter in the same market in that time. The average growth rate of container traffic is now 17.3%. According to the JICA(Japan International Co-operation Agency) projection, in the horizon of the year 2010 Bangladesh will be handled more than 700000 TEUs.

Table-20 Container demand forecast in Bangladesh

Years	TEUs
1995	243,000
2000	350,000
2005	509,000
2010	720,000

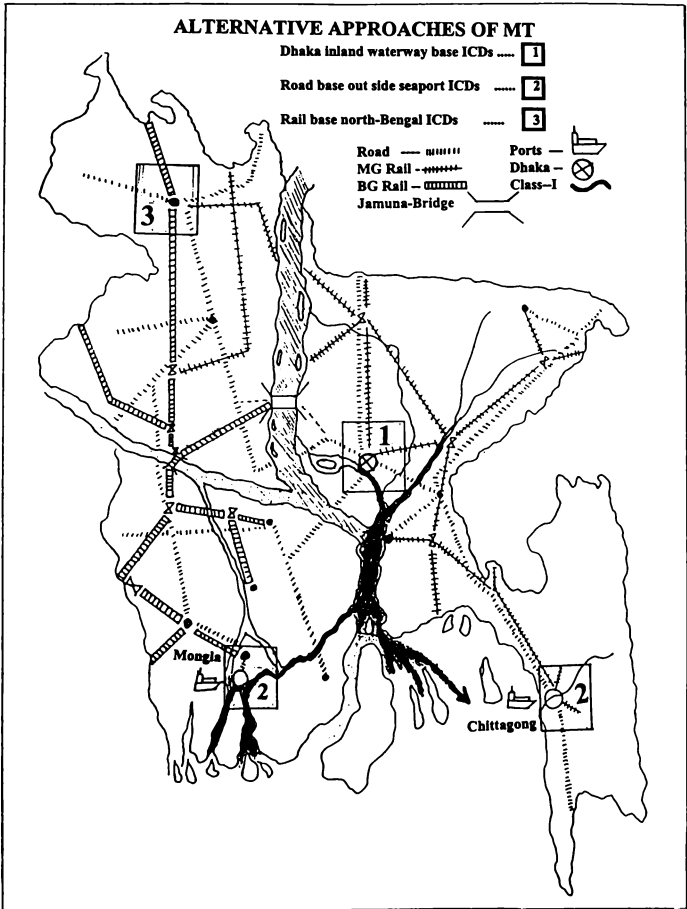
Source; CPA's Master plan

So, by the year 2010, export commodities of Bangladesh will be concentrated in manufactured goods rather than primary goods.

5.3.1 Alternative approach-1 *Dhaka inland waterway base ICDs*

It has already been mentioned that about 65% of the containerised goods handled in Chittagong port is designated to or originated from Dhaka area. The corresponding share of the Mongla port is approximately 40%. Only 10% of the total Dhaka base full load containers can now be carried by rail, which is the only leg of MT in the country. The total potential demand for container transport from the sea port to Dhaka area is presently about 90,000 TEUs. Assuming that the increase in the container traffic continues at the 17% annual level, the potential demand in Dhaka will be 150,000TEUs which corresponds to about 1.5 - 2 million cargo tons in 2010. Dhaka inland waterway based ICD creation will be one of the best option for reducing transport costs of the Dhaka region cargo. It creates competition between the rail, road and inland waterway. It has already been mentioned, Mongla port has limited hinterland facilities. Inland water way is the only potential access to the Mongla port. The container port in Dhaka will certainly increase the container traffic in Mongla and as such balance the container trade between the ports of Chittagong and Mongla which will substantially reduce the total transport cost.

Figure-12



Navigational waterways between Dhaka and both Chittagong and Mongla ports are guaranteed for vessel navigation throughout the year.

Table-21 Navigational waterways between Dhaka and both Chittagong and Mongla

Routes	Class	Water depth	Distance
Chittagong-Dhaka	1	3.7m (12 feet)	166 N- mile
Mongla-Dhaka	1	3.7m (12 feet)	164 N-mile

Source; Inland container river port- Dhaka project, 1995

Maximum navigable ship's size of above routes will be:-

Length over all-----	68m
Breadth-----	13m
Draft-----	3.5m
Dead-weight-----	1,400 m.tons
Ship's speed-----	10.0 Knots
Number of containers-----	88TEUs

(Source, Study report on procurement of inland container vessels Sept, 95)

If the inland container port is commissioned soon, then rail based ICD and inland waterway based ICD compete each other. Road based ICD can not be established yet in the Dhaka region, due to infrastructural limitations. So, road freight per TEUs is calculated here on the basis of break-bulk form. A comparison statement of freight rate per TEU with time are given below:-

**Table-22 Comparison of freight rate in different mode of transport from
Chittagong port to Dhaka region**

Sl. no.	Mode of transport	Freight rate per TEUs	Time
1.	Road	US\$ 200	7 hours
2.	Rail	US\$ 150	13 hours
3.	IWT	US\$ 125	17 hours

Source; Bangladesh transport study, 1994

Here rail and IWT connect with ICD. Road is directly connected to and from the factory. Apparently it shows that the road is suitable in comparison with rail and IWT regarding shorter time, but transit time in the port area for road is nearly 3 days. On the other hand ICD users have no transit time in port.

5.3.2 Alternative approach-2 *Road based out side sea-port ICDs.*

Container traffic appears to continue increasing by 17%-18% per year which is mainly based on the expected growth of exports. Chittagong port already faces a congestion problem. One of the country's export promotion strategy is to establish EPZs for attracting foreign investors. The country has already established 2(two) EPZs in the region, Chittagong-EPZ, which is 10 km around the port and Dhaka-EPZ, which is 20km away from Dhaka-rail based ICD. It is already discussed before that road has curvature limitation of the bridge approach for carrying full load container. So, road based ICD cannot be established in the interior part of the country. So, around the port area, road based ICD is the best alternative approach for reducing the congestion in the port area. So, this alternative approach-2 is designed on the basis of reducing congestion. The proposed road-based ICDs are. (1) Mongla road based ICD. (2) Chittagong road based ICD.

(1) Mongla road based ICD :- Of course, Mongla port does not face the congestion problem yet. But in near future, after the completion of Dhaka container port, there is a possibility to increase the container traffic through Mongla port. More over, GOB has a plan to establish a new EPZ in the Khulna region in the near future. So, this proposed road based ICD will be helpful for EPZ users. Shrimp and Jute goods are high potential in that region. So, the proposed road based ICD will encourage the shrimp and jute goods exporters.

(2) Chittagong road based ICD :- Container traffic as a whole increasing 17%-18%, but container traffic at Chittagong port is growing at the rate of 34% per year. So, Chittagong port already faces a tremendous congestion problem. It is now exporter demand for establishing the road based ICD out side port area. Most of the foreign investors have already invested their capital into the Chittagong EPZ. So, suitable location for newly proposed road-based ICD could be either in EPZ area or any other place, which will not 20 km away from the port. It will be the interim measures to over come the congestion problem in Chittagong port. It will also lead to the reduction container handling costs in Chittagong port.

Another reason for the future establishment of road based ICD is SAFTA. According to the SAFTA agreement, SAARC countries will enjoy trade liberalisation. Indian's seven eastern provinces are now blocked by the Bangladesh. So, transportation cost to and from these seven provinces to other part of the India is too expensive. If they use Bangladesh as a transit, especially Chittagong port it will be the cheapest way to transport goods. There is on-going discussions between Bangladesh and India regarding transit facilities. So, it is speculation that within the year 2005, Indian cargo will be transported through Chittagong port. If this measure is not taken soon, Chittagong port will not be capable to fulfil the future demand. Moreover, local exporters have an opportunity to take the new logistic strategy for exporting their manufacturing goods, because transportation cost will be much lower in this way.

5.3.3 Alternative approach-3 *Rail based North-Bengal ICD*

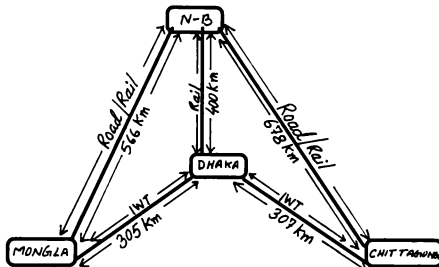
This approach would be prepared by the end of the year 2010. It has already been mentioned that GOB decided to construct the multipurpose bridge across Jamuna river. The proposed bridge will be 4.8km long, 18.5m wide. It will be a 4 lane multipurpose bridge which will initially be a road bridge with foundation adequate to carry a MG railway in the future. The bridge would also be capable of supporting an electric inter connector, a gas pipeline and telecommunication facilities. Hopefully, it will be commissioned in 1998. After completion of Jamuna multipurpose bridge, it will affect dramatically on the freight movement and passenger movement as well in the country. At present the yearly volume of freight crossing the Jamuna is nearly 3 million ton. The proposed bridge will eliminate ferry delays and reduce transit times for freight movements from around 30 hours to around 8 hours. The bridge would significantly increase road transport along the Dhaka- North Bengal.

By using the Jamuna multipurpose bridge investors may find new places in North Bengal for investment, because Dhaka will be more and more expensive place in the future due to huge congestion of all type of commercial activities. Land cost in Dhaka region is twice as high as Chittagong region and three times higher than the North-Bengal region. So, North-Bengal will be a potential place for future investment after the completion of the Jamuna multipurpose bridge. According to the bridge design, there is a provision on the bridge for carrying a single MG rail track. Rail based North-Bengal ICD will be commercially viable, because inland waterway has a limited draft in that region, only class-II navigable water(6feet). The railway already has a very good network in that region. But some reforming development programme is needed. (a)To match the BG to MG on both sides of Jamuna bridge. (b) To construct the 60km long MG track from Dhaka to Jamuna bridge. (c) To construct the 45 km long BG track from Khulna to Mongla. If these measures are taken then Parbatipur(name of the proposed place in North-Bengal) rail based ICD is one of the attractive ICDs for MTOs. It opens two MT opportunities. Firstly, North-Bengal will have direct access to the Chittagong and Mongla port by rail.

Secondly, it would co-operate with inland water way in the Dhaka region, that means, North-Bengal ICD to Dhaka by rail, Dhaka to Chittagong/Mongal port through inland waterway. Distance between the proposed North-Bengal ICD to Chittagong port and Mongla port are 678km and 566km respectively.

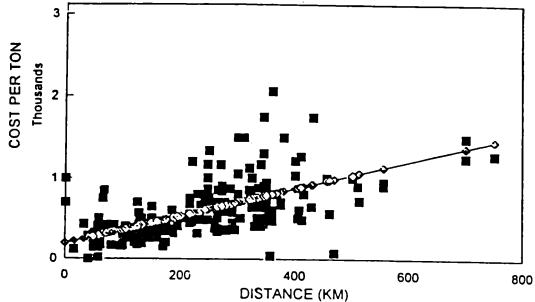
Figure-13

Alternative MT approaches from N-B to two seaports



If freight benefit analysis in the various made of transport or combination of mode of transport is compared then it will be more clear for the future commercial viability of North-Bengal rail based ICD. There are three possibilities for carrying the cargo. (1) cargo may be transported by road. (2) cargo be may transported by rail and (3) cargo may be partially transported by rail and partially by inland water ways. At first, a comparison the of road and rail freight. Lets consider the co-relation of cost with distance.

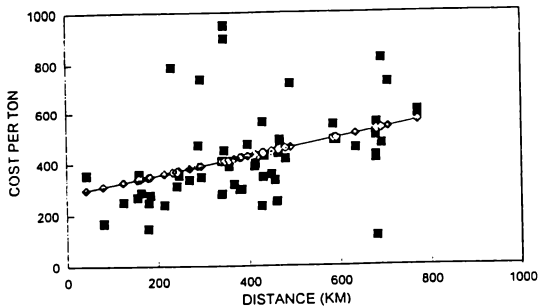
(1) For road freight



Source; Bangladesh transport sector study report,1994

Here, unit of cost consider as a taka. Taka is a monetary unit of Bangladesh. 40 taka= US\$ 1. From above co-relation more than 600 km distance, road freight per ton per km is more than 1000 taka, which is equivalent to US\$ 25.

(2) For rail freight



Source; Bangladesh transport study report, 2994

Here the unit of cost is also considered as a taka. From the above co-relation more than 600km distance, rail freight per ton per km is less than 500 taka, which is equivalent to US\$ 12.5. So, long distance rail freight is comparatively cheaper than road freight.

There are other possibilities for transporting the cargo, that is a combined mode of transportation. North-Bengal to Dhaka by rail and Dhaka to Chittagong or Mongla port by inland waterway. North- Bengal to Dhaka is 400km distance and Dhaka to Chittagong/ Mongla port 305km and 307km long distance respectively. On the basis of the above co-relation and existing inland water way freight rate. This combined freight will be US\$ 17.5 per ton per km.



So, Direct approach from proposed North-Bengal ICD to sea port is the cheapest way of transportation.

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 CONCLUSION

The economy of Bangladesh is now in take-off position. Average G D P growth is now around 5%, average export growth rate is 8% and the average import growth rate is 1.6%. The country's foreign trade currently contributes 23% of the country's G D P. The planning Commission of Bangladesh projects that in the year 2010 the country's G D P growth rate will be 7.5% and export growth rate will be 10%. It is already mentioned before that, non-traditional items contributed more than 80% in the export share. It has also been mentioned that these non-traditional items are basically manufactured in nature. For that reason containerisation in Bangladesh has also been rapidly growing over the last few years. Now the average growth rate of containerisation is 17.3%. A primary component is the container traffic increase in the growth rate of the garment industry which over the past years has been about 40% annually. The garment industry associations estimate that export will continue to increase by 300% during the next 10 years. This is due to the cheap labour cost, production cost relatively low in Bangladesh. Moreover, Govt. commercial policy is now totally favourable for foreign investors for investing their capital in Bangladesh. So, speculation is that in the next decade Bangladesh will be the attractive place for value-adding activities. On the basis of above circumstances, JICA (Japan International Co-operation Agency) projects that by 2010 Bangladesh will be handling 720,000 TEUs.

At present more than 80% of the country's total containers are handled by Chittagong port. Nearly 65% of the container traffic at Chittagong port is meant for the Dhaka area but only 10% of the containers are transported as such to and from

Dhaka, mostly by rail (country's only leg of MT) the rest being un-stuffed and transhipped into trucks as loose cargo. It is also mentioned before that due to the bridge curvature limitation fully loaded container cannot be carried over the road. Container transport by inland water does not exist yet. So, rail has a monopoly business for carrying container to and from Dhaka. From a cost consideration view point inland waterway is the most economic transport mode compared to road and rail. Not only that if containers are transported by inland water way, it will reduce the congestion on Chittagong port, and at the same time create competition between the Mongla and Chittagong ports. So, from an overall logistic view point, Dhaka inland water way base ICD, which is indicated here as an alternative approach no.1. is the best alternative for minimising transport costs.

6.2 RECOMMENDATIONS

MT in Bangladesh is still in an infant stage. So, exporters have limited choice for taking their new strategy. The following suggested recommendations are basically based on exporters and transport operator's expectations, which they feel are main constraints for reducing cost as well as developing the MT in Bangladesh.

1. To establish the Dhaka-inland water way base ICD (Dhaka container port):-

It is clear that Dhaka industrial complex accounts for maximum high value exports out of the country. Almost all the products like as garments, leather goods, pharmaceuticals, electronic goods are all capable of being containerised. But only rail is now capable of carrying the container in a Multimodal transport form. Due to monopoly, it is not cost-effective yet. So, other combination of MT are now necessary to create competition. Dhaka is also well connected by class-I waterways, most of which are maintained by natural riverflow, without maintenance dredging. By using such natural waterways and designing vessels for container a transport system could be created. In addition to saving in transport costs, the direct dispatch of the containers by waterways will obviously reduce the congestion in the seaports.

The inland water ICD in Dhaka will certainly balance the container trade between the ports of Chittagong and Mongla and will have a positive effect on the total transport costs in the country.

2. To encourage private sector participation in container handling and transport operation :- It is true that private entrepreneurs are more efficient than public entrepreneurs. Already private entrepreneurs are dominating in the export market of Bangladesh. The concept of MT; door-to-door and just in time services are also accomplished by private entrepreneur in a more efficient way than the public entrepreneur. Another important factor in MT is different kinds of MTOs; VO-MTOS and NVO-MTOs. NVO-MTOs are totally operated by private entrepreneurs, because of their specialisation in that field. The private sector should also participate in port and container handling sector. Although all the sea-ports and ICD are now owned by Govt. But for improving the service, that means, reducing the dwell-time of container, container handling should be immediately handed over to the private sector.

3. To simplify the customs procedures :- There is urgent need for simplifying customs procedures, reducing multiple checks by customs and for reducing delays. Customs should also provide facilities for clearing export goods in containers at premises of large firms, and at privately run freight consolidation centre. Computerisation of customs documents is urgently needed; this would enable faster clearance and processing and improved systems.

4. To give more autonomy to port authorities :- The problem of higher costs at the ports exists in spite of good management by the port officials who are experienced and competent. The defects are mainly in the shortage of equipment and facilities, and equally in the concentration of power in the Ministry of Shipping which inhibits the freedom of management needed for efficient port operations by the port manager.

Even though the ports make impressive annual financial surpluses, and its tariff on foreign ships are prescribed in dollar terms, thus earning direct foreign exchange, the port authorities have to get government clearance for purchases of even small spare parts, which is a major handicap. Due to shortages of spares, more than 30 percent of the port equipment remains inoperable. The Govt. should allow the ports to use a percentage of their direct foreign exchange earning (from Foreign ships) for basic spares and other essential purchases, subject to only post-audit by the Government.

5. To build the single MG rail track on proposed Jamuna Multipurpose Bridge

This recommendation is applicable for the long term development of MT in Bangladesh. It has already been mentioned that Jamuna multipurpose bridge hopefully will be commissioned in July,1998. After completion of Jamuna bridge, a new location for investment might be opened in North-Bengal. So, for the fulfilment of future demand, a single MG rail track is necessary to build on the Jamuna bridge to establish the future rail based North-Bengal ICD.

6. To give the permission for establishing container consolidation centres :-

As an interim measure, Chittagong port can overcome the congestion problem at its multipurpose container terminal by allowing the setting up of private sector container consolidation centres at Chittagong with customs facilities for bonding and clearance. Tentative location for this could be either outside the port or inside the EPZ area. The private agencies may bring in their needed equipment and provide facilities for stuffing/destuffing containers as a common-user facility under customs supervision, this will reduce congestion in the port and give better facilities for cargo owners and will reduce costs.

For better understanding, these recommendations are shown below as a priority list of actions.

Table-6.2.1 Priority list of actions

Sl.no.	Actions	Priority
1.	Establishing Inland Waterway base ICD-Dhaka.	High
2.	Privatisation in Container handling and transport operation	Medium
3.	Customs procedure simplification and computerisation.	High
4.	More Port Autonomy	Medium
5.	Establishing the single MG rail track on Jamuna Bridge	Low
6.	Establishing private container consolidation centres in Chittagong	High

Bibliography

Branch, A E (1990) *Elements of Export Marketing and Management*. London: Chapman and Hall.

Branch, A E (1985) *Elements of Export Practice*. London: Chapman and Hall.

Branch, A E (1989) *Import / Export Documentation*. London: Chapman and Hall.

Bugg, R & Whitehead, G (1984) *Elements of Transportation and Documentation*. Cambridge: Wood head-Faulkner.

Davies, G J & Gray, R (1985) *Purchasing International Freight Services*. Aldershot, England:Gower.

Dr.Gilman, S (1989) *Prospects for Development of Multimodal Transport System*. London: University of Liverpool.

Johnson, G G, Fisher, M & Harris, E (1990) *Officially Supported Export Credits-Developments and Prospects*. Washington, D.C: International Monetary Fund.

Lipsey, G R & Chrystal, K A (1995) *An Introduction to Positive Economics*. New York: Oxford University Press.

Milner, C, editor (1990) *Export Promotion strategies-theory and evidence from developing countries*. New York: Harvester Wheatsheaf.

Mullar, G (1995) *International Freight Transportation*. U.S.A: Intermodal Association of North America (IANA), and Eno Transportation Foundation Inc.

Economic and Social Commission For Asia and the Pacific (1982). *Impact of Containerisation on the Transport Systems of Developing Countries in the ESCAP Region: a Bangladesh Case study*. Bangkok: ESCAP.

Economic and Social Commission For Asia and Pacific (1982). *Report of the Country Workshop on Ocean Transport Cost and Negotiating Techniques in Shipping*. Dhaka: ESCAP.

United Nations Conference On Trade and Development (1995). *Identification of New Trading Opportunities Arising from the Implementation of the Uruguay Round Agreements in Selected Sectors and Markets*. Geneva: UNCTAD.

United Nations Conference on Trade and Development (1994). *Mega Multimodal Transport Operators & Mega Carriers*. Geneva: UNCTAD.

United Nations Conference on Trade and Development (1984). *Multimodal transport and Containerisation*. New York: UNCTAD.

United Nations Conference on Trade and Development (1994). *Multimodal Transport and Trading Opportunities*. Geneva: UNCTAD.

United Nations Conference on Trade and Development (1987). *Ocean Freight Rate and Their Effects on Exports of Developing Countries*. Geneva: UNCTAD.

United Nations Conference on Trade and Development (1992). *The Role of Transport in Trade between Developing Countries*. Geneva: UNCTAD.

United Nations Conference on Trade and development (1989). *The Economic and Commercial Implication of the Entry into Force of the Hamburg Rules and Multimodal Transport Convention*. Geneva: UNCTAD.

United Nations Conference on Trade and Development (1991). *Practical Problems Faced by Governments and Commercial Parties Involved in Multimodal Transport Operations to and from Developing Countries*. Geneva: UNCTAD.

United Nations Conference on Trade and Development(1995). *Fostering Competitive Multimodal Transport Services*. Geneva: UNCTAD.

United Nations Conference on Trade and Development (1995). *Recent Development in Diversification of Developing Courtney's Commodity Exports*. Geneva: UNCTAD.

Multimodal Transport Hand Book. (5th ed.). (1995). Geneva: UNCTAD.

ADB(1995). *Mongla port Area Development Project*. Dhaka, Bangladesh: Japan Overseas Consultants Co.Ltd.

CPA(1995). *Master Plan on Chittagong Port*. Chittagong, Bangladesh: Chittagong Port Authority.

CPA(1995). *Development Plan of Chittagong Port Upto 2000*. Chittagong,Bangladesh: Chittagong Port Authority.

PLB(1994). *BangladeshTransport Sector Study*. (Funded by UNDP, executing agency World Bank). Dhaka: Planning Commission of Bangladesh.

BIWTA(1995). *Inland Container River Port-Dhaka, A Study Report on Procurement of Inland Container Vessels*. Dhaka: Bangladesh Inland Water Transport Authority.

Rabbani, G (1988). *Containerization in Bangladesh*. MSc dissertation. Malmö,Sweden: the World Maritime University.

Kher, S V (1995). *Multimodal Transport in Developing Countries*. MSc dissertation. Malmö, Sweden: the World Maritime University.

AUOY

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**THE ADEQUACY OF THE LEGAL AND
INSTITUTIONAL FRAMEWORKS TO
PREVENT AND COMBAT MARINE
POLLUTION IN MAURITIUS**

By

PREMCHAND BHOWON

Republic of Mauritius

A dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

GENERAL MARITIME ADMINISTRATION

&

ENVIRONMENT PROTECTION

1996

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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ABSTRACT

Title of dissertation: The Adequacy of the Legal and Institutional Frameworks to Prevent and Combat Marine Pollution in Mauritius.

Degree : MSc

The Global concern for the environment and the adverse consequences of pollution on both developed and developing countries alike, including small islands, have not left Mauritius, a small island in the Indian Ocean, uninfluenced. The Government of Mauritius has now become very much conscious about the environment and its importance in the economic development of the country.

Mauritius was a British colony and achieved independence in 1968. From originally a mono-crop country, namely agriculture, the country subsequently pursued a diversified economic policy devoid of environmental consideration in the 1970's and 1980's. The country experienced considerable economic progress. Unfortunately, this economic growth was achieved at the expense of both terrestrial and marine pollution.

The negative impacts of pollution as a result of the remarkable economic growth were seriously felt in the 1980's. Government enacted certain laws, promulgated various regulations, ratified a few international treaties and established institutions to deal with both land-based and marine pollution.

The existing legal and institutional frameworks have been evaluated and proven to be inadequate to prevent and combat marine pollution effectively.

The author suggests several measures and recommendations to reinforce the laws and institutional capabilities for controlling and combating marine pollution in an effective fashion to safeguard and protect the environment with a view to ensure a better quality of life and sustainable development.

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LIST OF ABBREVIATIONS

BOD	Biochemical Oxygen Demand
EPA	Environment Protection Act
GEF	Global Environment Facility

ICS	International Chamber of Shipping
ISF	International Shipping Federation
IMO	International Maritime Organisation
ICZM	Integrated Coastal Zone Management
IOPC	International Oil Pollution Compensation
MARPOL	International Convention for Marine Pollution Prevention
NEC	National Environment Committee
NOSCP	National Oil Spill Contingency Plan
NGO	Non-Governmental Organisation
OPRC	Oil Pollution Preparedness and Response Convention
OSC	On Scene Commander
ROSCOP	Regional Oil Spill Contingency Program
SOLAS	International Convention for the Safety of Life at Sea
UNCLOS	United Nations Convention on the Law of the Sea
WCED	World Commission on Environment and Development
WMU	World Maritime University

1. INTRODUCTION

The author, as many other people, feels that the General Maritime Administration and Environment Protection (GMAEP) course at World Maritime University is an important and appropriate course to those serving particularly as administrators. On the one hand, it deals interalia with port and shipping operations and management, maritime transportation and maritime conventions. On the other hand, it stresses the importance of the environment and the way environmental problems have to be resolved. Many who have followed this course have undoubtedly realised for the first time that our ecosystems should be protected and preserved by all means. They are our life support systems and if necessary and timely measures are not taken to prevent them from deterioration, then we will fail to leave a secure and safe world to our future generations.

Already the present state of our global environment is a matter of serious concern. Our security is being threatened. Human activities have led to the deterioration of the environment. Among other things, the release of carbon dioxide and emissions of other harmful gases in the atmosphere have caused depletion of the ozone layer. Hence, global warming could pose a fatal menace to small islands. The latter may be swept away from the world map. Many nations inhabiting several thousands of small

islands will be in danger if efforts are not undertaken to prevent and combat all sources of pollution at national, regional and international levels.

Studies in environmental matters pursued at World Maritime University (WMU) by the author have caused him to realise how the protection and preservation of the ecosystems in Mauritius are crucial for the economic survival and sustainable development of the country. Figure 1 shows a map of Mauritius. It depicts an island surrounded by coastal areas with very sensitive marine resources.

Tourism and fishing are the main pillars of the country's economy. The ecology has to be protected by all means for the good of the nation.

It is in the light of the above comments that the author has been motivated to write a dissertation on a topic touching environmental issues, as the country's destiny is very much dependent on its ecosystems.

After independence in 1968, the country followed a policy of rapid industrialisation to fight unemployment and seek more economic independence and security from agriculture. The 1970's and 80's witnessed remarkable progress which was unfortunately accompanied by pollution problems. The negative impacts on the environment culminated in the enactment in 1991 of the first Environmental Act to deal with pollution problems in Mauritius. In addition to this Act, Mauritius has ratified many international conventions which indirectly contribute to the prevention and control of marine pollution in Mauritius.

Located in the Indian Ocean, a main route for many oil tankers and heavily reliant on the environment for its economic survival and with a minimum of existing legal and institutional mechanisms, Mauritius does not appear to possess the necessary

capabilities to protect and safeguard itself from the adverse impacts of pollution and oil spills. The dissertation will thus focus on how to set this deficiency right.

In addition to this introduction, the dissertation includes five other chapters. In the second chapter, since the dissertation topic deals with the environment, and given the fact that human welfare and well-being and future developments are so much dependent on the way nations endeavour to manage, safeguard and preserve the ecosystems, the author has thought it wise to state some of the important issues of the United Nations Conference on the Environment in 1992. Certain clues were provided regarding environmental management practices which all nations should be aware of. This is followed by a description of the attitudes and concerns towards the environment that exist in the author's country. Moreover, the chapter describes the geographical location, resources at risk, the type of government and the status of the economy of the country.

The third chapter deals with the various sources of pollution in Mauritius and their impacts.

The fourth and fifth chapters provide an idea to the reader about the existing legal and institutional mechanisms currently in place to deal with the environment in Mauritius. A few comments have also been made concerning these tools for environment protection.

The sixth chapter, which is the main and important part of the dissertation, tries to evaluate the adequacy of the existing environmental protection frameworks and makes recommendations to reinforce these measures with a view to deal efficiently and effectively with pollution and major oil spills to ensure the twin objectives of a healthy ecology and sustainable development.

2. GLOBAL AND NATIONAL CONCERN FOR ENVIRONMENTAL PROTECTION AND MANAGEMENT

The deteriorating nature of the global environment and ecosystem has necessitated the intervention of the international community. The Earth Summit Conference has had a great influence on nations. They realised that development and environment are two inter-related components and there is an urgent need to maintain a balance between the two. Consequently almost all countries including Mauritius rank the subject of environment high on their political agenda and have initiated several measures to ensure efficient management of the environment and safeguard themselves from the impacts of pollution. This chapter describes inter-alia some of the salient features of the conference on environment in June 1992 and enumerates some of the actions taken by Mauritius towards environmental protection and management.

2.1 Global concern

In December 1989, the United Nations General Assembly decided to hold a conference on environment and development in June 1992. This was to be considered as the first ever 'Earth Summit', or alternatively known as the United Nations Conference on Environment and Development.

Resolution 44/228, established the mandate of the conference and stated that the conference was to be based on 'Environment and Development issues and topics to be covered would range from climate change to human settlements. The resolution represented an interesting political balance between developed and developing country positions, between environment and development considerations, between national sovereignty and international responsibility and between past models of development and future needs to achieve sustainable development.

The conference also dealt with agreements on specific legal measures, for instance, conventions for the protection of the atmosphere (climate change) and biological diversity. The conference dealt not only with environment, but with development as well. It emphasized that development would not take place sustainably if the environment was not protected and managed properly as all production depended on it.

Integration is at the very heart of the conference. The main task of the conference was to move environment and development issues into the centre of economic policy and decision making. There is now widespread recognition that sectoral approaches to manage coastal zones environment to resolve conflicts must integrate responsibilities for environmental matters within the management mechanisms of sectoral economic interests.

Geographical and administrative boundaries have no meaning in environmental terms as marine living resources and ecosystems do not respect artificial boundaries. The economic and legal regimes must therefore be adjusted so that management is not constrained by political or administrative boundaries, but able to address the real physical and biological units being managed.

Public perception of the environment is in transition. Society is gradually appreciating that the impact of intensified human activities no longer permits a casual approach to the problems of environmental degradation. The increasingly active support of major governmental and non-governmental organisations is placing environment management as a significant public policy issue. Broader educational and public awareness programmes are essential to enhance society's participation in decision making debates.

Management of the environment encompasses several steps which include: collection, organisation and analysis of data, setting of priorities, making choices related to policy directives, laws and regulations, implementation of policies, surveillance and enforcement of rules and evaluation of results. However, there are still some problems and uncertainties regarding future ocean environment management purposes. They consist mainly of: the availability, incorporation, and utilisation of scientific and technical information in the policy process; jurisdictional problems; and, costs associated with management efforts.

The overall objective should be to ensure the long-term maintenance of marine environmental health, resource quality and ecological integrity. The oceans and coastal areas need to be viewed as a positive asset to achieve sustainable development. This can be attained only through an integrated management approach.

2.2. National attitude towards the environment

The issue of the environment is gaining importance in Mauritius. Public awareness of the environment has put the issue at the centre of decision-making in government, industry and the home.

Much thought has been given to the type of policy and institutional changes required to reverse environmental degradation and move towards sustainable development.

The National Environmental Policy takes the environment from the margin and places it at the mainstream of political thinking and decision making. Several key approaches have been identified in tackling environmental issues and natural resource management as follows:

(a) Institutional change

The Bruntland report indicated that environmental protection and management could not be safely left to weak and underfunded departments, or to several departments with overlapping responsibility. The issue of pollution control must be addressed responsibly. In response to this, the Government established the Ministry of Environment and Quality of Life to act as the lead agency for environmental matters. More of this department will be said in the chapter entitled institutional framework.

(b) Economic instrument

It has been decided to make use of taxes, charges and incentives to steer economic behaviour into environmentally desirable directions. In this connection, tax credits are granted on importation of pollution abatement facilities and accelerated depreciation allowance on investment in control equipment to comply with regulatory standards established by the Department of Environment.

(c) Integrated pollution control

One of the problems in dealing with the environment is the degree to which it is an integrated system. A change in one part affects all the others. This makes it difficult to set priorities for environmental action. For instance, if water pollution were to be first tackled, what would happen to the initiatives to deal with air pollution, being itself a primary source of pollutants in water. So, an integrated approach is needed when dealing with pollution issues.

(d) Legislation and regulation

More will be said on this topic in chapter four which deals with the legal framework. Presently, it is sufficient to say that environmental law and regulations, if vigorously enforced, would undoubtedly help protect the environment. In the absence of regulatory control the environment and the ecosystem are bound to deteriorate and even attain an irreversible situation. The nature of environmental law and regulations to be applied require an understanding of the state of the environment. For example, the setting of environmental standards, rules or criteria require all the understanding of the scientific implications of a pollutant.

(e) Public participation

There is now a growing recognition that the public has a right to information; and, more direct citizen involvement will reduce conflict, enhance trust in agency decisions and improve the quality of decision making.

(f) Strengthening partnerships

Better environmental decision-making will require co-operative efforts at all levels. The participation of the business community is essential in the implementation of effective solutions to environmental problems. The environmental non-governmental organisations (ENGOs) play a crucial role in educating people about environmental issues and environmental activity. At the international level, global problems require global solutions. International partnerships based on both bilateral and multilateral agreements are being built to address environmental problems. The Government of Mauritius has realized that the state of the environment and economic development are interrelated issues. The environment has to be properly managed and protected if sustained economic development is to be achieved. The government believes that a quality environment is a right of all the people and this is being achieved through the National Environment Policy, the Environment Protection Act, and the National Environmental Action Plan for Mauritius.

2.3. Geography

Mauritius is a volcanic island located at Latitude 20° south and longitude 58° East, some 800 km from the south-east tip of Madagascar. It has a land area of 1860 square km² and a population of just over a million inhabitants. Many islets form part of Mauritius. They are Rodrigues, Agalega, and the St. Brandon Islands. Moreover, Diego Garcia and Tromlin islands are also part of the country but are presently occupied by the Americans and French respectively. They are being used as military bases in the Indian ocean.

The climate is sub-tropical. It is warm and pleasant throughout the year. The temperature varies between 20⁰ and 32⁰ Celsius.

2.4 Environmental setting

Mauritius is situated in the belt of the south east trades and is surrounded by a ring of coral reefs, except for the southern and western coasts. The south east trade winds blow throughout the year. Tropical cyclones are common between November and March, with wind gusts of up to 280 km/hr. With the exception of the west coast, oil spill response operations in the open ocean are normally difficult, and impossible during stormy conditions.

Mauritius has different types of shorelines. In order of increasing sensitivity to spilled oil, the shoreline types are :

- (1) Exposed cliffs
- (2) Low lying basalt, beach rock and sea walls

- (3) Exposed boulder/cobble beaches
- (4) Sand beaches
- (5) Mixed sand and gravel beaches
- (6) Exposed sand flats
- (7) Sheltered rocky shores
- (8) Coral reefs
- (9) Sheltered tidal flats
- (10) Marshes and Mangroves

Accordingly different oil spill response methods are needed for each of these shoreline types.

2.5 Resources at risk

Sensitive habitats, fragile island ecosystems, unique flora and fauna are to be found throughout the island. Estuaries are breeding habitats for a variety of shrimp and prawn species, oysters and fish. Mangroves, which also occupy estuary areas, provide a habitat for crabs, shrimps, prawns, mollusks and fish which serve as a rich source of animal protein for the population. Strict environmental control has to be exercised to avoid these very sensitive and vulnerable resources from being adversely affected by any kind of pollution.

2.6 Government

Mauritius was a British colony and achieved independence in 1968. It has a democratic government based on the Westminster model. There is a general election every 5 years.

Mauritius is a multi-racial country. The constitution guarantees representation of all races in Parliament.

Mauritius attained the status of a republic in 1990. The President is the head of the state but executive powers are vested in the hands of the Prime Minister. Despite many pitfalls, the present system of government has worked well. It has given a political stability considered vital for sustained economic and social development.

2.7 Economy

Within a generation Mauritius has gone from gloom to boom. Today Mauritius prospers. It has developed into a labour intensive, industrial sector, heavily reliant on clothing exports and a very successful tourist business. Economic development has undoubtedly improved the standard and quality of life of the population but it has also produced a by-product, namely pollution, in its various forms. The purpose of the next chapter is to identify the various sources of pollution and their impacts on the environment.

3. SOURCES OF MARINE POLLUTION IN MAURITIUS AND IMPACTS

The main aim of this dissertation is to control and combat marine pollution. This objective cannot be achieved if pollution emanating from land is ignored and not controlled. Scientists believe that globally over 85 percent of the marine pollution is the result of land based sources (Puerto Rico Workshop on land-based sources of marine pollution-August, 1989). The marine environment in Mauritius exists with at least 80 percent of pollution coming from the land and about 20 percent is marine based. It is important to know the causes and sources of the various types of pollution in order to establish correct baseline data to develop an appropriate marine pollution control strategy, which is addressed in the concluding chapter.

First, it is wise to know the definition of marine pollution. According to the Joint Group of Experts on Scientific Aspects of Marine Pollution (GESAMP), the definition of marine pollution is: 'Introduction by man, directly or indirectly, of substances into the marine environment (including estuaries) resulting in such deleterious effects as harm to living resources, hazards to human health, hindrance to marine activities including fishing, impairment of quality for the use of sea water and reduction of amenities (Meng,Q,(1987), page 4).

It is however necessary to know that the sources of marine pollution are both point and non-point. Point sources are those whose point-of-origin and location can be easily determined and where effluents can be accurately identified and quantified, e.g., discharge of waste water from a treatment plant. Non-point sources are those whose origin or location are difficult to identify because they are diffused and often occur

along with other pollutants, e.g., infiltration of nutrients from septic-tank effluent into near shore marine waters. Point sources of pollution are normally industrial waste waters, sewage discharges and storm sewers and conduits, whereas non-point sources of marine pollution arise from, inter-alia, urban run off, ground water seepage, and solid-waste disposal and its leachates.

The difficulties of non-point sources of pollution are that they are not easily identified and quantified and their effects are equally devastating to the marine environment. Over sedimentation, nutrient enrichment and toxic contamination of the coastal waters and wetlands resulting from water run off are a major threat to the integrity of water quality and marine ecosystems. Pesticides that bio-accumulate, and untreated sewage containing pathogenic bacteria, affect the marine organisms. These effects can be easily transmitted through the food chain to humans and pose health hazards.

The following are some of the main sources of pollution occurring in Mauritius and their impacts on the marine ecosystems:

3.1. Waste water from industries

The Export Processing Zone scheme which was launched in the early 1970's, provided a package of incentives to attract local and foreign investors. Consequently many industries including dyeing, printing, battery making, tanning and paint manufacturing have been established gradually. The industries discharge untreated waste effluents into canals and rivers and these are carried to the sea. Fish kills have been attributed to pollution by industrial effluents reported from industrialised coastal regions. The Government has taken initiatives to provide the industrial estates with treatment plants and has set up an industrial park for polluting industries.

3.2. Disposal of sewage

One of the main sources of coastal pollution is the discharge of sewage into the sea which has given rise to nutrient enrichment of the water leading to severe eutrophication. The beaches in the vicinity are littered with large masses of dead algae. Siltation has resulted in the death of large coral colonies. Ear infections and inflammation of minor cuts incurred by swimmers have been reported from the affected area. (Ministry of Environment,1991).

3.3. Waste water from sugar mills

There are about 19 sugar factories operating on the island situated close to the sea and rivers. Liquid waste from sugar factories is discharged into rivers or streams that flow to the marine environment, resulting in considerable damage to aquatic life and alteration of water quality. During harvest season, lagoons are found to be polluted with soot, carbon particles of oil and other waste discharges. Mass mortality of fish is occasionally reported from lagoons. Actions have been taken for primary treatment of effluent before releasing it into the environment. Mills have been encouraged to use decantation ponds. (Ministry of Environment, 1991).

3.4. Coastal tourism development

The number of tourists has increased significantly from 180,000 in 1980 to 400,000 in 1995. (Ministry of Tourism,1995). Expanded tourism has led to the rapid construction of new hotels along the shorelines. The environmental problems of coastal tourism development are the release of domestic waste water, leakage from septic tanks and anchor damage to coral. Grand Bay, a very frequented beach has experienced all of these problems. Surveys conducted along the beach indicate that most of the corals are dead and the Bay has turned into a sand desert.

3.5. Agricultural run-off

Almost 80% of the total land is under sugar cane plantation. Modern agricultural techniques involve the use of large quantities of agrochemicals such as fertilizers and pesticides. With a view to increase yields the use of agrochemicals has been increasing considerably. Pesticides sprayed on fields are washed into rivers and this has led to fish kills in rivers and estuaries. During rainfall, pesticides from the fields flow to the sea through rivers leading to the destruction of corals.

3.6. Solid waste disposal

Some lagoons are heavily polluted with solid wastes such as old vehicle tires, broken glass bottles, scrap metal and ashes. Burning of these wastes gives rise to environmental nuisances like air polluted with smoke, carbon particles and noxious gases, which pose a threat to human health. (Ministry of environment, 1991). The Government has already created 5 sanitary landfill sites.

3.7. Marine based pollution.

One of the biggest threats to the coastal waters of Mauritius comes from disasters such as shipwrecks causing oil spills or the spread of hazardous chemicals. In 1972 an Egyptian vessel "TAYEB", grounded on the reefs releasing some 200 tonnes of oil into the marine environment.

Tank cleaning operations are undertaken in the high seas. There are reports of oil drifting from the high seas and being deposited as tar balls along the east coast of Mauritius. Deposits were reported in 1978 and 1987. (Ministry of the Environment , 1991).

In 1993 and 1994 the National Coast Guard regularly reported “tank washing” within the harbour.

3.8 Marine transportation.

As a result of an increase in foreign trade, there has been a considerable increase in maritime traffic to and from Mauritius. The number of vessels calling to the port louis harbour during 1990 was 1107, compared to 982 in 1985 of which 331 were fishing vessels, 27 tankers and 749 cargo vessels. During 1995 the number of calls increased to 1484, the majority of the increase being cargo ships. (Mauritius Marine Authority, 1995).

Increasing bunkering activities and petroleum transfer operations represent a growing potential source of marine pollution.

3.9. Other land-based incidents causing marine pollution

A number of oil spills causing marine pollution have occurred in the recent years (Regional oil spill contingency program, prepared for IMO by G.H.De Berdt Romilly, December 27, 1994).

1. In 1990 a leakage from the oil facility of the Central Electricity Board caused considerable damage to the wetland area adjoining the facility.
2. In 1991 an explosion at a bulk bitumen facility situated close to the shore resulted in marine pollution.
3. In 1990 and 92 a spill occurred at the Esso Oil Company storage facility.

4. In 1992 an oil spill from a rusting tank at the Total Oil Company depot was reported.

3.10. Port area development

In 1991, dredging was carried out in two phases. The first phase included the deepening of the access channel. Some 600,000M³ of sand was dredged and utilised by the construction industry. The second operation involved the dredging of some 687,000M³ of dredged materials. (Ministry of Environment ,1991).

Dredging was deemed necessary for the erection of cargo handling systems and storage complexes.

The dredging operation has led to adverse effects. Sediments rich in organic matter were carried away by currents to the coast. Fish kills were reported as a result of the high biochemical oxygen demand (B.O.D) of the organic wastes which depleted the oxygen content of the lagoon waters. Only small fish were affected.

This chapter was basic and appropriate to the subject matter of this dissertation in the sense that it identified the main causes and locations of marine pollution which will considerably assist in determining the types and scope of legislative and institutional frameworks to deal with marine pollution occurring in the waters under Mauritius jurisdiction. The next chapter considers the existing legislative mechanism.

LEGAL FRAMEWORK

Law is a set of rules governing human behaviour in a certain desired manner, recognised by society, and backed by sanctions like fines and imprisonment to ensure compliance. Similarly, environmental law is a set of rules governing the management, preservation and protection of the environment. Environmental legislation became popular in the 1950's when the need was felt to tackle the increasing environmental problems and oil pollution in particular. International and regional conventions have also been established to deal with the worldwide dimension of pollution problems.

Environmental legislation is effective only if it is supported by strong enforcement provisions. These include inter-alia, control, monitoring and supervision, observance of established standards, surveillance of oil pollution, clean-up operations, imposition of fines for violation of permit conditions and analysis of water quality parameters. Legislation will fail to preserve and safeguard the ecology if it is not enforced properly.

The Government of Mauritius was motivated to enact legislation for environmental protection because of the following: the repetitive occurrence of oil spills in land and offshore, the fear of pollution adversely affecting the presence of sensitive and endangered living resources of valuable industrial and cultural resources and the need for a healthy ecology, a better quality of life and sustainable development.

Mauritius legislation and international and regional conventions relating to environmental protection and oil pollution, are listed in this chapter.

4.1 Environment Protection Act 1991

This Act constitutes the first environmental legislation ever enacted in Mauritius to deal exclusively with environmental matters. The objective of the Act is to provide institutional and legislative frameworks for the management and protection of the environment. Among other things, the Act first requires the submission of an Environment Impact Assessment (EIA) with respect to any major project to make sure that environmental factors are considered in the decision making process. Standards, guidelines, permits and the like have to be observed because the Government is committed to make its enforcement capability highly effective.

Second, the Act recognises the integrated nature of the environment, hence it creates a new system, the Environment Co-ordination Committee, which consists of different Ministries and para-statal bodies having responsibilities for the control of different types of activities producing pollution.

Third, the Act introduces participating mechanisms through the establishment of technical advisory committees providing for public inspection and comments on EIA, and public hearings of the Environment Adjudication Tribunal, with a view to enhance trust in agency decisions and improve the quality of decision making.

Fourth, section 27 of the Act makes provision for liability for damages caused by a spill, and section 28 provides for the recovery of expenses incurred for any clean-up and

removal operation. The Minister is given the power to prescribe national standards with respect to water, effluent limitations, air, noise, waste and pesticide residues.

Finally, the Act enables the Minister to make regulations for the purpose of preventing pollution in the coastal and maritime zone. Section 44 creates the offence of dumping in the zone.

4.2 Relevant provisions in other laws

In Mauritius, as in most other countries, some aspects of environmental problems are addressed by legislation which was not enacted with the primary objective of environmental protection. Such provisions are found in the following Acts:

(a) The Ports Act 1975 empowers the Port Master to control the manner in which cargo and fuel are taken on, discharged, or handled (Section 28.1C). This official can also cause the removal of any article or thing obstructing navigation or any other business in or over waters which lie within the territorial seas of Mauritius (Section 32).

(b) The Maritime Zones Act 1977, provides for the preservation and protection of the marine environment and the prevention and control of Marine Pollution (Section 15.2d) in the territorial waters, the continental shelf, the exclusive economic zone, and the historic waters of Mauritius.

(c) The Fisheries Act 1980 provides for penal fees against individuals responsible for pollution impacting on fisheries resources from land based sources.

4.3 Relevant International Conventions ratified by Mauritius

(a) The United Nations convention on the law of the sea 1982 (UNCLOS). The UNCLOS is a general codification of law, and it provides a framework for a comprehensive global international environmental law. Part X11 particularly addresses the protection and preservation of the marine environment. The convention lays down, first of all, the fundamental obligation of all states to protect and preserve the marine environment. It also urges all states to co-operate on a global and regional basis in formulating rules and standards, and to otherwise take appropriate measures within their territorial sea to protect the marine environment. States are also granted jurisdiction for the protection and preservation of the marine environment in their Exclusive Economic Zone. The Convention covers five sources of marine pollution, from land-based waste, shipping, dumping, sea-bed activities and from the atmosphere. The Convention also provides the legal framework for the enforcement of the protection and preservation of the marine environment by flag states and coastal states.

(b) International Convention for the Prevention of Pollution from ships (MARPOL73/78)

This instrument is a combination of two treaties established in 1973 and 1978 respectively. It covers all the technical aspects of pollution from ships, except the disposal of waste into the sea by dumping, and applies to ships of all types, although it does not apply to most of the pollution arising out of exploration and exploitation of the sea-bed mineral resources. Most of the technical measures are included in five annexes to the Convention which contain regulations for the prevention of various forms of pollution by:

1. Oil,
2. Noxious liquid substances carried in bulk,
3. Harmful substances carried in packages form,
4. Sewage from ships, and
5. Garbage from ships.

Marpol 73/78 provides protection for coastal waters. Its requirement for keeping a record book on board ships to record operations concerning ballasting, de-ballasting, tank cleaning and discharge of oily mixtures, as well as handling of garbage and sewage reinforces procedures contemplated in the Port-Louis Harbour oil spill contingency plan.

(c) The 1969 International Convention on Civil Liability of oil Pollution Damage (Civil Liability Convention). This convention deals with liability of shipowners for oil pollution damage. It lays down the principle of strict liability for the shipowner and requires him to take out liability insurance. The shipowner is normally entitled to limit his liability to an amount which is linked to the tonnage of his ship.

(d) The 1971 International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (Fund Convention). The Fund Convention is supplementary to the Civil Liability Convention and creates a system of additional compensation. The Fund Convention set up the International Oil Pollution Compensation Fund (IOPC) to administer this system. The IOPC is a worldwide intergovernmental organisation which provides compensation for oil pollution damage resulting from spills of persistent oil from laden tankers. The main function of the IOPC Fund is to provide supplementary compensation to victims in the Fund's 68 Member States who cannot obtain full compensation for the damage from shipowner or his

insurer under the Civil Liability Convention. The compensation payable by the IOPC Fund for any one incident is limited to about US\$ 90 million, including the sum actually paid by the shipowner or his insurer under the Civil Liability Convention. The ratification of the Fund Convention provides a good insurance cover against major oil spills for Mauritius.

4.4 Regional Convention

On the regional basis, Mauritius forms part of nations designated for the East African Regional Seas Programme. The latter promotes co-operation among the East African mainland states and the islands of the South West Indian Ocean area to control marine and coastal oil pollution. Mauritius has acceded to the following three regional conventions:

(a) Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern African Region. The objectives of the convention are to preserve the special hydrographic and ecological characteristics of the eastern african region and to combat the threat to the marine and coastal environment posed by pollution and environmental degradation. Article 4 of the Convention provides that parties shall take all appropriate measures necessary to prevent, reduce and combat pollution and to ensure sound environmental management of natural resources.

(b) Protocol concerning Protected Areas and Wild Fauna and Flora in the Eastern African Region. The objectives of this agreement are the maintenance of essential ecological processes and life support systems, to preserve genetic diversity, and to ensure the sustainable utilization of harvested natural resources. Parties undertake to

preserve fragile ecosystems and endangered species of wild fauna and flora and their habitats.

(c) Protocol concerning Co-operation in Combating Marine Pollution in Cases of Emergency in the Eastern African Region. The purpose of this protocol is to combat the threat to the marine and coastal environment from the risks of major spillage of oil and other harmful substances by vessel traffic. The agreement requires parties to take measures both preventive and remedial including enactment of relevant legislation, preparation of contingency plans and identification and development of response capabilities for marine pollution incidents (Article 3).

The present environmental protection legislative framework for dealing with marine pollution in Mauritius is inadequate. Marine pollution occurs as a result of land-based wastes, different uses of the sea including shipping, fishing, exploration, scientific research and other polluting activities in the high seas. Marine pollution requires a comprehensive legal regime for its effective control and prevention. The marine ecosystem being of global dimension and oil pollution being transboundary, the legal regime should necessarily include a combination of national rules, regional and international conventions. The latter have to be transformed into municipal laws, implemented and enforced in order to avoid and minimise the undesirable effects emanating from marine pollution. It would be the objective of chapter 6 to make valuable suggestions for improving the legal structure.

5. INSTITUTIONAL FRAMEWORK

It is true that economic growth cannot be achieved without affecting the environment but it should also be borne in mind that we cannot at the same time ensure sustained economic development unless we save the environment. To attain this end, the Government of Mauritius has endeavoured to restructure the existing institutional arrangements, fragmentations, overlapping jurisdictions, narrow mandates and closed decision-making of various government and non-government agencies. The role of environmental protection agencies and institutions should not be reactive and curative only, but anticipatory and preventive as far as environmental protection is concerned. These agencies and institutions should not take a sharp stand against economic development policies of Ministries as this will create inter-Ministerial jealousies and lead to jurisdictional fights, policy fragmentation, and pursuance of narrow objectives. There is thus need for co-operation and collaboration among the various Ministries and agencies with different portfolios for economic development to occur in an ecologically sound and sustainable manner. This is well argued in Our Common Future, a report by the World Commission on Environment and Development (WCED) as follows: “Environmental protection and sustainable development must be an integral part of the mandates of all agencies of Governments, of international organisations, and of major private-sector institutions. These must be made responsible and accountable for ensuring that their policies, programmes and budgets encourage and support activities that are economically and ecologically sustainable both in the short and longer terms (p312).

Mauritius is fortunate to enjoy a relatively good economic progress. Unfortunately economic development has given rise to serious environmental problems. However, the priority should be to ensure development in an ecologically sound and sustainable fashion. With limited land mass and scarce natural resources, a growing population and emphasis on diversifying the economic activities, the country should now and without delay be prepared to tackle the environmental problems. Later the cost in terms of capital investment and human misery will be colossal and unmanageable. The people should arrest and reverse the degradation of the Mauritian environment and ecosystem. To attain this goal, in addition to appropriate legal mechanisms, sound environmental policies and responsible, co-operative, rational and nature loving institutions and agencies are considered extremely important.

5.1 Importance of environmental institution

Environmental management and protection, like other sectors namely education, economic development, transportation, and health among others, requires institutions to fulfill its objectives. Environmental institutions are important for the following purposes: for recruiting the right people for framing appropriate environmental legislation and policies, to implement the latter, to evaluate, to approve standards and procedures, to monitor and enforce and to co-ordinate with a view to achieve the set goals for improving the ecology and environment.

This chapter describes the principles, policies and institutional frameworks dealing with environment in Mauritius.

5.2 Environmental principles

The formulation and implementation of all environmental protection and conservation policies and programmes in Mauritius endorses the following principles:

- (a) **Conservation:** The conservation and preservation of the ecosystem should be effected through close monitoring and efficient management of the natural systems.
- (b) **Stewardship of Mother earth:** The Government shall maintain the quality of water, soil, ocean, atmosphere and space in perpetuity from one generation to the other.
- (c) **Future generations:** Economic development policies should take into account implications for future generations towards their environment.
- (d) **Preventive:** Government should consider preventive measures rather than just remedial and curative measures as far as environmental policies are concerned.
- (e) **Collective Decision Making:** Environment is the concern of every one and its protection is a collective challenge and requires the co-operation of one and all.
- (f) **Responsible Environmental Management:** The Government shall ensure the existence of an appropriate legislation, enforcement and judicial mechanism which guarantees the population from the risks of pollution.
- (g) **Global responsibility:** Pollution is trans-boundary and global in nature and the Government should co-operate regionally and internationally to apply comprehensive and effective solutions to solve environmental problems.

(h) **Promoting environmental code of conduct:** The Government should actively assist citizens, non-governmental organisations, media and the educational institutions among others to promote the values enshrined in the Environment Act, and measures to ensure environmental conservation, protection and enhancement.

(i) **Environmental education and awareness:** Education is necessary to emphasise the importance of the environment to the nation. The population should be informed about the adverse impacts of pollution so that they feel motivated and hence co-operate in the fight against pollution.

5.3 National environment policy

The primary objective of environmental policy is to protect and manage the country's environmental assets such that their capacity to sustain development is unimpaired, and to ensure that future generations are able to enjoy the magnificent environment endowed upon Mauritius. The policy envisions the following responsibilities:

1. The Government shall meet the basic human needs without endangering the environment.
2. Natural resources of the nation shall be utilised in a way which is ecologically efficient, with restraint and without waste so that these are available to all forms of life, and are continued for the use of future generations.

3. Land-use activities shall be planned in an environmentally sound manner so that there is minimal threat to the natural environment and its aesthetic value and beauty, and in particular:

(a) An Environmental Impact Assessment (EIA) will be required prior to the approval of any project having a significant impact on the environment.

(b) Requirement of EIA includes development of land reclaimed, inland and sea beaches, and coastal areas.

(c) Any lease of Government land for commercial, industrial or agricultural purposes will take into account the purpose of such use and its relevance to the preservation and conservation of the environment.

4. Prudence demands that high environmental quality should be achieved and maintained as inexpensively as is consistent with high standards. Experience indicates that the use of economic instruments such as taxes, charges and other incentives have a very important role to play in achieving cost-effective environmental management. It shall be the Government of Mauritius policy to use such instruments as appropriate.

5. Pollution should be controlled at its source. The polluter must pay for the cost of cleaning up the pollution. In particular, the government of Mauritius believes that:

(a) Pollution prevention is the direct responsibility of any enterprise which is causing it.

(b) Pollution control regulations must be applied during all phases of industrial activity and operation.

(c) Importation, manufacturing, transportation, processing, distribution and application of a toxic substance shall be regulated.

(d) Pollution (both water and air) must be monitored at source.

(e) It will be the Government policy to set source emission standards for materials discharged into the environment.

(f) All discharge of pollutants into the environment by an industry or a commercial concern must meet the established standards (Ministry of Environment, 1991).

5.4 National Environment Commission (NEC)

The NEC is an apex body (with membership of key ministers) chaired by the Prime Minister. Its role is to provide high level co-ordination, through the minister of environment, policy approval, setting environmental goals for environmental protection and natural resource management, approving standards, laws and regulations. The Commission shall exercise its leadership role, and meet regularly. Specifically, the commission shall provide leadership in: setting national goals and resolving intersectoral issues. The NEC is the pivotal body and ensures that the wishes of Parliament are carried out by all ministries and para-statal organisations. (Ministry of Environment, 1991).

5.5 Department of Environment

In 1983 the responsibility for environment protection was transferred from the Ministry of Agriculture and Fisheries to the Ministry of Housing, Lands and the Environment. In 1988 when the issue of environmental management assumed serious

importance, a new environment protection department was created within the Ministry. Today this department forms part of the Ministry of Environment and Quality of Life. The Department of Environment has the following mission:

- (a) It is responsible for the administration of environmental legislation.

- (b) It designs and develops standards, codes of practice and environmental guidelines.

- (c) It ensures compliance and enforcement activities

- (d) It provides specialised training for its staff

- (e) The department of environment has five operational departments namely Environmental Policy and Planning, Standards and Criteria, Enforcement, Public Information and Research.

- (g) The department of environment assists ministries and agencies of Government to incorporate environmental considerations into their own Ministry policies and plans of action. (Ministry of Environment, 1991).

5.6 National development plan

The Government has since long ago decided that economic policies and development should take into account environmental issues and the issue of environment ranks high in the National Development Plan. Mauritius is dependent on external financial assistance for its major development projects. Financial institution, like the World Bank, will not approve projects unless they are both economically and environmentally sound and viable.

5.7 National Environment Committee (NEC)

The National Environment Committee consists of various relevant ministries and some members of the public. Its terms of reference are as follows:

1. Identification of the environmental problems within human settlements and the natural environment.
2. Inventory of institutions involved in the control and monitoring of problems arising in the built environment and in the natural environment.
3. Inventory of legislation applicable to the control of built and natural environments.
4. Assessment of impact of major man-made activities on the natural environment.
5. Commissioning of review reports and studies on the state of the environment (Ministry of Environment, 1991).

5.8 National Coast Guard (NCG)

The NCG is a Government agency, the main function of which is surveillance of the Maritime Zones of the country. In addition, it also monitors and combats oil spills in the coastal region.

5.9 Oil companies

According to the polluter pays principle, oil companies in Mauritius have commitments for clean up and restoration if pollution is caused from their activities. Currently, they are in the process of building up the necessary infrastructure to address emergencies likely to occur at their facilities and at locations under their jurisdictions.

5.10 Role of Non-Government Organisations (NGO's)

Both NGO's and the media are formulators of public opinion and powerful catalysts for bringing change in the society. NGO's represent the voice of people to an environmentally sound quality of life. The creation of the Environmental Advisory Committee in the Environment Act gives the NGO concerned with environment a right of participation to influence policies regarding the environment in Mauritius. The committee sets up sub-committees to look into specific aspects of pollution problems, such as pollution from industries and tourism, habitat environment, marine and coastal environment and preservation and enhancement of the natural environment. Various ministries are appointed to chair these sub-committees.

5.11 The National Oil Spill Contingency Plan (NOSCP)

The Director of the National Oil Spill Contingency Plan has overall responsibility over all matters concerning any oil spill in Mauritius. Upon notification of an oil spill, the Director will decide whether responsibility for action belongs to the Port, an oil company or NOSCP itself. If responsibility belongs to the NOSCP, the Director will appoint the responding On-Scene Co-ordinator (OSC) for NOSCP - OSC LAND or OSC SEA as the case may be (UNEP regional seas report and studies No 125, UNEP, 1990)

In addition to the NOSCP, two other oil spill response plans are available: the Port-Louis Harbour oil spill contingency plan and contingency plans for the oil companies. The National Plan (NOSCP) takes precedence over all existing and future local oil spill contingency plans.

While the Director of NOSCP has final jurisdiction over any oil spill which may occur in Mauritius, the responsibility for containment, clean up and disposal is determined

by the geographical location of the spill. For this purpose, three classes of oil spills are recognised as follows:

(a) National Spills

National spills are defined as oil spills (at sea, on land, in rivers and lakes and on the beaches) which originate in areas not included in the Port Louis harbour and oil company spills response plans.

(b) Port Spills

Oil spills originating within the boundaries specified by the Port's Act will be the responsibility of the Port Master. The Port Master deals with Port spills according to the Port-Louis harbour contingency plan and keeps the Director of the NOSCP informed about such spills.

(c) Oil Company Spills

Oil spills which originate inland or at sea at any of the operational facilities of the oil marketing companies will be the responsibility of the operator involved. Spill response carried out by the oil companies will be overseen by the Port Master or the Director of the NOSCP. In the event the responsible parties or authorities fail to take timely or satisfactory response actions, it becomes the duty of the NOSCP to intervene. The National Oil Spill Contingency Plan is continuously being updated and provides the framework for all oil spill responses.

5.12 regional oil spill contingency plan

Figure 3 shows tankers route and the locations of the various island states of the Indian Ocean. These islands comprise of: Comores, Madagascar, Maldives, Reunion, Seychelles and Mauritius with its dependencies named Tromelin, Rodrigues, St. Brandon, Agalega, Solomon and Diego Garcia. Pollution is transboundary and none

of the islands are economically and technically capable of addressing a major oil spill in the region. Hence, a regional oil spill contingency plan has been worked out at the request of the International Maritime Organisation (IMO). More will be said about the project in the next chapter.

Principles and policies concerning environmental protection in Mauritius as stated above are appropriate, sound and promising. They should infact be put into practice lest they will be meaningless and fail to achieve environmental protection. However, the effectiveness of the institutional frameworks is far from successful. Land based sources of pollution are not being properly controlled, operational vessel source pollution continues unabated and it is highly unlikely that a major oil pollution incident could be properly addressed. Deficiency in response capabilities, lack of a single marine policy governing the activities of the agencies and non-ratification and failure to incorporate ratified conventions adversely affect operation of the existing institutional mechanisms to prevent pollution. Suggestions will be made in chapter 6 entitled evaluation and recommendations for strengthening the institutional frameworks

6. Evaluation, Recommendations and Conclusion.

In addition to land-based and other forms of marine pollution, Mauritius is also subject to a considerable environmental risk due to shipping traffic through the region. The potential for harm is considerable, particularly in view of the country's dependence on tourism and fishing, as the mainstay of the economy. There are also several areas of considerable sensitivity (Agalega), including fishing areas (St Brandon), coastal wetlands, tourism areas, and the important sea turtle breeding area of Tromelain island. Figure 2 shows the Exclusive Economy Zone (EEZ) of Mauritius of some 2.5 million square miles. The small size of the country suggests that it could not economically withstand a major oil spill in its territorial waters. The purpose of this chapter is to assess the adequacy of the legislative and institutional frameworks and make certain recommendations which would reinforce the legislative mechanism and enhance the response capabilities of the institutions to minimize and avoid pollution and help mitigate, the adverse impacts of a major oil spill within the waters it controls.

6.1 An evaluation of the Environment Protection Act, the oil spill contingency plans, and the ratified conventions and port state control.

6.1.1 Environment Protection Act 1991

The Act is a good piece of environmental protection legislation. Inter-alia, the main principles of environmental law are embedded therein. The notions of public protection, polluter pays principle, precautionary principle and public notification and consultation are well emphasized. These principles obligate economic activities to proceed with care and minimum harm to the environment.

The issue of land pollution is well addressed by the Act. As far as marine pollution is concerned, the Act only states that the Minister has the power to make regulations for the purpose of preventing pollution in the coastal and maritime zones. So far the Ministry of Environment has not come up with any specific legislation as to how to deal with pollution of the marine environment. It is true that administration for marine pollution is fragmented or is under the control of various Ministries. The Ministry of Environment being the lead agency for environmental matters should regulate and clarify the responsibilities of each agency to ensure a co-ordinated approach and an effective response to marine pollution.

6.1.2 National Oil Spill Contingency Plan (NOSCP) and its legal implications

Legal aspects relating to the importation of equipment and manpower in the event of a major spill (e.g. customs clearances, international agreements concerning the payment of

the costs for the hire of equipment and personnel, and international import requirements) need to be considered.

Legal provisions should be made in advance for quick customs and immigration clearances of equipment and foreigners, respectively, in the event of an emergency.

Government should initiate talks and discuss modalities for hire of equipment and payments to personnel for assistance during an environmental emergency. Pre-determined contracts should be in existence wherever possible. The country requesting assistance should reimburse the assisting country where as if the assistance is spontaneous the assisted country need not pay anything according to the (OPRC 1990).

6.1.3 Regional Oil Spill Contingency Plan (ROSCP)

Figure 3 shows the oil transportation routes in the Indian Ocean: In view of the islands being located along the most densely used oil transportation artery of the world, the particular vulnerability of the coastal waters, fishing and tourism being the pillars of the economies, the island states of the Indian Ocean region seized the opportunity during the United Nations Conference on the Sustainable Development of Small Island States to put a formal request to the international community to develop a regional oil spill response capability. The request was submitted to the Global Environment Facility (GEF) and conveyed to the Director of the Marine Environment Division of the International Maritime Organisation (IMO).

A regional oil spill contingency program for the island states comprised of Comores, Madagascar, Maldives, Mauritius and Seychelles was prepared for the International Maritime Organisation (IMO) by George H. de Berdt Romily, Environmental and labour consultant. The program was funded by the Canadian International Development Agency (CIDA).

The proposed Oil Spill Contingency Programme is intended to establish an effective marine pollution response capability through the creation of a regional monitoring, surveillance and response programme. It is proposed to establish an emergency response, information and training center. The center will co-ordinate national and regional policies and practices and provide effective and efficient communication, co-ordination and response.

GEF Funding may be required to develop the regional oil spill contingency plan. Subsequently, the problems of long term maintenance of equipment and necessary training at a national and regional level will remain as the island states are already experiencing restrictions in their operational budgets. But, it should be borne in mind that failure to prepare for environmental emergencies might cost more than what is spent every year in the maintenance of the plan. Failure to react to a major oil spill may present long-term damage to the ecosystem, environment and the economies. It is therefore advisable for the countries in the region to provide a small recurrent budget to ensure minimisation of adverse impacts in the event of a major marine calamity.

The draft project was finalised in December 1994. Since then there has not been any move to implement it. A major maritime accident involving tankers could be really disastrous to the region. One should not wait for bad things to happen to take action.

The threat is ever present and action has to be initiated as soon as possible. IMO and all the countries in the region should be apprised of these dangers and the need for quick action to implement the establishment of the plan.

6.1.4 The International Convention for the Prevention of Marine Pollution from Ships, MARPOL, 73/78.

This convention was ratified last year but unfortunately it has not been fully implemented. One of the main requirements is the need for reception facilities in the port. These will be made available as a result of assistance from the world Bank. The Government and the port authority should not delay the project as the illegal discharge of oily residues in our territorial waters is an ongoing threat that is adversely affecting the marine environment.

6.1.5 United Nations Convention on the Law Of the Sea (UNCLOS 1982)

One of the obligations of the Convention is that ratifying states should preserve and protect the marine environment within a state's Exclusive Economic Zone (EEZ). This obligation has to be honoured. The Department of Environment should convince the Prime Minister's office of the economic importance of the EEZ to the nation and initiate following measures for its preservation and protection: First, by setting up an effective surveillance mechanism to monitor oil spills and illegal fishing. Second, establish oil spill contingency plan to combat oil spills in the zone and prevent spills from moving towards the sensitive and vulnerable coastal areas. Mauritius is not economically capable to exercise these activities effectively, hence, it has to rely a great deal on regional and international co-operation for assistance as stated in the Convention.

6.1.6 Port State Control

There is a proliferation of substandard ships operating world wide which virtually pose serious threat to the oceans and the coastal zones. News of tankers going aground and bulk carriers capsizing resulting in loss of lives and serious environmental damage has now become common. IMO has been very much concerned about the situation and made provisions in the treaties like SOLAS, MARPOL, LOAD LINE AND THE STCW for the inspection of ships calling foreign ports to ensure that ships do comply with safety standards and cease to be a menace to lives and the ecosystems.

Though Mauritius is party to all the above conventions, unfortunately, it is unable to carry out port state control effectively or on a regular basis inspite of the number of ships calling the port is increasing. However, suspected ships are sometimes allowed to leave the port uninspected due to a scarcity of surveyors. Failure to inspect substandard ships might cost a great deal to the country in terms of the impacts of a major oil spill which might adversely affect fishing and tourism among other economic sectors in the event of an oil spill. The country should not be exposed to such risks.

Steps should be initiated at the earliest by the Ministry of Shipping to set up the necessary infrastructure both nationally and on a regional basis for ship inspection to safeguard the marine environment under the country's jurisdiction and in the region.

6.2 Necessity to ratify other international conventions

Inview of the vast Exclusive Economic Zone (EEZ) and the awareness of the severe consequences the country might suffer during an oil spill, other important international

conventions should be ratified by the government to avoid the degradation of the marine environment and to ensure efficient response to a major oil spill. The Government should adhere to the following international conventions:

6.2.1 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, of 1972, which came into force in 1975.

This convention has a global character and is a further step towards the international control and prevention of marine pollution. It prohibits dumping of various hazardous materials. It requires prior special permit for the dumping of other wastes or matter. Contracting parties agree to designate an authority to deal with the issue of permits, the maintaining of records and the monitoring of the state of the sea. Annexes list wastes which cannot be dumped and others which require a special dumping permit. The procedures for the issuance of these permits are laid down in the third annex which deals with the nature of the waste material, the characteristics of the dumping site and the method of disposal. Being party to the said convention would empower Mauritius to have a degree of control over both local and foreign vessels likely to dump waste in the region.

6.2.2 International Convention Relating to the Intervention on the High Seas in Cases of Oil Pollution Casualties, of 1969 (Intervention Convention).

This convention gives a right to a coastal state to take such measures on the high seas to prevent, mitigate or eliminate a threat to its coastline or related interests from pollution by oil, following a maritime casualty. The coastal state is empowered to take only such action as necessary. A coastal state which takes measures beyond those permitted under

the convention is liable to pay compensation for any damage caused by such measures. Provision is made for the settlement of disputes arising in connection with the application of the convention. The convention applies to all sea going vessels except warships or other vessels owned or operated by a state and used in government non-commercial service.

6.2.3 International Convention on Oil Pollution Preparedness Response and Co-operation (OPRC Convention 1990).

This convention requires states to develop and maintain an adequate capacity to deal with oil pollution emergencies, and addresses marine pollution from petroleum in any form (crude oil, fuel oil, sludge oil, refuse and refined products, Article 2).

Under the provisions of the agreement, Parties agree to co-operate and provide assistance where requested to deal with oil pollution incidents, subject to a party's capability and availability of resources. The requesting party should reimburse the assigning party for the cost of assistance, although in certain circumstances the payment may be reduced, waived or post-poned.

Parties are required to ensure that ships, offshore units, aircraft, seaports and oil handling facilities report oil pollution incidents to the nearest coastal state or competent national authority and advise neighbouring states at risk. Oil pollution emergency plans are needed for oil tankers of 150 gross tons and above. In addition, oil spill contingency plans are required for offshore structures engaged in petroleum exploration and any sea port and oil handling facility that presents a risk.

Member states are required to establish national oil spill contingency plans for responding promptly and effectively to oil pollution incidents. This will need the procurement of a minimum level of pre-positioned oil spill response equipment, development and implementation of training exercises on oil spill response and management and the establishment of suitable arrangements to facilitate the mobilization of necessary resources. An oil Pollution Co-ordination Centre (OPCC) has been established in London by the IMO to co-ordinate activities required under the convention.

6.3 Adequacy of the institutional framework, response capabilities and suggestions

6.3.1 Department of Environment

As mentioned previously, the Department of Environment is an administrative institution and is the lead agency as far as terrestrial and marine pollution matters are concerned. It is quite effective on the terrestrial front. Since its establishment in 1989 it has been able to partially create an awareness in the public's mind about the importance of the environment and endeavoured to control and minimize land-based pollution. But, the situation is far from satisfactory. One can easily notice dumping of wastes in various parts of the country and the discharge of industrial effluents in coastal areas which leads to fish kills and degradation of the marine environment.

This may be due to lack of staff or enforcement of legislation. The Department has to reinforce both its staff and enforcement capabilities on one hand, and on the other, apply severe sanctions against offenders. It is also proposed to introduce criminal liability applicable to the staff of the Department with a view to compel them to discharge their functions with responsibility and seriousness.

The activities of the Department of Environment have not been impressive at all with regard to marine pollution. It appears that the Department has not realised the impact that a major oil spill could have on the economy of Mauritius which is so dependent on tourism and fisheries. It has not established or initiated the steps needed to provide an operational National oil spill contingency plan. The problems associated with this will be addressed later on.

The Indian Ocean, being a route for tankers, the coastal areas, being sensitive and vulnerable, with tourism and fisheries being the pillars of the economy, all constitute adequate rationale to establish the necessary programmes for the protection of the marine environment. The Department of Environment, having two powerful institutions at its disposal, namely the National Environment Commission, with the Prime Minister as chairman and the National Environmental Committee (which includes all the important ministries) could have easily influenced environmental policy to attain necessary objectives relevant to the marine environment. The reason this has not been done may be due to a lack of co-operation among the various agencies concerned and budgetary limitations. Being aware of the disastrous and long-term damage that oil pollution can have on such a fragile economy, such obstacles should have been overcome a long time ago. The Department should also insist that the two institutions are convened regularly to consider urgent matters and to keep abreast of new developments in environmental affairs.

6.3.2 National Coast Guard

This institution has to exercise surveillance of the coastal areas and the vast Exclusive Economic Zone. Its activities should include; patrolling, identifying poachers in fishing grounds, carrying out search and rescue and taking action against oil spills. Unfortunately, the Coast Guard has no experience in oil spill management. The personnel are not trained in oil spill response and recovery. This is very unfortunate for it is the Coast Guard which is supposed to carry out containment and response to any major oil spill in the coastal waters. Necessary actions are deemed essential to remedy this deficiency. It is suggested that the Government of Mauritius approach the Canadian and the United States Coast Guards which possess the necessary expertise for long term training and equipment maintenance requirements. Furthermore, to enable the National Coast Guard to exercise proper enforcement in the territorial waters and even beyond national jurisdictions for instance on the high seas adjacent to Mauritius waters, against foreign vessels involved in polluting activities, arrangements should be made to acquire the necessary equipment, inter-alia, ocean-going tugs with fire fighting and rescue equipments, patrol boats, booms, skimmers, absorbents, dispersants, aircrafts and helicopters to deal effectively with surveillance and oil pollution prevention and response management.

6.3.3 The Port Authority

The fire and emergency response division of the Authority which is also expected to intervene in the event of an oil spill, either in the port or coastal areas, is not adequately prepared either in terms of equipment or qualified personnel. But, the future is promising. According to the Port Master Plan which is likely to be implemented very

soon, the issue of the environment is given due consideration. Port projects in the future would carry an agenda for the development and protection of the environment. This incorporates a comprehensive framework of environmental and safety policies which include, inter-alia, the preparation and drafting of adequate legislation, defining the requirements and design facilities for the collection of land and ship generated oily wastes, draft regulations to enforce safety in port operations, control of vessel's seaworthiness and the construction of facilities for reception and pre-treatment of oily wastes. The agenda should also take into account the worst probable risk and impacts of environmental emergencies both in the port and offshore.

6.3.4. The Commercial Petroleum Companies

There are four petroleum companies in Mauritius with facilities within the harbour area. They would not be able to deal effectively with a serious oil leakage or pollution incident because of their limited amount of spill response equipment. There is no formal agreement with any Government agency that would permit joint and co-ordinated response in the event of a spill nor is there any arrangement for the use of available Government equipment in emergency situations.

The petroleum industry has however developed a good plan for the future. The companies will develop an oil spill response plan. They have agreed to purchase the necessary oil spill response and recovery equipment and to train people in oil spill combating methods. The oil industry is interested in co-operating with and making its resources available to the national oil spill response authorities. The potential contribution of the oil industry should be included in the establishment of an operational national oil spill contingency plan and would be beneficial to the country.

6.3.5 The National Oil Spill Contingency Plan (NOSCP)

There is such a plan in existence in Mauritius but unfortunately the Government has failed to make it operational because of the following problem areas :

1. On Scene Commanders nominated under the plan have not been advised of their appointments.
2. No contact names and addresses have been provided for oil spill response personnel.
3. No clear lines of responsibility and oil spill communication systems have been developed.
4. No simulation exercise has been undertaken to determine if the National Plan works in the event of a spill.
5. Decisions need to be made concerning suitable methods for the disposal of recovered or waste oil, and guidelines need to be developed for the transportation of oily wastes.

The establishment of an operational national oil spill contingency plan is a national priority especially in view of the significance of tourism and fisheries to the national economy and the consequences an oil spill could have on these industries. This project should be included in the Mauritius National Development Plan to ensure international assistance to satisfy equipment needs, to undertake necessary training, to establish necessary legal and institutional arrangements and to develop a coastal sensitivity atlas.

National resources would be needed to ensure the long term maintenance and support for any national oil spill programme that may be established. This objective may be achieved either by levying port charges against ships visiting the Port Louis harbour or requesting the State Trading Corporation, the sole importer of petroleum products, to contribute to the on-going maintenance of an oil spill contingency plan.

The oil spill contingency plan in Mauritius has neither been enacted nor is it operational yet. It is just in a draft stage. It is suggested that the following points (Sampson, T (1996) be taken into consideration by the Department of Environment while finalising the plan:

1. The contingency plan should address an organisational structure which will govern the operational and strategic control of the oil response. Representatives of various organisations; fire fighting, first-aid, health and bird nurseries and so on are formed within one response organisation. Positions should be based on expertise. The response organisation works for one leader and should focus on one action plan.
2. The contingency plan should address the provision of the necessary equipment and manpower to launch a successful response. Booms, skimmers, barges and trained personnel, inter-alia, are required to respond to any oil spill or accident. It is important for the contingency plan to address co-operative arrangements to reduce costs and ensure adequate manpower and equipment for catastrophic incidents.
3. The contingency plan must pre-decide what courses of action can be taken in what areas as far as use of dispersants or in-situ burning are concerned. Waiting for

discussion aggravates the situation. Every action should as far as possible be decided in advance.

4. The contingency plan should provide a way that the entire worst probable spill can be prevented from causing widespread environmental damage. So, the contingency plan must make detailed plans for the protection of the extent of resources that may be at risks by the worst probable spill.

5. The contingency plan should pre-determine which resources at risk will receive the protection of the equipment available in the coastal line. A priority plan should be ready in advance for the purpose.

6. The contingency plan should address the problem of storage of recovered product. The site for the disposal of the recovered substance must be identified in advance.

7. The contingency plan should state the appropriate clean up technique for each stretch of shore line. Different types of shore line require different techniques for instance, the wetlands affected by oil should be flooded and oily water pumped out.

8. The contingency plan should also address the question of "How clean is clean?". When the clean up should cease is a difficult question for the On Scene Command (OSC) and is a matter which is often influenced by emotional and political motives. To allow for correct decisions it is important that necessary guidance is pre-determined well within the plan for the particular shoreline in question.

9. The contingency plan should make provisions to restore the area to its original state.

10. The contingency plan should be updated regularly to take into account new developments and elements and be comprehensive and far reaching, with a view to ensure sustainability of the region being affected.

As for the command structure of the plan is concerned, it should incorporate inter-alia the following features (Spitzer, J (1992):-

(a) There should be a single or common communication language and terms utilised should have similar meaning in the minds of all people involved so as to avoid misunderstanding and confusion and ensure the success of the command structure.

(b) A comprehensive communication network is deemed necessary in the event of a major spill to facilitate activities of the command structure.

(c) The command structure should include chiefs having a reasonable span of control ranging from 3 to 7 immediate subordinates. A manageable span of control increases accountability, adherence to the action plan and reduces free-lancing that can cause injuries and loss of control.

(d) An efficient command structure co-ordinates all operational activities properly, ensures the efficient utilization of equipment and manpower and tends to minimize costs and leads to an effective response to an oil spill.

In view of the United Nations Conference on the Sustainable Development of Small Islands States, and given the sensitivity and vulnerability of the islands of Mauritius, a

proposal to the Global Environment Facility (GEF) for the establishment of an operational national oil spill contingency plan would most probably receive support since the project is a priority in the region.

6.4 Recommendations

6.4.1 Control of Land based wastes

One of the main components which contributes largely to the deterioration of the marine environment is land-based waste. Approximately 70 percent of the pollutants which reach the marine environment originate from areas subject to national jurisdictions (Okidi, C,(1978). The same is true for Mauritius. Hence, land based wastes have to be severely controlled by the Government of Mauritius if the marine environment is to be safeguarded against the various adverse effects mentioned earlier.

The following specific strategies should be considered to control land based sources of marine pollution:

(a) Oil pollution from land based sources and ships should be addressed by the planning, design, construction and maintenance of adequate reception and treatment facilities. Waste oil from vehicles should be collected and recycled and receive proper treatment and disposal.

(b) Sewage treatment and disposal facilities should be required to control domestic and commercial sewage pollution and proper operation and maintenance should be assured.

A system of permits should be developed to control the discharges. Effluents and/or waste quality standards should be applied to the discharge permits.

(c) Industrial pollution is becoming a critical problem in Mauritius. Preventive and corrective measures are urgently needed to select, locate and control, industrial development. Waste reduction management schemes should include environmental impact assessments and audits as integral parts.

(d) Hazardous waste disposal facilities should be established as such wastes can easily pollute the surface, ground and coastal waters through run-off or infiltration. Hazardous substances should not be disposed of into the coastal, surface or ground waters. Chemically secure disposal facilities for hazardous wastes should be designed, constructed and permitted to prevent the release of such wastes into the environment.

(e) Non-hazardous land fills should be located in areas away from wetlands, mangroves, and bodies of water. They should be constructed in such a way to preclude water pollution by run off and leachates.

(f) Pollution from agro-chemicals should be controlled by regulation. This involves restrictions on the use and concentration of persistent pesticides and fertilizers. Pest management programmes should be encouraged.

(g) Siltation/Sedimentation resulting from soil erosion, dredging and mining operations should be limited by establishing and enforcing control measures. These may involve the use of buffer zones, land use planning, coastal engineering structures and

environmental impact assessments for all major projects before they are undertaken in coastal areas (U.S.MAB(1990).

6.4.2 Arousing Environmental Awareness

To enlist support for the protection of the environment, the population should be informed and educated about the consequences of both land based and marine pollution on the society and the economy. It is true that it is easy for the short term benefit from economic development to normally be regarded to outweigh the need to protect the environment. So people must be brought to understand the long term benefits of environmental protection which result in sustainable development. To cover the whole population in an attempt to create an awareness about environmental matters, mass media should be utilised to support any legislation dealing with the environment. Environmental studies should be introduced and integrated into basic curricula of schools and universities.

6.4.3 ISO 14000 - Environmental Management System

Governments, exporters and the whole business communities in developing countries should give serious thought to the ISO 14000 standards in order to, among other things, ensure a sound environmental protection of their companies' operations and able to withstand competition in the world market and remain in business if the standards are to become mandatory worldwide.

The ISO 14000 standards describe the basic elements of an effective environmental system referred to (EMS). The elements include an environmental policy, establishing objectives and targets, implementing a program to achieve those objectives, monitoring and measuring its effectiveness, correcting problems and reviewing the system with a view to improve it and the overall environmental performance. An effective environmental management system can help a company to manage, measure and improve the environmental aspects of its operations.

The implementation of the ISO 14000 standards will lead to better environmental management and hence, better environmental performance, increased efficiency and a greater return on investment.

There are many reasons to implement the ISO 14000 standards:

1. The increasing use of voluntary standards with some having discrepancies might be eliminated in favour of one international standards based on the ISO 14000
2. It may become a De Facto requirement to do business
3. Another key player in the ISO 14000 movement could be the Government. Governments worldwide are looking at the role that ISO 14000 can play in the regulatory systems, their enforcement procedures, and their procurement policies.
4. An effective EMS can integrate existing management system to reduce costs and systems duplication in a company and thus lead to some internal savings.

5. The implementation of an effective EMS can provide future savings in the form of lower insurance rates and better access to capital. Insurance companies will be willing to issue coverage for pollution incidents and banks will grant loans without difficulty if companies have a proven environmental management system in place.

6. The implementation of the EMS can be a requirement of 'due diligence' for legal protection from negligence.

7. The ISO 14000 acceptance worldwide will provide more incentives to initiate pollution prevention activities and the achievement of environmental excellence. (Tom Tibor, 1996).

6.4.4 Need for material and intellectual resources

The implementation of environmental legislation and pollution control requires material and intellectual resources. Deficiencies in these lead to the lack of, or inefficient, law enforcement. Lack of enforcement has been one of the major obstacles in many countries including Mauritius as far as environmental protection is concerned. The following measures are therefore proposed to improve the situation:

(a) The strengthening of institutional capacity requires ensuring that institutions dealing with land and marine pollution are well equipped in terms of materials and equipment. The staff must be given regular training locally and abroad to ensure the ability to apply an effective response to any kind of environmental emergency.

(b) The Government should allocate a recurrent budget to both local and state levels to ensure the protection of the environment. The financial resources should match the magnitude and development of environment protection.

(c) The technical capacity of the personnel in the environmental sphere should be reinforced. Both land and marine environmental protection involve technical matters that necessitate scientific reasearch, international information exchange and the continued education of the relevant people.

6.4.5 The need for sectoral collaboration

Co-operation and co-ordination within the country involves many Governmental departments and agencies including both those involved in economic development and environment protection. There is a need for a balance between the two. This requires mutual understanding, co-operation and co-ordination in economic planning processes taking into account the environmental issues to ensure sustainable development for the benefit of the nation.

6.4.6 Role of the Ministry of Trade and Shipping

This Ministry can play a very important role as far as ship source pollution is concerned. It possesses the necessary legal authority. The Ministry has ratified several key conventions like SOLAS, MARPOL, STCW and Load Line. Unfortunately, the sad news is that the Ministry is unable to implement the instruments fully. This is due to a lack of qualified marine personnel like surveyors and reception facilities and other infra-structure. The Ministry of Environment being the lead agency in environmental

protection matters in the country should recognise the important role the Ministry of Shipping has to play in vessel source pollution prevention and accordingly should feel eager to give its full support to solve some of its difficulties and also ensure the participation of the Ministry of Shipping in the National Environment Commission (NEC) and other committees for a better integration in the fight against pollution and rational decision making.

On its part, the Ministry of Shipping among other things should initiate the following:

(a) Improve the infra-structure both in terms of manpower and equipment at the Sea Training School and conduct training of seafarers according to the revised STCW requirements. According to Gold, E(1985) page 132, the human element is particularly crucial in the area of marine pollution. IMO estimates that over 80 percent of all marine pollution incidents are due to human error. It may be higher than that. The remaining 20 percent is generally of technical or mechanical fault. A recent industry study of 20 serious tanker accidents illustrated that in every single case human error was the root cause of accident. Accordingly, investment in training of seamen is fully justified because it contributes to the avoidance of accident and especially prevention of marine pollution.

(b) Encourage the training of marine engineers, surveyors, shipping managers and so on to overcome the current scarcity and meet future challenges facing the maritime sector in Mauritius.

(c) Ensure the implementation of the International Safety Management (ISM) code by both the public and private shipping sectors in Mauritius and all other shipping

companies whose ships are registered under Mauritius open registry. In view of the importance of the ISM code to enhance capability to prevent and minimise marine pollution from ships among other things, a detailed explanation is given on how to implement the code.

Some shipowners and managers on a world wide basis have deliberately not managed and operated their ships properly. They have been secretly taking chances or risks by running substandard ships. Other owners have not been able to invest in new tonnage due to high cost of buildings and low freight rates. This situation has led to a proliferation of substandard ships with all the risks associated with such ships including loss of lives and environmental degradation.

The shipping sector in Mauritius is no exception. Cases of mismanagement by companies both ashore and aboard ships have been recognised.

Since the 1980's IMO was growing increasingly concerned about the evidence of poor management in shipping and in 1994 IMO adopted an International Safety Management code.

The role of the Ministry should be to ensure the implementation and enforcement of the provisions of the code with a view to improve management standards of all ships flying its flag.

The objectives of the code are as follows:

- (a) to provide for safe practices in ship operation and a safe working environment

(b) to establish safeguards against all identified risks

(c) to continuously improve safety management skills of personnel, and preparation for emergencies including environmental.

The Ministry should ensure that shipping companies endeavouring to implement the code does the following:

1. Establish a Safety Management System (SMS) to ensure compliance with all mandatory requirements
2. Establish and implement a policy for achieving the objectives of the code
3. Designate a person or persons ashore having direct access to the highest level of management to take prompt actions in the event of emergencies
4. The Ministry should issue a document of compliance which should be kept on board.
5. The Ministry will have to issue a safety management certificate to certify that the shipping company operates as per the safety management system as established by the company.

The International Chamber of Shipping (ICS) and the International Shipping Federation (ISF) have published guidelines on the application of IMO's ISM code. The guidelines include advice on the conduct of international audits by companies to verify whether safety and pollution prevention activities comply with safety management system. (Mariscene Magazine, Summer, 1996).

The ISM code is aimed at improving the management and operation of ships which in turn helps to promote not only safety at sea but more importantly avoids the degradation of the marine environment by minimising the risks of oil pollution from ships. This objective can only be achieved by the co-operation, commitment, competence and motivation of all working on board and ashore irrespective of their positions.

(d) The Ministry should reinforce Port state control on suspected vessels calling at Port-Louis harbour to make sure that unseaworthy vessels are not given clearance to proceed to sea and become a potential source of pollution and a threat to the fragile marine ecosystem of the country.

(e) As it is responsible for the implementation of Marpol, the Ministry of Shipping should press the Port Authority and the Ministry of Environment to convince the Government to install reception facilities as soon as possible in the Port to end the illegal discharge of oily residues by tankers and other vessels in the country's coastal zones.

6.4.7 Integrated Coastal Zone Management (ICZM)

This concept found its origin in the United States. Its application bore very positive results. There are various sectors with different interests operating in coastal areas. They comprise inter-alia the activities of tourism, fishing, shipping and oil exploration. Experience has shown that lack of co-operation and unilateral pursuance of policies by the associated agencies results in chaos and non-achievement of overall or sectoral objectives. Alternatively, co-operation among various bodies, co-ordination and integration of policies and objectives of the various sectors tend to ensure good and

efficient use of resources and contribute towards the attainment of desired goals in the interest of all.

6.4.8 Regional Co-operation

Pollution knows no territorial boundaries. The seas and the oceans are inter-related. Pollution in one part can reach and affect other parts of the marine environment in different countries. Because of the extra-territorial nature of pollution, the need for regional co-operation among neighbouring states is really vital for an effective joint response effort to any kind of major oil spill to mitigate the adverse impacts on the ecology and the economy.

To prevent transboundary marine pollution, the following measures, inter-alia, should be taken. Information should be exchanged among the neighbouring states, standards concerning control of pollutant discharges should be harmonised, a prompt warning system of serious pollution incidents should be established; and co-operation for long-term training and sharing of equipment should be arranged.

6.4.9 International Co-operation

A number of regional, international conventions, protocols and treaties have been established to combat marine pollution. They include, inter-alia, MARPOL 73/78, UNCLOS 82 and OPRC 90. The ratification and implementation of these instruments would help to control marine pollution and ensure international co-operation and assistance in terms of equipment and qualified manpower in the event of a major oil

spill. Moreover, a country like Mauritius should also establish good relations with IMO, UNDP and GEF to acquire the necessary technical know-how and assistance for the protection and preservation of both land and marine environment. Mauritius cannot fight major oil pollution alone, it is bound to seek regional and international co-operation to safeguard itself from the adverse impacts of environmental emergencies.

7. Conclusion

Mauritius is recognised as an economic model by many developing countries. It is classified as a newly industrialised nation. The country has witnessed remarkable economic growth but unfortunately such socio-economic progress has only been achieved at the expense of excessive consumption of resources and emission of large quantities of pollutants which have exerted adverse influences upon the ecological balance and the environment. This may constrain further economic development in the future. It is feared that further economic growth might result in more land-based and marine pollution. As the situation stands now, the country is not able to cope with the protection of the environment. It is exposed to a permanent risk.

Being an insular state with sensitive coastal areas, and vulnerable marine resources, the island will not withstand a major maritime casualty without serious and prolonged economic effects. Prompt action and measures should therefore be undertaken by the Government and the Department of Environment to: establish an operational national oil spill contingency plan as soon as possible, initiate long-term training in oil spill and pollution management; provide for acquisition of pollution response equipment and its maintenance; activate efforts to develop and implement the regional oil spill contingency plan for the Indian Ocean Islands, ratify other relevant international conventions; set up

the necessary infrastructure and superstructure to honour obligations of the international conventions; and, seek necessary international assistance to achieve and ensure a healthy ecology and environment all with a view to achieving sustainable development.

MAJOR ROADS
 SECONDARY ROADS
 DISTANCE IN KM
 HOTELS (See Hotel Accommodation Guide page 51)
 RESERVOIR/POND
 FLAT COUNTRY UNDER SUGARCANE
 CENTRAL PLATEAU
 TOWNS
 HIGH GROUNDS
 MOUNTAIN
 SUGAR FACTORY
 HOSPITAL
 CRATER
 TOURIST WEBSITE/PLACES OF INTEREST

1 2 3 4 5 6 7 8 9 10 km
 SCALE 3.8 mm = 1 km

MAURITIUS

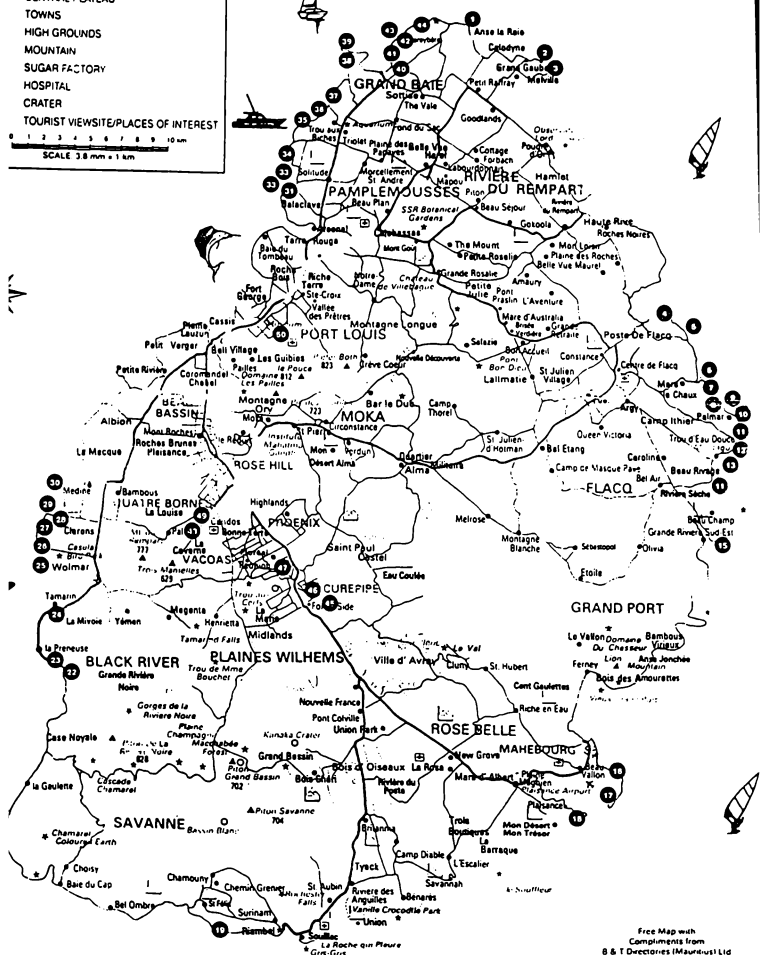


Figure 1 - Map of Mauritius

Free Map with
 Compliments from
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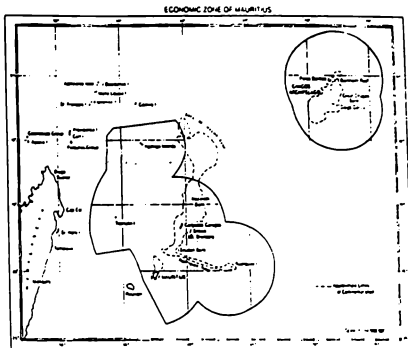


Figure 2 - Exclusive Economic Zone of Mauritius

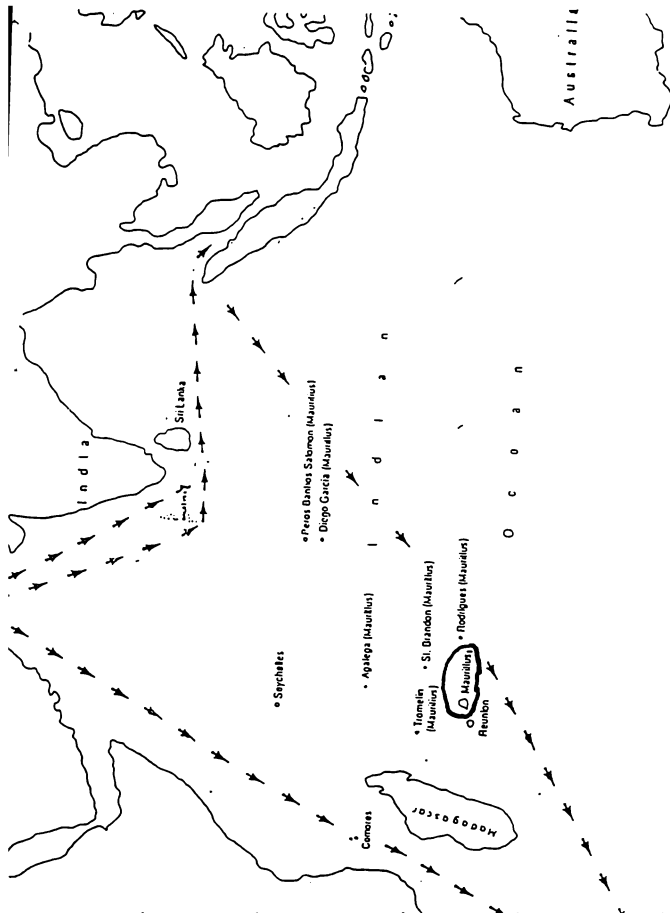
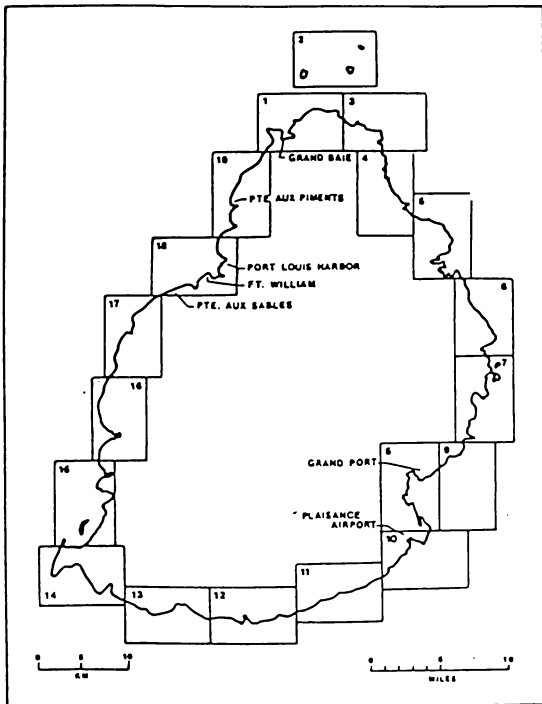


Figure 3 - Oil Transportation Routes in the Indian Ocean



: Map of Mauritius showing the 19 segments contained in the "Coastal
ity Atlas of Mauritius for Oil Spill Response".

BIBLIOGRAPHY

Convention on the Prevention of Marine Pollution from Dumping of Wastes and other Matters 1972.

Environment Protection Act 1991 (Mauritius).

The Fisheries Act 1980 (Mauritius)

George. H. De Berdt Romilly(1994). *Regional Oil Spill Contingency Program for the Island States of the Indian Ocean Region*.(Draft Mission Report). Ministry of Environment, Mauritius.

Gold, E(1985). *Handbook on Marine Pollution*. Norway: Assuranceforeningen Gard.

International Convention on Civil Liability for Oil Pollution Damage 1969.

International Convention on the Establishment of an International Fund for compensation for Oil Pollution Damage 1971. (Fund Convention).

International Convention Relation to Intervention on the High Seas in Cases of Oil Pollution Casualties 1969.

*International Convention on Oil Pollution, Preparedness, Response and Co-operation (OPRC)*1990.

International Convention for the Prevention of Pollution from Ships (Marpol 73/78).

The Maritime Zone Act 1977 (Mauritius).

Mariscene Magazine, Summer, 1996

Meng, Q (1987). *Land-based Marine Pollution*.

Ministry of Environment and Quality of Life (1991). *State of the Environment in Mauritius*. Government of Mauritius, Port Louis, Mauritius.

Mauritius Marine Authority, Port-Louis, 1995

Ministry of Tourism, Mauritius, 1995

Murday, M; and E. R. Gundlach (1990). *Oil Spill Contingency Plan for Mauritius*. UNEP Regional Seas Reports and Studies No. 125.

Okidi, C.O (1978). *Regional Control of Ocean Pollution: Legal and Institutional Problems and Prospects*. Alphen aan den Rijn - The Netherlands: Sijthoff & Noordhoff.

The Ports Act 1975 (Mauritius).

Sampson, T. J (1996). *Planning for Marine Environmental Emergencies*. Lecture notes. World Maritime University, Malmö, Sweden.

Spitzer, J (1992). *An Incident Command System in Practice and Reality*. Edmonton: Arctic Marine Oil Pollution Technical Seminar.

Sven-Olof Ryding (1992). *Environmental Management Handbook*, Lewis Publishers, Boca Ratan, Florida.

The United Nations Convention on the Law of the Sea 1982 (UNCLOS).

Tom Tibor and Ira Feldman (1996). 'ISO 14000', *a guide to the new management standards*, United States of America, Wayne Mc Guirt

U. S. MAB (1990), *Puerto Rico Workshop on Land-Based Sources of Marine Pollution in the Wider Caribbean Region*, Department of State, Bureau of Oceans and International Environmental and Scientific Affairs.