Government of the People's Republic of Bangladesh
Bangladesh Water Development Board
Flood Plan Coordination Organisation

FLOOD ACTION PLAN

NORTHEAST REGIONAL WATER MANAGEMENT PROJECT (FAP 6)

WATER TRANSPORT STUDY

September 1993

Shawinigan Lavalin (1991) Inc.
Northwest Hydraulic Consultants

in association with

Engineering and Planning Consultants Ltd.
Bangladesh Engineering and Technological Services
Institute For Development Education and Action
Nature Conservation Movement

Canadian International Development Agency

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GLOSSARY AND ABBREVIATION

Arat	Whole-seller trading mart.
Aratdar	Owner of the *Arat*.
Barki boat	A small capacity boat used in sand & boulder collection.
BIWTA	Bangladesh Inland Water Transport Authority.
BIWTC	Bangladesh Inland Water Transport Corporation.
BIWTA Master Plan	Study Commissioned by BIWTA, November 1988.
BBS	Bangladesh Bureau of Statistics.
BWDB	Bangladesh Water Development Board.
CBPP	Country Boat Pilot Project.
Char	Sandy shoal in the river.
Eid	Muslim Religious Festival.
Ghat	Berthing site where boats load and unload cargo.
GOB	Government of Bangladesh.
Haor	A natural physiological depression of land.
Hatday & *Non-Hatday*	Marketday & Non-Marketday.
IWT	Inland Water Transport
OD Survey	Origin - Destination Survey.
Planning Commission	Planning Commission of the Government of Bangladesh.
PEC	Project Evaluation Committee
Rabi Crop	Winter crops.
TC	Traffic Counting of Country boats.
MT	Metric Ton

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FORWARD

This report focuses on the role of Inland Water Transport in general and country boats in particular. Draft condition of the major rivers routes and the natural and man-made obstacles to navigation have also been identified.

The report is mainly based on the data collected through field investigations. Valuable inputs were also received from secondary sources like BIWTA, BBS, Planning Commission and NERP. Cooperation from Bangladesh Country Boat Owners' Association in this connection is highly appreciated.

This report is prepared by the following individuals:

- Md. Nazibor Rahman, Socio-economist
- Mehdi Monnu, Supervisor
- Shahid Ali, Supervisor

1. INTRODUCTION

Bangladesh is predominantly a riverine country. The presence of three of the world's major rivers, the Ganges, the Brahmaputra and the Meghna, the heavy monsoon rainfall, and the low-lying nature of much of the country make floods in Bangladesh an annual and inevitable phenomenon. About half of the country's 144,000 sq km is vulnerable to flooding and remains inundated for about three to six months of the year. These geographical features, the poor engineering characteristics of the alluvial soil, and the presence of innumerable rivers, canals and haors make the cost of building and maintenance of roads one of the highest in the world. Despite a large sum of money channelled to develop the modern transport system, the traditional means of transport still serve rural Bangladesh, especially the Northeast Region of the country. Because of the geographical setting and the presence of a large number of important rivers and haors, road building is more difficult and costlier there than in the other parts of the country. As a result, water transport in the region has become prominent and, in some cases, the only means of transport. The experts within NERP have noted this on several occasions.

It has been reported that draft conditions in many of this region's rivers are deteriorating and thereby creating problems for navigation during the dry season. This is partly due to age-old neglect and absence of dredging and maintenance. The water control structures in many places also hinder smooth navigation. Further development in this area will simply aggravate the situation.

It is therefore essential that water transport be taken into proper consideration in the Flood Action Plan. But the fact remains that very little quantitative information is available for proper planning of the sector. BIWTA deals only with the formal sector of IWT and could neither catalogue the minor river routes used by country boats nor assess their roles. Besides, the data available for the formal sector of water transport are, in most cases, understated.

Under the circumstances, NERP decided to conduct a study on water transport in the region with special emphasis on country boats, considering the fact that country boats play a vital role in transportation, and occupy a high position in the sectoral distribution of economy in the region.

1.1 State of Waterways in the Northeast Region

Of the 5968 km of classified waterways in the country, there are about 1400 km in the region. These are used by larger commercial vessels/boats operating in the formal sector as well as by the smaller mechanized and non-mechanized country boats carrying both cargo and passengers. Besides, there are innumerable rivers, canals, and haors which remain navigable seasonally, and in some cases annually, for country boats.

An estimated 95% of the total 173.3 cu km surface water supply moves through the region between the months of May and November inclusive. During these months almost 60% of the region is inundated to depths exceeding one meter, creating an aquatic environment and facilitating inland water transport. (Interim Report, January, 1993, FAP - 6, p. 12.)

Between the months of December and April, an estimated 5% of the total surface water supply is available in this region. During these months, water is required for irrigation of rice and rabi crops, domestic uses such as washing, industrial uses such as cooling, provision of an over-

wintering habitat for fish, sustainability of bio-diversity within the wetland, and maintenance of navigation routes (FAP - 6 Interim Report).

1.2 Socio-economic Parameters of the Region and the Role of Water Transport

The Northeast Region has an area of 24,200 sq km and a population of 17.66 million. About 10% of this population does not have any land and 40% of the households do not possess any cultivable holdings of their own, but have homesteads. Landless and marginal farmers owning land up to one acre comprise 70% of the total population (FAP-6 Report by Mohiuddin). Because agriculture is a seasonal activity (mostly single cropped) with unpredictable returns, most of these people rely on sectors other than agriculture for their income and employment for a considerable period of the year.

In this geographical and socio-economic environment, water transport in general, and country boats in particular, plays a vital role in supporting the poor and the marginal households by offering a substantial amount of employment. It is roughly estimated that about one-fourth of the country's 85 million country boats belong to the region.

2. OBJECTIVES OF THE STUDY

The water transport sector naturally deserves extensive study. Because of time limitations, a short study was planned to prepare a background paper on the sector. The main objectives of the study were to:

- Prepare an overview of the transport sector and compile the data for the region.
- Find the traffic pattern, and its seasonal fluctuation, of country boats in relation to some major river ports of the region.
- Find the volume of cargo movement within, to and from, the region, together with origins, destinations and intermodal shares in transportation.
- Find the draft condition of major rivers both seasonal and perennial, classified and unclassified, of the region; locate the obstacles to navigation; and produce relevant map/maps.

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3.1

3.2

3. METHODOLOGY

Relevant information from the secondary sources was collected during the first month of the study. On the basis of the findings, an assessment of the requirement, size, and scope of the study was made. As there was no quantitative information available on country boats from the secondary sources, it was understood the need for concrete information on cargo transportation would require two field surveys: one during the dry season and the other during the wet season. Two separate structured formats (Annexure -1 & 12) were designed for the purpose. In keeping with the objectives, the study report was divided into four sections and presented accordingly with methodological details discussed section-wise for the sake of relevance.

3.1 Creation of Computer Database

A computer data base model was developed for data processing. To make data entry numeric, appropriate coding files were created for different items such as commodity, place of interview, origin, destination, and mode of transport. A Cobol program was used to get a wide range of tables for analysis.

3.2 Analytical Model

A simple analytical model was developed in consultation with transport economists. To find the volume of all commodities transported by country boats annually to and from the important markets of the region, it was planned to conduct traffic surveys on market and non-market days to get a weekly average of the commodities transported during the dry and the monsoon seasons. This would help to calculate the yearly turnover. The formula used was:

Volume transported by country boats on the marketday x 1 day = m
Volume transported by country boats on Non marketday x 6 days = n

Therefore,

Volume transported by country boats in a week = m+n and
Volume transported by Country boats in dry season = (m+n) x 26 weeks.

Likewise, we can say that

Volume transacted in the monsoon season = (x+y) x 26 weeks.
And total volume transacted in a year stands at (m+n)x26 + (x+y)x26 weeks.

It should be noted here that most of the marketplaces interviewed have *Hatday*s only once in a week.

Findings from the traffic survey were crosschecked with the information collected from the origin-destination survey on the yearly movement of major commodities transported by country boats and their shares in the transport spectrum.

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4. AN OVERVIEW OF THE TRANSPORT SECTOR

4.1 Methodological Details

Data available from the secondary sources were collected to get an overview of the transport sector in general, and water transport in particular, to assess their roles in the national and regional economy.

Accordingly, data from the Planning Commission, BIWTA, Country Boat Pilot Project, BTSS, BBS, and BIWTA Master Plan Study have been obtained and compiled to find the shares of the region.

4.2 Findings

Rail

The country has 2745.5 km of railroads that carried 48.38 million passengers and 2.51 mt of cargo in 1991-92 with its 1627 coaching vehicles.

Road

In the country, there are 13,629 km of road, 7915 km paved and 5714 km kuncha. There were 206,663 mechanized vehicles in 1991: 24,114 were buses and coaches, 31,420 were trucks, and 163,117 were cars, jeeps, motorcycles, and autorickshaws.

IWT

The total length of waterways in the country is 23,100 km, of which 5968 km remain navigable during the monsoon season and 3814 km during the dry season. There were 4317 mechanized and non-mechanized registered vessels with an estimated total capacity of 765,785 tons. They carried 30.90 million passengers and 3.80 mt of cargo in 1990-1991. According to some official estimates, apart from IWT vessels, there are about 850,000 country boats in Bangladesh. These boats have a total carrying capacity of 3 million tons, 20 times the capacity of all the trucks in the country. They carry almost 16 billion ton.km per year which is twice as much as all the formal modes (rail, road and formal IWT) combined.

Bangladesh Inland Water Transport Authority (BIWTA) is responsible for development, maintenance and control of inland water transport with its 4300 staff in 14 departments. BIWTA has the following ongoing programs:

Third Flood Rehabilitation Project

The effect of the '88 and '89 floods on the inland water transport system was extensive. On the basis of the assessment made by the World Bank, BIWTA prepared a rehabilitation program to provide support for:

- civil works,
- maintenance dredging,

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- hydrographic survey and equipment,
- dredger accessories,
- pontoons,
- navigational aids,
- dredger/vessels spares,
- replacement of vessels, and
- consultant services.

5 Projects Under IWT III Project:

1) Procurement of 5 survey work boats and 3 accommodation barges.

Proposed Date of Commencement:	January 1992
Completion:	June 1994
Allocation:	Tk. 137,943,000.

2) Procurement of aids for navigation facility.

Date of Commencement	1991
Completion:	1996
Total investment cost:	Tk. 370,347,000

3) Dredging of existing waterways and improvement of dredging operations and efficiency.

As per charter responsibility, BIWTA undertook a project "Development Dredging of Existing Waterways" to maintain navigational draft. As per PEC decision, the project started in 1987 - 88 at a total cost of Tk. 3304.4 lac for improving the following six river routes.

River routes	Volume in ('000) cubic meter
1. Kushiyara (Ikardia- Ajmiriganj)	18.50
2. Titas (Homna to Ramchandrapur)	16.72
3. Meghna (Dhaka to Barisal)	2.50
4. Dakatia (Chandpur to Icnuli)	1.00
5. Kirtonkhola and Patuakhali (Barisal to Patuakhali)	3.50
6. Kangsha (Baulai-Dharmapasha-Mahanganj)	12.00
Total	**54.22 lac cu.m.**

Of this total volume to be dredged, 47.22 lac cu m is for the Northeast Region which is about 84% of the total dredging work. 29.85 lac cu m of the total 54.22 lac. cu m proposed for development dredging was completed by June 1992. The remaining 24.37 lac cu m and an additional 50.00 lac cu m was recommended by the World Bank for the development dredging of the following rivers:

1. Kushiyara River (From Ikardia to Ajmiriganj)
2. Kangsha River (Baulai-Dharmapasha-Mahanganj)

3. Titas River (From Homna to Ramchandrapur)

Amount of Earth work:

By Manual labour	By Dredger
12.34 lac cu m	Tk. 74.37 lac cu m
Cost Tk. 196.14 lac	Tk. 1988.12 lac

It is important to note here that BIWTA has 8 dredgers, BWDB has 23, and Chittagong Port Authority has 1. With its 8 dredgers, BIWTA carries out as much dredging as BWDB does for the purpose of navigation.

4) Development of 100 launch landing stations in rural areas of Bangladesh.

Total cost:	Tk. 379,343,000
Date of Commencement:	January, 1992
Date of Completion :	June, 1996

5) Development of telecommunication for BIWTA.

Under this project about 64 telephone sets will be offered to BIWTA and BIWTC for vessel-to-shore communication. The Telephone and Telegraph Department will allocate a separate frequency for BIWTA and BIWTC under this project.

Allocation for BIWTA in Fourth Five Year Plan is Tk. 1,701.8 million. The amount spent as of 3.12.1990 is Tk. 1,539.7 million.

Of the 44 BIWTC stations in the country, the Northeast Region has only 4. They are Bhairab bazar, Ashuganj, Chhatak, and Narayanganj. BIWTC does not have any obligation towards maintenance or development of waterways.

Information on Country Boats

Concrete information about the vast informal sector of inland water transport, the country boats, is not available from the secondary sources. The Country Boat Pilot Project of BIWTA funded by Norway and the Netherlands provides information on a national level, but has less regional detail.

According to the CBPP, there is no concrete record of the number of country boats in Bangladesh. The Third Five Year Plan puts the 1984-85 estimate at 200,000. The 1991 Statistical Year Book puts the figure at 723,000 and the May 1988 Agricultural Census reports the number to be 887,167. The project estimates about 210,000 cargo boats with capacity greater than 50 maunds (2 tons apr.). There are at least 165 recorded types of country boats, but less than 40 are common.

The project reports 20% of the boats in the region are hired, 40% are boat owner operated, and the remaining 40% are non-owner operated. With respect to other areas of the country, the percentage of hired boats is higher in the Northeast Region. About 75-80% of the commercial

boats (more than 2 tons) in the region are mechanized. On average, earnings almost doubled after mechanization and in some instances they increased by as much as a factor of three.

Breakdown of Costs for Typical Cargo Boat Operation

Crew	Food	Diesel & Oil	Police	Taxes	Profit
32.30%	16.78	26.85	3.02	10.07	10.99

About 60% of the country boat owners said they had no outstanding loans. Of the remaining 40.4%, 31.8% had loans from institutional sources and the 68.2% had loans from non-institutional sources (money lenders, friends, relatives). Among institutional sources, Bangladesh Krishi Bank provided credit to most of the respondents (51%), followed by Sonali and Agrani Bank, each accounting for 15%.

Water Transport for Agriculture, Domestic, and Fishing Purposes in the Northeast Region

Transport is very important for agricultural purposes in the haor areas where the farms are at a relatively long distance from the villages and the transport system is inefficient. The following points clarify the importance:

- The volume of produce transported from farm to home is several times larger than what is usually transported for marketing.
- Transportation of raw produce involves huge labour which adds substantially to the production cost. A costly but inefficient transport system aggravates loss of paddy if there is a sudden flood.
- The water control structures are barriers to country boat operation. The public cuts are mainly done for easy navigational access to and from the haors.

Road transport is almost non-existent in the haors. But there are internal canals to drain water from different pockets of the haors to the rivers. These canals are also used for transportation of goods and passengers to and from the haors.

Country boats are an integral part of haor life. A great many families keep their own small domestic boats, which are used for agricultural and domestic purposes around the homestead and also for fishing, attending markets or schools, collecting fodder and firewood, and visiting relatives, or doctors.

Country boats are rented at high prices during harvest time. A small *Barki* boat (without crew) can cost 37.5 kg paddy per day. The rent increases if a flash flood occurs. Six tonner medium sized boats can earn as much as 110 kg of paddy a day in the crisis situation. The price of different commodities varies substantially, depending on the access to water transport. Here are a few examples:

- In certain land-locked areas of Derai and Jamalganj, where the country boats cannot go, the per maund (37.5 kg) price of paddy remains at least Tk. 30 less than in the

areas served by country boats. Had there been no country boat for purchasing and transporting paddy during the harvest, the price would have gone down by Tk. 50 per maund in the surplus areas of the region.

- Country boats are also used for fishing and fish transportation. There are many mechanized country boats with ice boxes carrying fish from different haors to Sunamganj and Bhairab.

4.3 Comments

The officially reported volume transported on the waterways is far below the actual. The maps available are backdated. No concrete data is available for the country boats except the numbers provided by BBS and some figures provided by the Country Boat Pilot Project on the basis of their limited initiatives.

5. COUNTRY BOAT TRAFFIC SURVEY

One of the chartered functions of BIWTA is to conduct traffic counting for proper planning of the sector. But normally they cannot count country boats because of resource limitation.

5.1 Methodological details

In the present study, traffic survey was considered to be the best way to get first-hand, concrete information as to the number of boats attending the markets, types and volume of transported commodity, income generated, and employment offered. For this purpose, one simple structured interview sheet (Annexure - 1) was designed.

Two teams of enumerators, each team guided by a supervisor, surveyed 15 markets during the dry season and 19 markets during the wet season. Each team of three to four enumerators interviewed the boats attending the selected markets. To obtain accurate information and a good average, the survey at each market was carried out for two days, covering one market day and one non - market day. The enumerators appointed were familiar with the sector and drawn from university graduates and experienced boatmen. To ascertain the quality of data, strong supervision was ensured.

The enumerators stayed on boats rented for the study purpose until the survey was completed. This helped a great deal to establish rapport with the boatmen and the aratdars. The presence of the enumerators at the ports for forty-eight hours ensured quality of information.

Almost every market centre has more than one **Ghat**. Moreover, boats come and go all day and some boats make several trips a day. To record all these, the respective enumerators had to remain at work throughout the whole day. Under the circumstances, the supervisors had to, in many cases, participate in the traffic counting which delayed the origin-destination survey they were responsible for. However, at a later stage, the investigators assisted the supervisors in this survey.

Criteria for Selecting the Market Centres

It is evident that all the important markets in the region are situated along the rivers. Drawing on our earlier experience, we made a list of the markets for the study. After discussion with the team leader and some experts of other disciplines within NERP, we selected the following markets for dry season survey.

1.	Bhairab Bazar	2.	Ashuganj
3.	Kuliarchar	4.	Narsingdi
5.	Narayanganj	6.	Munshiganj
7.	Katpatty	8.	Barmi
9.	Ajmiriganj	10.	Markuli
11.	Shacna	12.	Sunamganj
13.	Chhatak	14	Companiganj
15.	Chamraghat.		

Though Narayanganj, Ashuganj, Munshiganj, Katpatty and Barmi are not within the boundary of the region, they lie just on the border and a huge quantity of cargo is transported to and from these markets. By virtue of that they constitute a part of the region, as it were, and deserve to be included in our study.

On the other hand, Habiganj, Mahanganj and some other important river ports along the Kushiyara river, although situated within the region, were dropped from the dry season study because they are not very important during the dry season. However, Habiganj, Mahanganj, and two more market centres, Zakiganj and Sherpur, were covered during the wet season survey.

5.2 Findings

- The markets showing zero in Table 1A were dropped from the dry season traffic Survey.

- Although there was no traffic in Habiganj and Mahanganj during the dry season counting, we found that Mahanganj handles almost one-third of the cargos handled at Bhairab. Habiganj also handles a substantial amount of cargo by waterways in the monsoon.

- Zakiganj and Sherpur were covered to see the importance of river transport in that area. But the result was not impressive.

- Table 1A shows that, in most cases, the ratio of mechanized boats to non-mechanized boats was 3:1. The exceptions are in Sunamganj, Chhatak, and Companiganj due to the presence of a huge number of small non-mechanized boats that collect boulders, and in Narayanganj where there is a large number of small ferry boats. As a result, the ratio stands at 1:3. Of 8663 boats, 6657 are non-mechanized and 2006 are mechanized. Volumes carried in and out by these boats on market days are 23,935 tons and 10,764 tons respectively. As for the non-market days, 7884 boats carried 19,507 tons of cargo in and 9080 tons out.

- Minor inconsistency in summing up the decimals might be observed in some cases because of computer programming.

Table 1A : Dry Season Traffic Pattern
Number of Mechanized and Non-mechanized boats with Volume (in tons) Carried in and out on *Hatdays* and *Non-Hatdays* against Markets

Name of Market	*Hatday*					*Non-Hatday*				
	Mechanized	Non-Mechanized	Total Boats	Volume in	Volume out	Mechanized	Non-Mechanized	Total Boats	Volume in	Volume out
Bhairab Bazar	218	71	289	1610	1671	189	77	266	854	414
Ashuganj	70	4	74	479	179	37	3	40	233	33
Kuliarchar	86	14	100	138	129	19	1	20	30	5
Narsingdi	136	53	189	648	374	150	30	180	429	421
Narayanganj	92	232	324	1035	1075	86	164	250	732	1654
Munshiganj	304	70	374	1675	604	62	40	102	287	225
Katpatty	221	105	326	1860	267	435	281	716	3697	764
Barmi	373	77	450	1411	933	138	19	157	417	364
Ajmiriganj	67	34	101	275	37	34	2	36	139	11
Habiganj										
Markuli	13	3	16	17	8	6	1	7	30	2
Sachna	99	31	130	478	125	38	8	46	55	17
Sunamganj	50	1063	1113	1035	62	28	1011	1039	968	15
Chhatak	166	890	1056	6936	224	135	856	991	6223	143
Companiganj	19	4002	4021	5942	4885	23	3958	3981	5238	4883
Mahanganj										
Chamnaghat	92	8	100	391	183	44	9	53	169	121
Zakiganj										
Sherpur										
Total	2006	6657	8663	23935	10764	1424	6460	7884	19507	9080

Figure 1

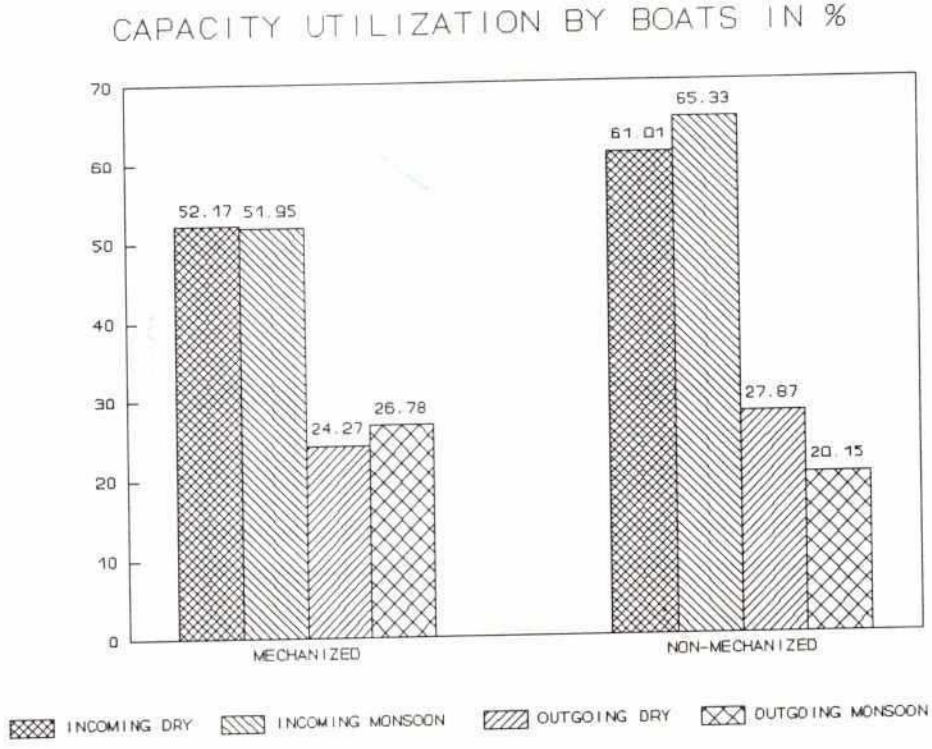
CAPACITY UTILIZATION BY BOATS IN %
70
60
50
40
30
20
10
0
52.17
51.95
24.27
26.78
61.01
65.33
27.87
20.15
MECHANIZED
NON-MECHANIZED
INCOMING DRY
INCOMING MONSOON
OUTGOING DRY
OUTGOING MONSOON

Table 1B : Wet Season Traffic Pattern
Number of Mechanized and Non-mechanized boats with Volume (in tons) Carried in and out on *Hatday*s and *Non-Hatday*s against Markets

Name of Market	*Hatday*					*Non-Hatday*				
	Mechanized	Non-Mechanized	Total Boats	Volume in	Volume out	Mechanized	Non-Mechanized	Total Boats	Volume in	Volume out
Bhairab Bazar	412	289	701	1926	1267	330	259	589	1324	928
Ashuganj	203	62	265	2203	147	116	24	140	1201	170
Kuliarchar	74	62	136	352	98	48	20	68	90	46
Narsingdi	548	27	575	1841	849	212	4	216	307	163
Narayanganj	276	2990	3266	2869	1704	402	4479	4881	3033	1694
Munshiganj	132	136	268	462	142	300	91	391	942	176
Katpatty	523	117	640	4356	510	342	133	475	3909	350
Barmi	437	166	603	1633	1219	103	214	317	650	454
Ajmiriganj	302	352	654	1011	400	55	62	117	89	59
Habiganj	276	166	442	381	355	258	77	335	322	173
Markuli	28	115	143	141	74	8	39	47	28	19
Sachna	164	990	1154	686	431	72	304	376	198	118
Sunamganj	215	1066	1281	1942	266	233	975	1208	1621	311
Chhatak	299	1883	2182	5833	453	275	1499	1774	5866	221
Companiganj	481	9149	9630	15753	8840	317	8649	8966	14896	8056
Mahanganj	148	327	475	822	501	102	106	208	413	243
Chamnghat	68	81	149	257	101	56	228	284	203	112
Zakiganj	22	54	76	57	67	12	15	27	17	29
Sherpur	73	959	1032	411	372	22	11	33	48	61
Total	**4681**	**18991**	**23672**	**42948**	**17804**	**3263**	**17189**	**20452**	**35167**	**13392**

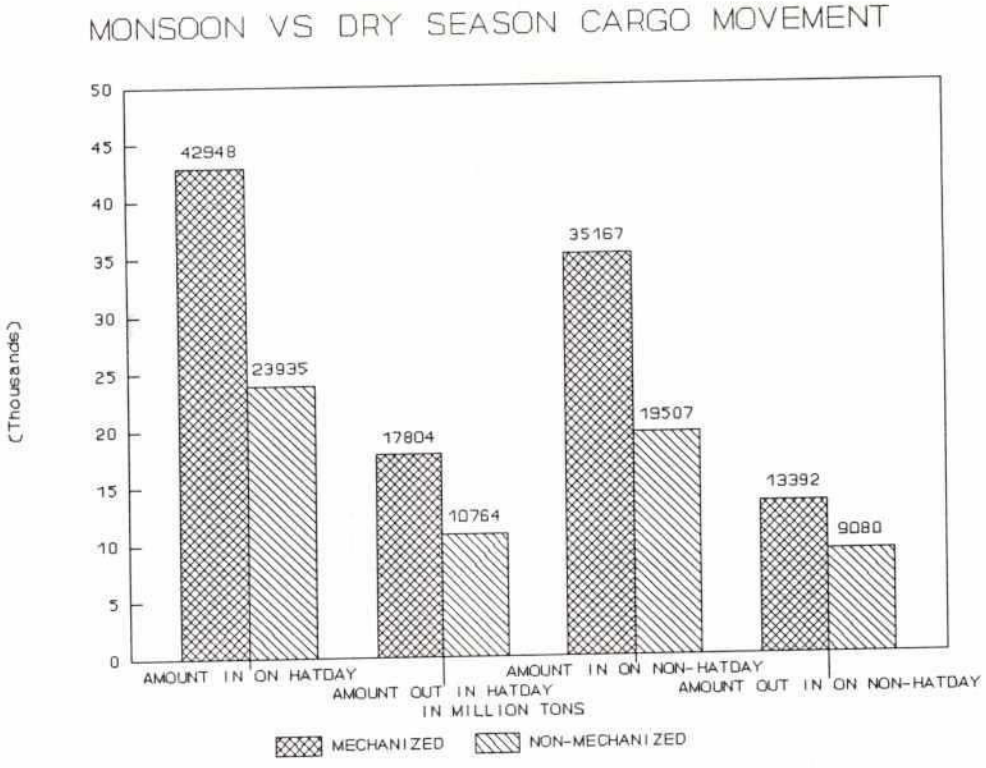
MONSOON VS DRY SEASON CARGO MOVEMENT
(Thousands)
50
45
40
35
30
25
20
15
10
5
0
42948
23935
17804
10764
35167
19507
13392
9080
AMOUNT IN ON HATDAY
AMOUNT OUT IN HATDAY
AMOUNT IN ON NON-HATDAY
AMOUNT OUT IN ON NON-HATDAY
IN MILLION TONS
MECHANIZED
NON-MECHANIZED

Table 2A: Number of Boats under Different Categories with Volume Carried in and Services Offered (in ton-miles) on *Hatdays* of Dry Season

Category of Boats	Mechanized Boats			Non-mechanized Boats		
	No. of Boats	Volume Carried (Ton)	Ton-miles Transported	No. of Boats	Volume Carried (Ton)	Ton-miles Transported
(00-50) Maund	137	71	381	5551	5656	33888
(51-225) maund	1059	2290	30621	256	478	3120
(226-above) maund	810	7398	660346	850	8039	60082
Total	2006	9759	691348	6657	14173	97090

Table 2B: Number of Boats under Different Categories with Volume Carried Out and Services Offered (in ton-miles) on *Hatdays* of Wet Season

Category of Boats	Mechanized Boats			Non-mechanized Boats		
	No. of Boats	Volume Carried (Ton)	Ton-miles Transported	No. of Boats	Volume Carried (Ton)	Ton-miles Transported
(00-50) Maund	264	144	543	16725	16912	83546
(51-225) maund	2995	5678	75284	1765	2272	11937
(226-above) maund	1422	14121	706765	501	3819	133954
Total	4681	19943	782592	18991	23003	229437

Tables 2A and 2B show the number of mechanized boats increased by two times and non-mechanized boats by three times. The number of mechanized boats with a capacity of 226 maunds or more increased from 810 to 1422 and the number of non-mechanized boats with the same capacity went from 850 to 501 in the wet season, clearly indicating that many non-mechanized boats were mechanized with irrigation pump engines in the monsoon season. The number of non-mechanized small boats increased substantially because many domestic and idle boats came into commercial operation or attended markets for domestic purposes.

Total ton-miles transported by mechanized and non-mechanized boats on *Hatdays* are 788,438 in the dry season and 1,012,029 in the wet season.

It is important to note that 40% (810) of the mechanized boats (capacity of 226 and more) carried 75% of the total volume and accounted for 90% of the total ton-miles transported by mechanized boats. In the case of non-mechanized boats, 12% (850) of the same capacity carried 56% of the total volume and accounted for 61% of the total ton-miles transported during the dry season. The same pattern was found in the wet season.

The above figures indicate that although the large boats are small in number, they carry the lion's share of the cargo. Deterioration in draft level will affect this group, creating a big transportation problem. The small boats will not be able to replace them, as they are not economically viable for long trips, and they are vulnerable to open waters and big waves.

Table 2A shows that in terms of number, the ratio of mechanized to non-mechanized boats is about 1:3. But in terms of volume carried, it is about 3:4 and in the case of ton-miles transported, it is 7:1 (Table 2). This indicates that the non-mechanized boats are mostly small, slow, and mainly ply short distances.

Table 3A: Number of Boats under Different Categories with Volume Carried in and Services Offered (in ton-miles) on *Non-Hatdays* of Dry Season

Category of Boats	Mechanized Boats			Non-mechanized Boats		
	No. of Boats	Volume Carried (Ton)	Ton-miles Transported	No. of Boats	Volume Carried (Ton)	Ton-miles Transported
(00-50) Maund	73	29	247	5341	5378	32631
(51-225) maund	800	1324	16997	334	763	3388
(226-above) maund	551	5125	457385	785	6886	37913
Total	**1424**	**6478**	**474629**	**6460**	**13027**	**73932**

Table 3B: Number of Boats under Different Categories with Volume Carried Out and Services Offered (in ton-miles) on *Non-Hatdays* of Wet Season

Category of Boats	Mechanized Boats			Non-mechanized Boats		
	No. of Boats	Volume Carried (Ton)	Ton-miles Transported	No. of Boats	Volume Carried (Ton)	Ton-miles Transported
(00-50) Maund	366	118	274	15320	15032	73560
(51-225) maund	1803	2840	29100	1280	1779	4963
(226-above) maund	1094	11506	503947	589	3889	66138
Total	**3263**	**14464**	**533321**	**17189**	**20700**	**144661**

* *Total ton- miles transported by mechanized and non-mechanized boats on non-Hatdays in dry season is 548561 while it is 677982 in wet season.*

Table 4: No. of Crew Per Boat, Boat Capacity Crew Ratio in Dry and Wet Seasons

Boat Type	Dry Season		Wet Season	
	No.of Crew Per Boat	Boat Capacity (in ton) Crew Ratio	No.of Crew Per Boat	Boat Capacity (in ton) Crew Ratio
Mechanized	03.32	02.74	03.47	02.34
Non-mechanized	02.22	01.58	01.98	.93

Table 4 indicates that crew per boat for mechanized and non-mechanized boats stands at 3.32 and 2.22 respectively, and capacity-crew ratio for mechanized and non-mechanized boats stands at 2.74: 1 and 1.58: 1 respectively. It is generally believed that mechanized boats demand less crew which is not so in this case due to the fact that the non- mechanized boats are small.

As far as seasonal fluctuation in boat capacity-crew ratio is concerned, we see the ratio is almost the same for the mechanized boats. But for non-mechanized boats it has gone from 1 crew for 1.58 to 1 crew for .93 tons. Huge number of domestic boats that came into operation have lower capacities. More crew is needed for non-mechanized boats to cover risks, and less work in agriculture at that time pushes some of the work force into the boat sector.

Table 5: Average Haul Length (in mile), Journey Time (in hours) and Speed (mph) against Mechanized and Non-mechanized boats with their Origins

Name of the Origin	Mechanized				Non-Mechanized			
	No.of Boats	Average Distance	Average Journey Time	Average Speed	No.of Boats	Average Distance	Average Journey Time	Average Speed
Within *thana*	1457	8.60	1.71	5.04	12146	5.70	2.68	2.12
Outside *thana*	574	14.86	2.88	5.16	703	6.67	2.94	2.27
Within NE Region	493	44.44	9.20	4.83	132	10.41	7.16	1.45
Outside NE Region	905	54.35	12.53	4.34	101	28.66	18.58	1.54

Mechanized boats have more than double the speed of non-mechanized boats. The speed decreases with the increase of haul length due to the fact that long journeys in most cases involve stops for cooking, eating, and overnight stays. Thus the average speed goes down.

It has been observed that haul-length varies remarkably for the boats attending different markets. For example, haul length for the boats attending Bhairab on the market day is 107 miles, while it is only 5.9 for Companiganj and 10.5 for Kuliarchar. This variation explains the characteristics of the markets and their catchment areas.

Table 6: No.of Mechanized and Non-mechanized Boats with their Origin and Destination (*Hatday* and *Non-Hatday* in Dry and Wet Season)

Origins and Destinations	Origins		Destinations	
	No. of Mechanized Boats	No. of Non-mechanized Boats	No. of Mechanized Boats	No. of Non-mechanized Boats
Within *thana*	4325	44929	3479	42913
Outside *thana*	2978	1966	3299	3132
Within NE Region	2182	2138	2429	2946
Outside NE Region	1888	229	2166	271

Table 7: Volume Carried In and Out with their Origin and Destination in %

	Origin				Destination			
	1	2	3	4	1	2	3	4
Dry Season	59%	8%	9%	24%	59%	9%	11%	21%
Monsoon Season	57%	12%	18%	13%	22%	61%	10%	7%

1 = Within the *thana*
2 = Within the district, but outside the *thana*
3 = within the northeast region, but outside the district
4 = Outside the northeast region.

Table 8: No.of Boats against Market Places on *Hatdays* and *Non-Hatdays* in Dry and Wet Season (with their performances and earning) the Services Offered and Income Generated in their Incoming Trips

	No.of Boats	Volume Carried	Ton-miles Travelled	Income Generated	No.of Crew
Hatday dry Season	8663	23935	788440	3376022	21633
Haiday Wet Season	23672	42948	1012032	5899151	54305
Non *Haiday* Dry Season	7884	19507	548563	2631434	18864
Non-Haiday Wet Season	20452	35165	677984	4560286	45242

According to Annexures 8, 9, 10, and 11, total income of the boats for the incoming trips made on the *Hatdays* is Tk. 3,380,938 and for *Non-Hatdays*, Tk. 2,635,527. The average weekly income is (2,635,527 x 6) + 3,380,938 = Tk. 19,194,100. Total earnings of these boats stands at about Tk. 500 million for the six months of dry season. Since the volume of cargo movement will increase substantially during the monsoon season, so will the earnings.

Volume carried in on *Hatdays* in dry season = 23935 tons
Volume carried in on non-Hatdays in dry season = 19507 x 6 days = 117042 tons
Weekly figure = 140977 tons
Therefore, volume carried in during the six months of
dry season is 140977 x 26 weeks = 3664502 tons

Similarly,

Volume carried in on *Hatdays* of wet season = 42948 tons
Volume carried in on *Non-Hatdays* of wet season = 35165 x 6 days
The weekly figure = 210990 tons
Therefore, volume carried in
during the wet season
is 210990 x 26 weeks = 6602388 tons

The yearly volume carried in = 10,266,890 tons

The O-D survey shows that country boats carry 8.84 million tons in their incoming trips. The difference is due to the fact that the O-D survey was a sample survey while the traffic counting survey covered all the boats.

The average capacity utilisation by country boats in incoming and outgoing trips was 55% and 25% respectively. This indicates that country boats carried 4.48 million tons in their return journeys which is very close to the information provided by aratdars (4.94 mil tons). The total

cargo carried by country boats in incoming and outgoing journeys was 14.74 million tons, exactly half the amount carried by all the modes (29.8 million tons).

The total income of country boat operation obtained through traffic counting stands at Tk. 1990 million.

Analysis of the O-D Survey reveals that of 15.3 million tons carried in to 19 markets of the region, country boats carried 57.8% or 8.84 million tons. Since the average freight rate per ton was Tk. 137.35 (Annexure 8-9), the earning stands at Tk. 1214 million. Similarly, of the 14.5 million tons of outgoing cargo, country boats carried 34.3 % or 4.97 million tons, and the earnings stand at Tk. 682.6 million. The total is Tk. 1896 million. This is for major commodities in the major markets.

The gap is due to the fact that the aratdars suppressed information, not so easy for the boatmen to do. Besides, it was a sample survey. There was the question of memory.

The Annexure 8A indicates that there were 21,633 crew in 8663 boats on the market days, and Annexure 10 shows 18,864 crew in 7884 boats on non-market days. It is not likely that the hatday and non-hat day crews are the same people because most of them will be in the return part of the journey on the next day.

Still, it should be acknowledged that some repetitions of crew occurred. The crew collecting boulders at Companiganj was counted once again at Chhatak while it was unloading the boulders. It is important to mention that some of the boats met had already interviewed. But the percentage will not exceed 1 or 2, except in the case of the crew at Companiganj, Sunamganj, and Chhatak. We assume that at least 8000 fresh crew members attend the 15 markets every day of the week during the dry season. The weekly figure of the crew attending the 15 markets stands at 21,663 on hatdays + 8000 on non-hatdays, excluding repetition, X 6 days = 69,633.

In the monsoon season, this figure increased from 21,663 crew members attending 15 markets on hatdays in the dry season to 54,305 attending 19 markets in the wet season. The corresponding figure for non-hatdays has increased by a factor of 2.5 in the wet season. On the basis of the above calculation, we can say that about 150,000 people are involved in boat operations in the monsoon season around these 19 markets. If we take into consideration the whole of the Northeast Region, the minor markets, and the boats engaged in localized operations (rural to rural and the boats engaged in domestic and fishing purposes), we will find that about .5 million people are earning their livelihoods relying on country boats.

From Table 8 we can calculate the highest freight rate for a distance of less than 1 mile in our data obtained from TC is Tk. 324 per ton-mile, and that is for fish and vegetables. Fertilizer has the lowest freight rate, Tk. 32.4, and the rate for bricks is Tk. 48.6. Perishable items have the highest freight rates. However, the average freight rate, irrespective of distance and commodity type, was found to be Tk. 135 per ton.

Freight rates fall dramatically with an increase in haul length. For example, paddy commands a freight rate of Tk. 83.16/ton-mile for a haul length of 1 mile. For 1.1 to 5 miles it is Tk. 11.88/ton-mile, and it gradually goes down to Tk. 1.08/ton-mile when the length is over 100 miles. This is more or less the pattern for all commodities.

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Capacity utilisation of non-mechanized boats seems higher than that of mechanized boats. This is due to the fact that many small, non-mechanized boats, included in the sample and engaged in the transportation of sand and boulders, are fully utilizing their capacity.

5.3 Comments

Since boatmen were somewhat afraid of the survey, it is likely that they suppressed information on the capacity of their boats and the amount of cargo they were carrying. Also, we could not interview all the boatmen. For these reasons, our experience and familiarity with the sector suggest we add 5% to the reported information on capacity and volumes carried.

Any items in the boats in fourth or fifth position in terms of weight were either termed "miscellaneous" or merged with the main cargo.

Passenger transportation in our dry season study was not found to be very significant. Most people arrived at the markets on foot or by rickshaw and launches. However, passenger transportation in the monsoon season increased by a factor of five.

6. ORIGIN - DESTINATION SURVEY

6.1 Methodological Details

One of the four main objectives of the study was to find how the volume of cargo moved within, and to and from, the region together with the origin, destination, and intermodal shares in transportation. To fulfil this objective, an origin-destination survey was carried out with the country boat traffic counting covering the same markets. A format (Annexure 12) was designed to interview the sample arats of major trades. In consultation with experts, it was decided to interview three types of arats - big, medium, and small - from each trade. Their yearly turnover was averaged and multiplied by the total number of arats of the particular trade to get the volume of commodities transacted annually.

The arats of important commodities that are relatively major in the respective markets were interviewed. There were 68 types of commodities considered in all the 19 markets. Making the commodity-wise tables, the most common ones were taken and the rest were classified as "other commodities".

The supervisors conducted interviews in the markets, assisted by the enumerators in some cases. Some of the markets were revisited as it was presumed some of the information was under or overstated.

Criteria for Selecting Types of Trades and *Arats*

The criteria for selecting the aratdars for interviewing involved a set of measures and sampling techniques. Chamber of Commerce and certain trade-based associations were also contacted

- to obtain the number of traders in different trades, and
- to get a general impression as to their yearly turnover.

On the basis of this information, three traders/whole-sellers - big, medium, and small - from each trade were chosen for interviewing.

In preparing the origin-destination matrix, the origins and destinations were distributed amongst the 19 markets. Accordingly, Adamjeenagar fell under Narayanganj and commodities coming to Narayanganj from Adamjeenagar were considered as transportation from Narayanganj to Narayanganj in the matrix. This is why the volumes in and out, to and from, one market do not tally with information given by other markets. For example, jute coming to Adamjee and Narayanganj from Barmi was recorded separately in Barmi but was merged in the matrix. When Narayanganj was asked how much jute it received from Barmi, the answer was the actual amount received at Narayanganj proper.

6.2 Findings

Almost all traders follow the Bengali calendar year maintaining their accounts. The statement of annual movement of cargo in the report covers the Bengali calendar year 1399 (15.4.92 - 14.4 1993). The annual movement of commodities mentioned in this study falls within this time period.

- The major 12 commodities in our survey include paddy, rice, wheat and flour, salt, jute and jute goods, fertilizer, cement, POL, molasses, wood, sand, and boulders and shingles. "Others" represents the rest of the marketwise principal commodities.

- The differences between commodity inflow to and outflow from the markets reflect the surplus or the deficit condition of the area. In some extreme cases, although the trade is there, no cargo goes out. For example, paddy comes to Barmi but does not go out because all the paddy here goes to the boilers (husking mills) to be transformed into rice.

- From the projection of the BIWTA Masterplan Study, it is understood that in 1995 the total movement of some major commodities in the country will be 11.5 million tons. Our findings indicate that only the 19 markets of the Northeast Region received 16.3 million tons and delivered 14.5 million tons last year. This figure indicates that the transport demand has increased at a higher rate than was anticipated in 1985. Other reasons could be that the official statistics are not qualified enough and our study took country boats into consideration. If all the minor commodities had been covered, the figure would have been even larger.

- In 1985, the total amount of major commodities' inflow to the greater district of Dhaka was 2.59 million tons (BIWTA MASTERPLAN). The increase in transport demand was 4% at that time. Now, it is 7%. So, if we accept an average increase of 6%, the total cargo inflow to Dhaka today, after seven years, stands at 3.89 million tons. Narayanganj has half the share of greater Dhaka. That means the total inflow to Narayanganj should be 1.94 million tons today. In our data, it is already about 4 million tons.

The consultants of the BIWTA Masterplan Study mentioned under-reporting of IWT data by a factor of 1.8 to 1. It appears to be more than that. Most of the trips by IWT vessels for informal commodities like paddy, wood, and consumer goods are not reported, especially in the case of the return journeys. Our findings on the volume transported by the IWT vessels differ substantially from the official figures.

Table 9: Yearly Inflow of Major Commodities (in tons) and their Intermodal Share against Markets

Name of the Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	1218262	360499	735824	50730	71207
Ashuganj	400235	181886	197950	20349	49
Kuliarchar	68657	38792	3653	25295	916
Narsingdi	366250	213246	31370	113189	8444
Narayanganj	3800618	1127469	2266946	406202	
Munshiganj	215707	203150	1622	10934	
Katpatty	758227	167489	50847	539890	
Barmi	203101	107360	23640	72100	
Ajmiriganj	51845	48953	248	2365	277
Habiganj	127719	80279	16	47376	47
Markuli	32297	31621		676	
Sachna	2817564	1136030	1681534		
Sunamganj	354820	334631	1975	18213	
Chhatak	2409036	2387067	2520	17005	2444
Companiganj	2271079	2270694		385	
Mahanganj	145013	92039	85	51618	1269
Chamraghat	97495	86441		11054	
Zakiganj	14884	7724		7159	
Sherpur	1086	111		975	
Total	**15353906**	**8875491**	**4998236**	**1395523**	**84656**

Table 10: Yearly Outflow of Major Commodities (in tons) and their Intermodal Share against Markets

Name of the Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	1187391	829614	95517	260615	1642
Ashuganj	313684	113511	4814	195228	129
Kuliarchar	71876	45516		21735	4624
Narsingdi	345011	209003	2200	133807	
Narayanganj	3593419	466454	471479	2655485	
Munshiganj	162744	115955	25462	21325	
Katpatty	570579	412621	121971	35986	
Barmi	172329	94865		77463	
Ajmiriganj	51845	49817		2028	
Habiganj	111821	3202		108619	
Markuli	32275	30516	721	1037	
Sachna	2795252	133914	2644444	16893	
Sunamganj	354820	14763	318425	21631	
Chhatak	2257086	108519	1943805	204761	
Companiganj	2271079	2268482		2597	
Mahanganj	139151	86136		29773	23249
Chamraghat	97428	14154		83274	
Zakiganj	14884	200	633	14050	
Sherpur	1386	33		1353	
Total	**14544069**	**4997285**	**5629477**	**3887669**	**29637**

In our survey, total inflow and outflow of cargo to and from 19 markets in the Northeast Region (from 15 April 1992 until 14 April 1993) was 15.3 million tons and 14.5 million tons, with country boats carrying 14.74 million tons, or just 50% of the total volume transported by all modes.

Figure 3

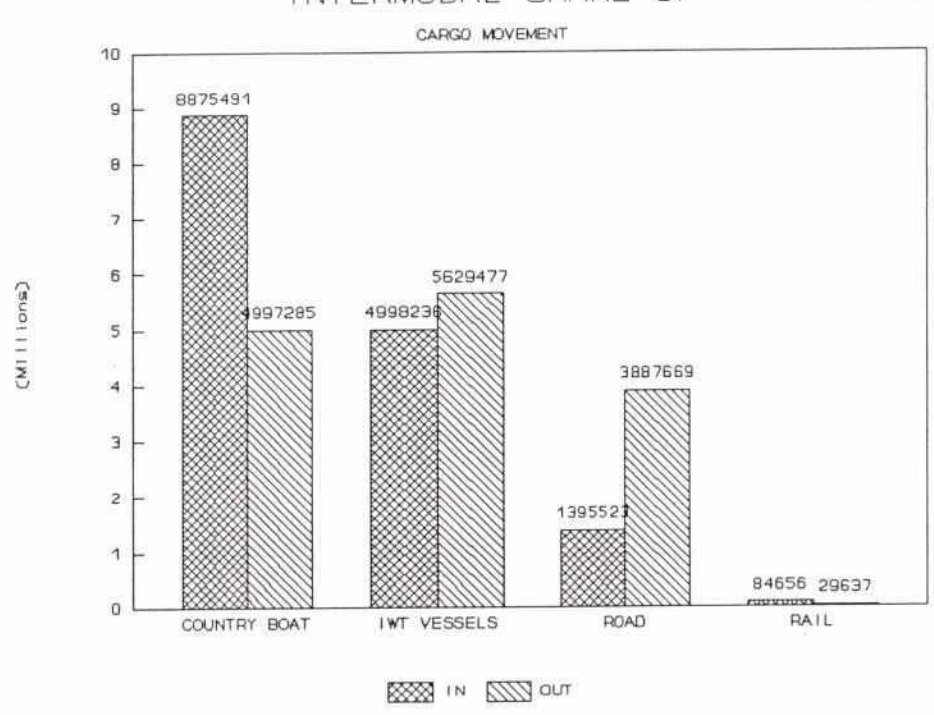
INTERMODAL SHARE OF
CARGO MOVEMENT
(Millions)
10
9
8
7
6
5
4
3
2
1
0
8875491
4997285
4998236
5629477
1395523
3887669
84656
29637
COUNTRY BOAT
IWT VESSELS
ROAD
RAIL
IN
OUT

Table 11: Yearly Inflow of Major Commodities in 19 Markets with their Origin and Destination (Amt. in thousands tons)

Destination	Origin																				
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayanganj	Munshiganj	Kattpatty	Barmi	Ajmiriganj	Habiganj	Markuli	Sachna	Surnamganj	Chhatak	Companiganj	Mohanganj	Chamraghat	Zakiganj	Sherpur	Other	Out NER	Total
Bhairab	20	231	25	10	13	18	12	5	25	9	13	22	26	22		7	36	13	18	10	673	1208
Ashuganj		85								29		21	9	43		42	19		92		52	392
Kuliarchar	4	1	37						3	1		5				7	4			1	5	68
Narsingdi		38	1	102	5	2							10					45	1		160	364
N.ganj	6	119		208	46	355		33				333	25	331	93	51			56	164	1973	3793
M.ganj					7	47			22	9			17			16	13			9	73	213
K.patty						10	9	1									64			53	608	745
Barmi				35	18			29				19					12				83	196
Ajmiriganj	7		1	1					23			10					5		1			48
Habiganj		21							63	17								12	8		1	122
Markuli	5										5							19	1			30
Sachna	27											2776	7	6								2816
S.ganj													341					6			6	353
Chhatak	3										1	1		125	2268			3	4		2	2407
C.ganj														2	2267			1				2270
M.ganj	33											5				65					7	110
C.ghat	4			8								19		59		1	5					96
Zakiganj																		13				13
Sherpur																			1			1

Table 12: Yearly Outflow of Major Commodities in 19 Markets with their Origin and Destination (Amt in thousands tons)

Destination-tion	Destination																				
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayanganj	Munshiganj	Kat patty	Barmi	Ajmiriganj	Habiganj	Markuli	Sachna	Sunamganj	Chhatak	Companiganj	Mohanganj	Chamraghat	Zakiganj	Sherpur	Other	Out NER	Total
Bhairab	73	22	68	3	13	29	4	48	107	11	12	79	144			69	205	30	53	59	137	1166
Ashuganj	18	151	2	9	12				3			1	1					11	31		72	311
Kuliarchar	2	16	14	2					1			1					9			11	11	67
Narsingdi	39	16		162	3								2							1	113	336
N.Ganj	126	3	0	75	659	114		154						5			3				2442	3581
M.ganj					4	24	24														112	164
K.patty	11			9	20		39														480	559
Barmi				19	36			33	4			5				1					68	166
Ajmiriganj	1	6				9	4	1	26													47
Habiganj									1	73	1							1	7		20	103
Markuli		1				2	1	7			13						4	1				29
Sachna	78	7			916						3	45				8		7			1730	2794
S.ganj	1												14					12			317	344
Chhatak		2												112	2			228			1912	2256
C.ganj														2267	2							2269
M.ganj	4	11			1	4										82	4	2			23	131
C.ghat	1	2														4	86				4	97
Zakiganj																		14				14
Sherpur																			1			1

Importance of the Market Centres

Bhairab bazar
Bhairab bazar is one of the most important inland river ports, next only to Narayanganj. Known as the Gateway to the Northeast Region, Bhairab supplies and receives the bulk of commodities to and from different parts of the region. The largest share of these cargoes is carried on the waterways. Our origin-destination survey showed the yearly outflow of major commodities from Bhairab is 1.16 million tons, while the yearly inflow is 1.20 million tons.

Ashuganj
Ashuganj is on the left bank of the Meghna River, just opposite Bhairab. Ashuganj is known for its fertilizer factory and electric power plant. There is also a big silo there.

As a business centre, it deals mainly in paddy. There are quite a number of boilers here. The main incoming cargo is paddy and the principal outgoing commodities are rice and fertilizers. There are many agencies, mostly water-based, engaged in the transporting of commodities.

Kuliarchar
Kuliarchar is on the right bank of the Kali River. Though the centre is serviced by road and rail, water transport is first in cargo carrying. Both mechanized and non-mechanized boats play vital roles in this respect.

Paddy, jute, bamboo, fish, and bananas are Kuliarchar's main commodities.

Narsingdi
Narsingdi is on the right bank of the Meghna River. The Haridhoa, a small river that becomes navigable only during the monsoon season, passes through the town. Narsingdi is a district headquarter and an important industrial and commercial centre. There are two jute mills and a number of textile factories. As a business centre, it was once famous for paddy/rice and jute trades. Though the jute trade has lost some prominence, a vast catchment area in the charlands both up and downstream is still served by Narsingdi's wholesalers in such commodities as rice, fertilizer, timber, clothing, seasonal fruits, and necessary consumer goods.

There are four main ghats, including an IWTA terminal, through which cargoes and passengers come and go.

Narayanganj
Narayanganj is situated on the banks of the Sitalakhya River. Once famous for its jute trade, Narayanganj was called the Dandy of the East. It is the most important river port of Bangladesh.

There are many jute mills here on both sides of the Sitalakhya. Adamjee is the biggest. Jute generally comes from the northeast and northwest regions of the country. Water transport plays a significant role since the bulk of jute is carried by this mode. However, jute trading, and thus the number of jute arats, is declining.

Salt is another major trade in Narayanganj. There are many salt refining industries here. It is also known for its POL business. There are two POL depots in the district, one at Godnail and the other at Panchabati. A considerable supply from these two depots is transported throughout the country by boat, especially to the northeast and the western parts of the country.

There are two dry dock yards and a big BIWTA terminal in Narayanganj. Sarulia, Pagla, Fatulla and Shyampur-Munshikhola are well known sand and boulder trading centres.

Munshiganj

Munshiganj is on the right bank of the Dhaleswari River. A small but beautiful town, Munshiganj is one of the old river ports of the country and a renowned trading centre of rice, paddy, timber, and potato. Though the town is serviced by roads, water transport still remains the most important mode for cargo transportation. Besides the district headquarters, Moktarpur, Katpatty, Kamalaghat are important nearby commercial centres.

Munshiganj district or, to be precise, the greater Bikrampur area produces a large amount of potatoes. This explains the establishment of numerous cold-storages in and around Moktarpur, a trading centre situated on the bank of the Dhaleswari. There are about 43 cold-storages in Moktarpur. The capacity of a medium-size cold-storage is 100,000 sacks of potatoes. Potatoes from different parts of the district are brought here by country boats and stored in these cold-storages for seven months (March to September) of the year.

Katpatty

Katpatty is one of the biggest timber trade centres of Bangladesh. There are about 48 timber arats, of which 23 deal in new and 25 in old timbers. Country boats play significant roles in carrying the timbers.

Katpatty and Rekabibazar are also known for their paddy and rice trade. They have about 200 boilers (rice mills) and 150 arats of rice. Supplies of paddy to the boilers generally come from the districts of Rajshahi, Rangpur, Dinajpur, Sylhet, and Barisal by country boats. Some of the boiler owners have their own rice arats. Rice is supplied to different districts, such as Dhaka, Narayanganj, Chandpur, and Comilla. Country boats are the main means of transport here. About 6666.6 tons of rice are supplied annually by a medium-sized arat.

Barmi

Situated on the right bank of the Banar River, Barmi was once an important business centre in the region. But with the development of road communication, Barmi has lost much of its prominence as an inland river port.

Still, Barmi has trade links with Narayanganj, Demra, Palash, and Ghorasal to the downstream and Tok and Trimohoni to the upstream. Mechanized country boats and modern IWT vessels carry cargoes to and from Barmi. Fertilizer, salt, flour, POL, and consumer goods are the main incoming cargoes, while paddy/rice, jute and other agri-products, and consumer goods are the principal outgoing commodities.

Barmi is also a passenger transit point, by virtue of its road linkage with Dhaka and other towns and its waterways linkage with the interior catchment areas of the Banar River.

Ajmiriganj

Ajmiriganj is on the bank of the Kushiyara River (locally called the Berakona). The centre is completely dependent upon Bhairab bazar and Ashuganj for incoming goods. A small amount of commodities comes from Fenchuganj, Kishorganj, and Kuliarchar. The main outgoing cargoes are paddy, fish, and sweet potato. There is no railway or road to connect Ajmiriganj with the neighbouring business centres, only waterways.

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Habiganj
Habiganj is situated on the Khowai River. Habiganj was once very dependent on the Khowai for trade and commerce, but due to the erection of sluice-gates on the Khowai, the river has lost its importance.

During the monsoon season, four ghats function in Habiganj. These are Kalarduba, Madrassah, Rampur Bandher, and Gorurbazar ghats. There is also the less important Court station ghat. Of these ghats, only Kalarduba ghat has commercial importance. During the dry season these ghats cease working. In monsoon time, the roads and fields of most areas of Lakhai and Baniachong *thana*s are underwater. During this period, country boats are the only means of transport to Habiganj.

There are 10 boilers and 1 auto rice mill in Habiganj. There are 25 rice wholesalers and 60 paddy traders.

Markuli
This centre is on the right bank of the Kushiyara River, locally called the Kalni. Markuli is very important because of its location at the juncture of three *thana*s, Sullah, Derai, and Baniachong; four unions; and two districts. The market at Markuli is very big and expands daily. Most of the shopkeepers who sit in the open air come with their goods by boat from Ajmiriganj, Baolee, and other places.

The centre depends on Bhairab for all kinds of consumer goods. Only a particular type of fertilizer comes from Fenchuganj. Launches and mechanized country boats are the only means of connecting Markuli with other areas.

Sachna
Located in a flood-prone area, this important business centre is on the right bank of the Surma River and is better known than its *thana* headquarters. Paddy, sand, and fish are the main outgoing cargo; diesel, fertilizer, salt, flour, molasses, and other consumer goods are the principal incoming commodities with 80% of the cargo coming from Bhairab and 20% from Sylhet and Sunamganj. Fazilpur and Durlavpur are the two major sand trading centres in the vicinity.

Sunamganj
Sunamganj, a district town on the left bank of the Surma River is known for quality sand and shingles. There are 60 to 65 sand and stone traders who form 27 groups.

Sunamganj is dependent on Bhairab, Ashuganj, Dhaka, and Sylhet for incoming cargoes of consumers goods, diesel, and fertilizer. The main outgoing cargoes are paddy, sand, and shingles.

Chhatak
This centre is at the confluence of the Surma and the Dholai Rivers. The Chhatak and Ainpur cement factories are situated here. The centre is known for limestone and boulders. The Sonai River, locally called the Chelo River, and the Dhalai River are the main sources of boulders and sand.

Limestone is imported from India by cable cars and river boats. Boulders come through the Dhalai and Telikhal or Piyain Rivers.

Companiganj
Companiganj is on the right bank of the Dhalai river. It is a newly established *thana* headquarter, not well-connected by modes of transport other than river. A road is being constructed from Sylhet to Companiganj. Bholaganj, a neighbouring growth centre, is known for its boulders and shingles. Between Companiganj and Bholaganj, Nitaiganj is another important trade centre.

Mahanganj
One of the biggest business centres in the region, Mahanganj is situated by the Kangsha River. It would have been the biggest, had the Kangsha remained navigable throughout the year.

Mahanganj is well connected by rail, but road communication is poor.

The main outgoing commodities are paddy, jute, mustard, chicken, and fish; the incoming cargoes are diesel, fertilizer, and all kinds of consumer goods. For its incoming cargoes, Mahanganj is totally dependent on Ashuganj and Bhairab bazar.

Chamraghat
Chamraghat is a transit ghat situated on the right bank of the Narasunda River in Karimganj *thana* under Kishorganj district. It is gradually developing into a river port. There is a guest house established by the BIWTA. There is a pontoon, but no launches or IWT vessels travel here. The only means of transportation is by country boats that connect the haor areas with Kishorganj via Chamraghat.

The main incoming cargoes are sand, boulder and shingles, fertilizer, and POL. Paddy and wood are the main outgoing cargoes. However, passenger movement through this ghat is the remarkable feature.

During the monsoon, cargoes going to Itna, Mitamine, Khaliajuri, Ajmiriganj, and Nikli from Kishorganj, Mymensingh, and Netrokona are transported through this port. About 100 country boats of different sizes and with various commodities and passengers ply to and from this ghat daily.

Zakiganj
Situated on the right bank of the Kushiyara River opposite to Karimganj of Assam, Zakiganj is a small *thana* town under Sylhet district. Though situated on a river navigable year round, Zakiganj could not flourish as a river port or business centre because of a potential restriction: it is a border town, and heavy commercial transactions are not permissible here.

There is a small bazar where necessary consumer goods are available. Adjacent villages of Dubail beel are dependent on Zakiganj. Khalachhara-Birosree and Kajalshah unions to the west (downstream) and Sultanpur, Baratakuria upstream are served by this market centre.

Sherpur
Spread over both banks of the Kushiyara River, Sherpur has the potential of developing as a growth centre. A union headquarter under Moulvibazar *sadar thana*, it is linked by the Dhaka-

Sylhet highway to important business centres of the country. Accessible by both waterways and roads, Sherpur is likely to develop as an inland river port.

6.3 Comments:

- The cargo movements shown in the tables reflect the volume of major commodities only, and certainly not of all the commodities. The zeroes in the tables on yearly movement of commodities do not necessarily mean a total absence of the commodity. Rather they mean that trade in that commodity is insignificant in that market and therefore not considered.

- In some cases, the same commodity has appeared twice or thrice in the data. For instance, boulders from Companiganj first go to Chhatak and are unloaded there. Then they go to places such as Narayanganj and are distributed.

- We could not cover the minor trades, and the aratdars interviewed seem to have suppressed information about their yearly turnovers. Therefore, it is likely that the yearly turnover will be at least 10% more than what is presented here.

7. STUDY ON DRAFT CONDITIONS

Within IWT, the country boats operate with the larger mechanized vessels in the three main classified waterways, but their reserved domain of operation is the network of innumerable small rivers and canals. However the feeder routes used by country boats have not been catalogued. As a result, the economic significance and importance of country boats and the network of waterways as a means of cheap transportation have not been reckoned with at the national planning and policy making levels.

This necessitates a detailed survey of the waterways to identify all the river routes, and to understand their importance and contribution to the economy and their potential for future development. Because of our time limitation, we could not study all the rivers and canals of the region. However, we tried to cover as many as possible.

7.1 Methodological details:

Data on draft restriction is not available for all the rivers. Therefore, a map of the major river routes, obtained from a satellite photograph, and a map of the minor river system, developed from topographic maps, were superimposed to get a complete map of the river system.

Information on the minimum draft situation of all the major river routes was obtained from BIWTA. The rivers for which hydrographic charts were not available were covered through observation and interviews during field visits.

The major trouble spots (draft problems), as well as the duration of the trouble, were identified through interviewing the local people and the experienced boat operators at different market centres. The navigational problems created by different infrastructures such as roads, embankments, bridges, sluice gates, and barrages were identified and marked on a map with corresponding legends. All the river routes covered in the study were marked with different colours to show the draft pattern.

7.2 Findings

Four major rivers, the Old Brahmaputra, the Kushiyara, the Surma, and the Meghna, together with their tributaries and distributaries, form an unique network of waterways that meets the large part of the transport demand of the Northeast Region. But over the last two decades, development of road communication, erection of flood control structures, and continuous siltation have adversely affected these waterways, creating draft problems. Findings of our study corroborate the statement.

A. State of Major Rivers

Narasunda River:
The Narasunda River contains three tributaries, all flowing from the Old Brahmaputra River. One originates at Iswarganj, one at Shambhuganj, and the other near Hossainpur. All three meet at Nandial and the combined flow falls into the Chowganga River at Chowganga bazar of Karimganj *thana* and finally into the Dhanu River. The Narasunda River crosses the

Mymensingh-Kishorganj road three times, at Iswarganj, Nandial, and at Tararghat. At Iswarganj, the river is locally known as the Kanchamati.

The Narasunda does not remain navigable throughout the year. Boats having a capacity less than 20 tons can ply from June to October. From Tarail to Chowganga, the river dries up in the month of March. Due to the bridge over the river at Tararghat, big boats cannot pass when the water level is high.

When the flow from the Shambhuganj and Hossainpur branches is extremely strong, the water of the Iswarganj branch begins to flow towards Iswarganj. The flow in this branch is low due to the embankment at its mouth.

Intervention: Embankment at the mouth.

Arial Khan River:
Once a mighty river, the Arial Khan flows from the Old Brahmaputra. Erosion and siltation were very high in the past. But the erection of an embankment on the left bank of the Old Brahmaputra during the regime of the late President Ziaur Rahman has blocked the Arial Khan. Though the deepest part of the river retains water throughout the year, it dries up at several places during the dry season, hindering the movement of boats. **Chars** were formed at a number of places.

There are markets along both banks of the river. At places, the river is leased out for fishing every year. There are irrigation projects on both sides of the river. Movement of boats starts with the onset of rainy season and continues for five to six months.

Intervention: Cross-dam at Katiadi.

Mogra River:
Near Challishabazar, the Mogra River is known as the Dhalai. Originating from the Kharia River, the Mogra falls into Chowganga near Chamraghat. On its route, the Mogra meets the Dhaniakhali River near Atpara. It was connected with the Kangsha River by a natural canal, but the link has been cut by a sluice gate at Trimohoni.

During the dry season, from November to May, the Mogra remains non-navigable. At places, the river becomes completely dry. Hyacinth grows wildly wherever water remains. The river bed gets higher every year.

Early rainfall makes the river navigable from May. Throughout the rainy season, boats having a capacity of up to eight tons can ply. Bridges at a number of places hinder the movement of big boats.

Purbadhala, Trimohoni, Shimulkandi, Challisha, Netrokona, Narayandaha, Luxmiganj, and Teligati are the markets along its banks.

Intervention: Bridges at Trimohoni, Netrokona, and Atapara; and a sluice gate at Trimohoni.

Dhalai River:
Originating at one of the branches of the Mogra River at Shyamganj, the Dhalai River meets the Mogra again at Netrokona. It is not a prominent river for commercial transportation. A sluice gate across the river at Netrokona has blocked the flow and the river is dead.

Someswari and Shibgonjdhala Rivers:
Originating in India, the Someswari River enters Bangladesh at Durgapur and falls into the Kangsha River at Kamarpur, traversing a distance of 25 km. At Birisiri, it branches off into the Someswari and Shibgonjdhala Rivers.

During the dry season, the Someswari dries up; but the Shibgonjdhala remains navigable year round, and mechanized country boats make regular trips from Jaria to Durgapur via Birisiri. However, during the month of April the draft level at places goes down to a minimum of 1.5 feet. This compels the boatmen to resort to lighterage. From Birisiri to Jaria, a distance of 5 km, the Shibgonjdhala is filling with sands coming down from the hills. Due to the decreasing depth, floods occur during the monsoons and spill over the banks, causing damage to the standing crops. Moreover, heavy amounts of sand carried by the flood waters remain in the fields and affect the fertility. A part of Kullapara, half of Birisiri and Gaonkandia, and the whole of Kakoirgara unions are affected by flooding. The Birisiri-Jaria road also becomes flooded.

The Someswari River was once the only transport route connecting Durgapur, Thakurakona, Netrokona, and other places on both its banks. But due to heavy siltation at its mouth at Birisiri, the river dries up and becomes non-navigable. If this silted mouth of the Someswari River were opened, it would regain its erstwhile navigability, and the pressure of the waterflow through the Shibgonjdhala River would be reduced. As a result, the Shibgonjdhala would not over flood its banks, siltation would be less, and farming would not be affected.

Dhanga/Moheskhali River:
Originating in India, the Dhanga/Maheshkhali River falls into the Someswari River. The river remains navigable from June to October. The flow of water does not cease completely. During the peak draught period, the draft level goes down to 0.5 to 1 foot. The river bed is being filled with sand and pit coal.

Dhaniakhali River:
This river originates at the Kangsha River at Taittor and falls into the Mogra River. The river remains navigable year round. But from March, the draft level goes down to about 1.5 feet at Hattrabari, Thakurakona, Lalchandpur, Madan, and Taittor. The boats have to resort to lighterage at these trouble points. During the low draft season, commodities from Bhairab and Ashuganj are carried by smaller boats up to Durgapur. However, during the monsoon, big boats with capacities up to 40 tons ply through this river.

Taittor, Thakurakona, Lalchandpur, Madan, and Atpara are the main markets along the Dhaniakhali River.

Kharia River:
Originating at the Brahmaputra River at Rambhadrapur, the Kharia crosses the Mymensingh-Haluaghat road at Phulpur and falls into the Kangsha River at Dehulia-Bashtala. Most of this 11 mile long river is dry in the dry season. It becomes navigable with the coming of the rainy season, starting in June and continuing until October. Boats having a capacity of up to 8 tons

can ply during this period. The Kharia is heavily silted which causes frequent floods during the monsoon season.

Kangsha River:
One of the longest rivers of the Northeast Region, the Kangsha originates at the Bhogai River and falls into the Dhanu (Surma) River at Gaglajor. Dozens of rivers from Meghalaya and the Brahmaputra fall into the Kangsha. Unfortunately this river has ceased to be perennial. From Jikli to Dobarpar bazar, the river is completely silted. There the water flows through the Ichhamoti diversion. The Kangsha becomes fully navigable only in the monsoon season.

Malijhee River:
Originating in India, the Malijhee River enters Bangladesh at a point near Jhenaigati and falls into the Chillakhali River at Balughat, traversing a route of about 25 km. The river crosses the Sherpur-Nalitabari road at Tinani bazar. From Jhenaigati to Tinani bazar, there are about 9 irrigation bunds on the river. During the irrigation season, no boat can ply because of these man-made interventions. In the rainy season, when all the bunds are withdrawn, boats of up to 40 ton capacity can ply. The river bed fills with sand and it floods almost every year.

Tinani bazar, Jhenaigati, and Holdigram are the markets along the banks of the Malijhee River.

Bhogai River:
Originating in India, the Bhogai River enters Bangladesh near Hatirpagar, flows through Nalitabari town, and falls into the Kangsha River at Morichpuran of Nalitabari *thana*. The river is about 19 miles long. Before road communications in the adjoining areas were developed, country boats were the only means of transport, for passengers as well as for commodities. In the early eighties, boats with up to 40 ton capacities used to ply through this river. But now only boats with up to 6 ton capacities can ply in the dry season. In the rainy season, however, big boats are seen in the river. Draft level during the dry season recedes down to 1.5 feet. Siltation is very high and there are many **chars** in the river. River bank erosion is also very high.

Hatirpagar, Ghatpara, Nayabeel, and Nalitabari are the markets along the banks.

Chillakhali River:
The river originates in the Indian hills of Kaliakura at Bouramary and falls into the Malijhee River at Balughat. The river is navigable only during the rainy season from June to September. There is a sluice gate near Sanyasibhita where the river has crossed a bridge on the Sherpur-Nalitabari road. Besides, a good number of irrigation bunds are usually made on the river. The river does not dry up completely, but due to the sluice gate and cross dams, the lower part of it dries up. The river bed is rising, causing the waterflow to spill over the banks and create floods in the monsoon season. The cultivable lands are losing fertility due to sand siltation coming down with the flood water.

Chowrasta, Salahabad, Krishnapatty, and Balughat are the markets along the banks.

Mrigi River:
Originating at the Brahmaputra, the Mrigi River flows to meet the Dashani and then falls into the Brahmaputra. About 24 years ago, the river was navigable year round. But due to siltation, the Mrigi has been turning into a dead river. There are sandy shoals at places. Draft level goes down to 1/2 foot during the dry season. This hampers irrigation, fishing, and trading. During

the irrigation period, temporary bunds are erected across the river. Small domestic boats ply during the dry season, while in the monsoon season, boats of 8 to 12 ton capacity can operate. Konabazar, Ilisha,4 and Sribardi are the markets on its banks.

Kushiyara River:
The river branches off from the Barak at Amalshid of Zakiganj and marks the India-Bangladesh border down to Gojukata, a length of about 32 km. At Gojukata, the Kushiyara enters Bangladesh and flows south-west towards Fenchuganj. From Amalshid to Gojukata, there is a dyke along the right bank. But this dyke cannot withstand the pressure of flood waters and breaches at places. Thus flash floods occur over wide areas of Zakiganj, Beanibazar, and Golapganj *thanas*.

From the confluence of the Surma and the Kushiyara up to Markuli, the river is called the Dhaleswari. From Ajmiriganj to Markuli it is called the Kalni, locally known as the Berakona. From Astagram to Ajmiriganj the river has shallow draft. During the dry season, from December to April, no barges or ships can operate in this river; only some launches.

From the upper reaches a little off Astagram up to Ajmiriganj, the draft is so shallow that these vessels have to scale down their speeds. About 15 to 20 years ago, the river had a depth of about 100 feet, but it is only 6 to 7 feet deep now. The local people observed that if siltation continued at the present rate, the river would die within 6 to 7 years. (However, dredging has already started along the Astagram-Ajmiriganj stretch). The lowest draft is 2.5 feet at Ikardia, Katakhali from December to March.

Surma River:
The Surma River branches off from the Barak at Amalshid (Zakiganj) border and enters Bangladesh at Baratakuria. Though it is navigable for the greater part of the year, the draft level drops in February-March to about 2 to 3.5 feet at its mouth and at Kanairghat.

Khowai River:
Originating in the Atharamura hills in the Tripura state of India, the Khowai crosses the border near Rajabazar and enters Bangladesh in Habiganj district. It takes a north-westerly direction upto Habiganj town and then turns to the south-west to fall into the Kalni River near a village named Bajuka, the meeting place of Astagram, Lakhai, and Baniachong *thanas*. The river is named after the Indian town of Khowai. Its total length inside Bangladesh is 85 km.

The river is navigable in the wet season. But due to the existence of two sluice gates, one at Amkandi and another at Haripur, movement of country boats is very much limited. The Khowai River is classified by BIWTA as unsuitable for navigation by mechanized boats. However, along the Habiganj-Bajuka portion, locally called Barak, commercially operated boats, and at times formal IWT vessels ply. These boats/vessels mainly carry passengers and small amounts of goods. During the monsoon season, the river traffic extends up to Shaistaganj, but on a very small scale.

In March, the draft level drops down to about 1.5 feet at Teghoria of Habiganj.

The Khowai River is embanked on both sides. The total length of the embankment is 84 km. But when it rains heavily, the embankment cannot contain the deluge; on-rush of water sometimes spills over the embankment and flash floods occur, causing great damage to the standing crops.

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The flood water also carries sand which is another threat to the cultivable lands. The river bed is rising every year due to siltation.

Sutang River:
Originating in the Raghunandan hills of Habiganj district near the Bangladesh-India border, the Sutang River flows into the Meghna at a place south of Madna. The Sutang is about 50 km long. The river is mostly non-navigable with the exception of a part in its downstream that remains navigable during the wet season. When it rains, the river carries huge amounts of sand and is heavily silted. The Sutang River bears no commercial importance as such.

Karangi River:
The Karangi River originates in the hills on the Bangladesh-India border (within Habiganj district), flows in a northwest direction almost parallel to the Khowai, and touches the Bijna River at Balikhal to the north of Habiganj town. It continues to flow northwest and then gradually turns to the southwest and falls into the Kalni River at a point north of the Khowai-Kalni confluence. The Karangi River is almost as long as the Khowai. The river dries up during the dry season at several stretches and is only partly navigable during the monsoon season. Small country boats of up to 6 ton capacity ply along the river. Bahubal bazar is one of the important marketplaces on its bank.

Bibyana River:
The Bibyana is one of the important rivers in Habiganj district. Taking its flow from the Kushiyara at a place down from Dighalbak, the Bibyana meets the Kushiyara again at Dumargaon of Markuli. The approximate length is 15 km. The Bibyana becomes navigable in June and remains so until October. During the dry season, the water level drops to 1.5 to 2 feet, and at several places the river completely dries up.

Up to 6 ton capacity boats ply during the monsoon season. Enayetgonj is the most important market along the Bibyana's route, and the other markets are Shantirbazar, Megharkandi, and Sonapurbazar.

The Bibyana River marks the northern boundary of Habiganj district with Sunamganj.

Shakha Barak River:
Shakha Barak originates at the Kushiyara River at Sarkarbazar (of Moulvibazar *thana*) and meets the Bijna River at Jinarpur of Habiganj district. It is a tiny river, with a length of about 8 to 9 km. It is almost a dead river now, and remains navigable only from June to September. Up to 5 tons capacity boats move along this river; but there is little traffic. There is a sluice gate at its mouth which has greatly contributed to its gradual death. Kuflarbazar, Guraraibazar, and Kataraibazar are the markets on or near both its banks.

Bijna River:
The Bijna River starts at Jinarpur of Habiganj and is said to be an extension of the Lengua River. The Bijna is also connected with Shakha Barak by a canal called the Katakhal at Jinarpur and meets the Karangi River at Balikhal. The Bijna remains more or less navigable year round. However, during March the draft level goes down to 2 feet at several places along its approximate 20 km length. Boats having up to 20 ton capacities ply with passengers and commodities. Guglarbazar, Fultali, Aliganj, Imambari, Notunbazar, and Kalaijuri are the market places along its route.

Luba River:
Originating in the Jaintia hills in India, the Luba River enters Bangladesh through the Dona tea estate in Kanairghat *thana*. Then it flows into the Surma River at Lubamukh.

The Luba is navigable year round. About 200 country boats carry boulders from the hillside. However, the number of boats goes down during the dry season. The lowest draft during this period is 1.5 feet in February-March.

Chalti (Dopajan) River:
The Chalti River, also called the Dopajan, originates in the Meghalaya hills of India. It carries with it sand and boulders from the hills. The sand and boulders are deposited in the river bed near Sunamganj. If the sand and stones are not removed, they could block the river. To keep the river navigable for the barki boats, people remove sand and stones from the bottom of the river. From the meeting point of the Chalti and the Surma, the source is about 8 miles away. About two miles from its confluence, the Chalti remains navigable. Deposition of sand and shingles takes place after that point.

The lowest draft of the river during the peak draught period stands at 0.5 foot.

Dhalai River:
Originating in India, the Dhalai River flows to the southwest and branches off into the Dhalai River and the Foizalerdhala River. The Dhalai remains navigable until November and then dries up. The Foizalerdhala is perennial, but not navigable for big boats. From October to May, only barki boats can ply.

B. Some Important River Routes

Bhairab - Companiganj route:
This 230 km long route connects Mitamine, Itna, Khaliajuri, Gajaria, Sachna, Jamalganj, Sunamganj, Doara Bazar, Chhatak, and many other market places with Bhairab. Modern IWT vessels ply almost year round, excepting February and March, up to Chhatak. Country boats can go as far as Bilajuri ghat of Companiganj even during the dry season. In monsoon time, navigability for boats and comparatively shallow draft vessels extends up to Companiganj. This route is prominent for transportation of sand, boulders, and shingles.

Bhairab - Ajmiriganj route:
This route is about 90 km long. BIWTA classified it as a perennial one, but the route has suffered from draft problem for the last 7 or 8 years. Along the Astagram-Ajmiriganj stretch, the draft level drops to 2.5 to 3.00 feet at some points during the winter. This hinders the movement of modern IWT vessels. Even the mechanized country boats have to slow their speeds. Recently BIWTA has started dredging at the trouble points.

Rashidganj (Kumri) - Habiganj route:
There are two different routes from Rashidganj to Habiganj. The Kushiyara-Barak route is about 35 to 40 km longer than the Berakona-Ratna route and takes 3 to 4 hours more than the latter. The Kushiyara-Barak route remains navigable throughout the year. The Berakona up to its meeting point with the Ratna River is silted and needs dredging. The Ratna up to Habiganj also has a draft problem; no boats from Rashidganj go to Habiganj during the dry season.

Daky-Kanchanpur khal route:
This khal connects the Kushiyara River with the Surma River. Boats from Chamraghat, Mitamine, and Itna go to Rashidganj, Kakailchhao, and Ajmiriganj through this khal. In December, the water level goes down, but does not affect country boat traffic. The lowest draft of this route is 5 to 7 feet.

Dhanpur-Berakona Khal route:
This is another connecting khal between the Surma River and the Kushiyara River. This khal remains navigable year round. If heavy rainfall occurs in the winter and the water level of the Kushiyara goes up, a cross dam is built across the canal to facilitate the cultivation of boro and irri paddy in the interior haor areas. If the water is allowed to flow through the khal, the perennial part of the haor, which is the fishing area, expands and affects fishery. The lessee of the fishery encourages the people to build the cross dam across the khal. The lessee contributes substantially for the purpose. The lowest draft of the khal is about 4 to 5 feet.

Chamraghat-Shamarchar route:
Shamarchar is about 50/60 km off Chamraghat and it takes 7 to 8 hours for the mechanized country boats to reach Shamarchar. The route covers the Narasunda and Dhanu Rivers, Dhonpur-Berakona khal, and one of the branches of the Surma River (which diverts from the mainstream of the Surma at Sunamganj and meets the Dhonpur-Berakona khal near Dhonpur). The route remains navigable up to Beri near Shamarchar. By the beginning of winter, the water level goes down to 3 to 5 feet along the Beri-Shamarchar stretch and boats have to slow down. From Shamarchar to Kallayanpur towards Sunamganj, the water level goes down to 1 foot and boats cannot ply for 1 or 2 months.

Chamraghat-Goaldighi route:
It is only 25 km from Chamraghat to Goaldighi through the Ghorautra and Gharabhanga Rivers. Gharabhanga connects the Ghorautra and Baulai (Surma) Rivers. In December, the confluence of the Gharabhanga and the Baulai (Surma) dries up due to siltation, allowing no boat to enter.

Chamraghat-Kishorganj route:
This route stretches about 35 km along the Narasunda River. The Narasunda from Chamraghat to its meeting point with the Ghorautra River remains navigable year round. The Chamraghat-Kishorganj route is almost completely dry during the dry season, partially due to the embankment at the Narasunda mouth on the Brahmaputra River and partially due to siltation. Boats can ply only 3 to 4 months of the year through this route.

Gaglajor-Mahanganj route:
Gaglajor is at the confluence of the Kangsha and Surma Rivers. In October, the water level of the Kangsha goes down to 1 foot. People build a cross dam at Gaglajor to retain water for irrigation. This year the flow during the dry season was so low that the cross dam could not accumulate much water and irrigation was affected. Thirty-four LLPs ceased operation due to lack of water in Mahanganj. During this period cargo carried from Ashuganj and Bhairab bazar for Mahanganj, Dharmapasha, and other market centres had to be unloaded near the cross dam and the goods carried by road transport.

Gajaria-Fazilpur route:
This route connects the Baulai River with the Abbua and the Jadukata Rivers. The Baolai River falls into the Surma at Gajaria. Sand and stones coming down on the Jadukata River have made

Fazilpur a well-known trading centre. Big boats from Gajaria ply up to Fazilpur without any draft problem. But from Fazilpur these boats cannot go further upstream through the Jadukata River. In winter, the water level goes down to 1 foot. Several thousand barki boats collect sand and stones from Jadukata and transfer the cargo to big boats at Fazilpur.

Draft restrictions in the rivers like Rakti and Abbua are the biggest problems for the boats engaged in transportation of sand in the area. The Rakti used to remain navigable for the whole year for all sizes of boats, just 15 years ago. Now, it goes completely dry and, for six months, even the smallest boats cannot ply. The water level in the Abbua River at the Beheli Ferry ghat decreased to 4 feet at the lowest on the 10 March 1992 and big boats had to use lighterage.

Embankment and navigational problems:

Embankments are obstacles to the free movement of boats. Submersible embankments also pose a threat to the operation of mechanised boats before the embankment is sufficiently flooded. Propellers of mechanized boats often hit submersed embankments and break. Aquatic grasses that grow in the still water of the embanked haor are another hindrance. The mechanised boats operating along main routes need direct openings through the embankments to reach their destinations without making long detours. The owners of these boats are rich and strong enough to cut the embankments where needed. They also get support from the passengers since such openings save time.

The villagers need easy access to and from the haors for agricultural activities. Hundreds of fishing boats from the periphery need easy access to the haors. People living within the haor also need access to rivers and markets outside. All these demand openings in the embankment. A list of 17 public cuts on the embankment of a haor shows 14 of them were directly or indirectly made for navigation purposes.

7.3 Comments

The BIWTA Masterplan observes that " deterioration of Bangladeshi waterways' navigability over the past decades has taken place - and will continue - in the northeast division's tributaries and connectors of distributaries and in various northeast division rivers (Old Brahmaputra, Dhaleswari-connector, Kushiyara, Kangsha, Surma east of Chhatak-tributaries). The main cause of this deterioration is the increased obstruction of surface water and groundwater in the low flow season, whereas the reduction of cross boundary flows from India is likely to be a second important cause."

We fully agree with the statement. In almost all cases, it has been reported that the draft situation is deteriorating at an alarming rate. Therefore, the BIWTA Masterplan recommends smaller, shallow draft vessels for the future.

C. List of the River Routes with their Origin, Destination, Length, Lowest Draft and Trouble Period

Name of River	District *Thana*	Origin	Destination	Distance from Origin (km)	Lowest Draft in Feet	Where	Period of the Year
Surma	Sylhet Sunamganj Netrokona Kishorganj	Barak Amalshid (Zakiganj)	Meghna Bhairab	220	3.5	Kanairghat and Chhatak	Jan-Feb
Kushiyara	Sylhet Habiganj Kishorganj	Barak Amalshid (Zakiganj)	Meghna Bhairab	210	2.5	Astagram Kathkhal	Jan-April
Ratna	Ajmiriganj Habiganj	Kushiyara Ashuganj	Barak Habiganj	35	Dry	Rashidganj	Jan-April
Dhaky	Itna Kishorganj	Kushiyara Ashuganj	Surma Itna	10	5.00	Kanchanpur	Jan-March
Berakona Khonpurkhal	Kishorganj Habiganj	Kushiyara Ashuganj	Surma Dhanpur, Itna	9	4.00	Berakona	Jan-March
Surma (Branch)	Sunamganj Netrokona	Surma Sunamganj	Berakona Dhonpurkhal Itna	25	1.00	Samarchar Kallyanpur	Jan-March
Narasunda	Kishorganj	B.Puttra Hossainpur	Ghorautra Karimganj	30	Dry	Hossainpur Chamraghat	Jan-March
Baulai	Netrokona Sunamganj	Jadukata Tahirpur	Surma, Gajaria Kaliajuri	35	5.00	Gajaria	Jan-March
Abbua	Tahirpur Sunamganj	Jadukata Tahirpur	Baulai Tahirpur	15	1.00	Jadukata Baulai	Jan-March
Jadukata	Tahirpur Sunamganj	Meghalaya India	Abbua Tahirpur	18	1.00	O-D	Jan-March
Rakti	Bishwamvarpur Sunamganj	Jadukata Tahirpur	Surma Durlavpur	10	1.5	O-D	Jan-March

C. List of the River Routes with their Origin, Destination, Length, Lowest Draft and Trouble Period

Name of River	District *Thana*	Origin	Destination	Distance from Origin (km)	Lowest Draft in Feet	Where	Period of the Year
Kangsha	Sherpur Netrokona	Bhogai	Surma Gaglajur Khaliajuri	65	Dry	Dharmapasha	Jan-May
Mogram	Tahirpur	Meghalaya India	Patnai Tahirpur	12	Dry	O-D	Dec-May
Patnai	Tahirpur Sunamganj	Mogram Tahirpur	Baulai Tahirpur	15	1.00	O-D	Jan-March
Dopajan (Chalti)	Sunamganj	Meghalaya India	Surma Sunamganj	12	.50	O-D	Jan-March
Barak	Habiganj	Khowai Ashuganj	Kushiyara Habiganj	35	2.50	On the Org.	Jan-March
Chalo	Chhatak Sunamganj	Meghalaya India	Surma Chhatak	7	1.00	O-D	Jan-March
Dhalai	Companiganj Sylhet	Meghalaya India	Surma Chhatak	12	Dry	Netaiganj Telikhali	Jan-March
Foizaler Dhala	Companiganj Sylhet	Dhali Netaiganj	Katanodia (Dhalai Telikhal	3	1.00	Netaiganj Telikhali	Dec-May
Ghorautra	Kishorganj Nikli	Narasunda Karimganj	Surma Nikli	15	Dry	O-D	Feb-April
Malijhee	Sherpur	Meghalaya India	Chillakhali	20	Dry	O-D	Nov-May
Bhogai	Nalitabari Sherpur	Meghalaya India	Kangsha Nakhla, Sherpur	33	1.5	O-D	March
Chillakhali	Nalitabari Sherpur	Meghalaya India	Malijhee Nalitabari	18	Dry	O-D	Nov-May

C. List of the River Routes with their Origin, Destination, Length, Lowest Draft and Trouble Period

Name of River	District *Thana*	Origin	Destination	Distance from Origin (km)	Lowest Draft in Feet	Where	Period of the Year
Sonakhal	Rupganj Narayanganj	Lakhai Rupganj	Meghna Narsingdi	35	Dry	O-D	Nov-May
Mrigi	Sherpur	B.Puttra Sherpur	B.Puttra Sherpur	22	1.00	O-D	March
Kalagachia	Narsingdi	B.Puttra	Arialkhan Narsingdi	20	Dry	O-D	Nov-May
Arialkhan	Pakundia Kishorganj	B.Puttra Pakundia	Meghna Narsingdi	32	Dry	On the Orgn.	Nov-May
Dhunakhali	Thakurakona Netrokona	Kangsha Jariajanjal	Mogra Atpara	20	1.5	O-D	March
Mogra	Netrokona Kishorganj	Kharianodi Phulpur	Narasunda Karimganj	85	Dry	Trimohoni Atpara	Nov-May
Someswari	Durgapur Netrokona	Meghalaya India	Baulai	25	Dry	Birisiri	Dec-May
Shibganj Dhala	Durgapur Netrokona	Shameswari Birisiri	Kangsha Jaria	9	1.5	Birisiri	March-May
Sarigoyain	Gowainghat Sylhet	Assam India	Surma Chhatak	25	1.5	On the Orgn.	Jan-March
Khowai	Habiganj Bahubal	Tipera India	Barak Habiganj	45	1.5	Teghoria Habiganj	March
Shakhabarak	Habiganj	Kushiyara M.bazar	Bijna Habiganj	9	Dry	O-D	Oct-May
Bijna	Habiganj	Shakhabarak Habiganj	Karangi Habiganj	20	2.00		March
Luba	Kanairghat Sylhet	Karimganj India	Surma Kanairghat	9	1.5	O-D	Jan-March

C. List of the River Routes with their Origin, Destination, Length, Lowest Draft and Trouble Period

Name of River	District *Thana*	Origin	Destination	Distance from Origin (km)	Lowest Draft in Feet	Where	Period of the Year
Sutang Nadi	Habiganj	Raghunathpur Hill, Babiganj	Kushiyara Madna Habiganj	50	dry	O-Half of the length	Jan-March
Monu river	Moulvi bazar	Tipera India	Kushiyara	40	dry		Jan-March
Karangi	Habiganj	Hill of Babiganj	Bijna Habiganj	35	dry	Half of the length	March
Bibyana	Habiganj	Kushiyara Habiganj	Kushiyara Habiganj	15	dry	different places	March
Kharia	Phulpur Mymensingh	B.Puttra Phulpur	Mogra Dhobaura	17	dry	O-D	Oct-May
Dhanga/ Moheskhali	Moidhanagar Sunamganj	Meghalaya India	Someswari Moidhanagar	10	.5	O-D	Oct-May

8. CONCLUSION AND RECOMMENDATIONS

Water transport is the backbone of the transport system in Bangladesh. Of the 5968 km of classified waterways in the country, there are about 1400 km in the Northeast Region. Besides, there are numerous rivers, canals, and haors that remain navigable for country boats for most parts of the year. This, together with seasonal inundation of about 60% of the region up to a depth of 1 m, makes it unique for navigation, but constitutes a bottleneck to development of road transport. Due to the region's geographical features, reliance on water transport is greater there than in other parts of the country.

Despite increased siltation and draft restrictions, of the 15.3 million tons of cargo carried in and the 14.5 million tons carried out, to/from 19 markets of the region by all modes, IWT commands a share of 91% and 69%, while the combined share of road and railway stands at 9% and 31% respectively.

At the national level, water transport is the second largest employer in the country, next only to agriculture. Country boats alone offer 60% of all employment in the transport sector. A total of more than two million people rely on country boats as their main source of income to support about 10 million dependents (CBPP Report).

The O-D Survey analysis reveals that country boats earned Tk. 1896 million in a year. Corresponding figures obtained through traffic counting are Tk. 1990 million. Thus country boats not only provide transportation of commodities for marketing, but also provide a substantial amount of jobs to the resourceless, 50% of the population, at a time when agriculture offers very little or no employment.

With agricultural land being mainly single cropped in the region, a great number of people rely on the transportation business for a considerable period of the year. In addition to transportation of agricultural and forestry products, the rivers at Fazilpur, Sunamganj, Chhatak, and Companiganj as well as many other rivers of the region offer thousands of people year round employment in the collection and transportation of sand and boulders.

Water transport is very important for agriculture in the haor areas where other modes of transport are virtually non-existent. Many families keep boats to serve agricultural and domestic purposes.

With mechanization of country boats, the traffic patterns in the rural areas have changed. People now travel more than before, simply because it is fast, convenient, and less expensive. It gives them access to the urban centres and resources, and enables them to find employment there while still living in their villages nearby. In this way, the boats enhance rural mobility and contribute to alleviating the problem of rural unemployment. In addition to direct employment on boats, the sector also supports ancillary employment for mechanics, carpenters, and labourers.

Due to mechanization, the country boat sector demonstrated its responsiveness and potential to the changing demand in the transport sector. During the last decade, transport demand in the country has increased at a higher pace than economic development. It is likely that the trend will continue. But despite enormous spending on road building, rural areas are still greatly served

by the waterways. There is no denying waterways are, and will remain, a very important feature of rural life.

IWT demands minimum infrastructure and remains the cheapest and most fuel-efficient mode of transport. Under the circumstances, inland water transport in general and country boats in particular deserve immediate attention at the decision level for development.

RECOMMENDATIONS:

Integration in Overall Planning:

The country boat sector should be integrated in overall development planning, both at the national and regional levels.

Developing Coordination among Navigation, Road Building, Water Management, and Planning of Rural Infrastructure:

IWT faces draft problems in winter and cannot cross the embankments and sluices or pass through the bridges during the monsoon season due to a lack of coordination between the agencies involved in planning. Of the 66 water control projects studied, 19 have major and 14 have medium level negative impacts on navigation. Large embankments without proper sluices/navigation locks are forcing boats to make long detours. The Country Boat Pilot Project indicates that the public cuts on the embankments are mainly done for easy navigational access to and from the haors. The need for good coordination among authorities like BIWTA, Roads and Highways, BWDB, LGED and NGOs working for road and waterway development is apparent. Consultation with boat operators is an essential pre-requisite.

Reopening and Clearing Disused Canals:

Many canals and waterways have slipped into disuse owing to lack of maintenance and resources. In these cases, small investments can bring large benefits in terms of improved water transport and rural access and mobility. It is possible to confirm the participation of boatmen and boatmen's associations in these activities.

Selective Dredging and River Training:

The draft condition in many of this region's important rivers is deteriorating due to a high rate of siltation. Minor improvements in the trouble spots can reopen long routes for IWT operation. The need for dredging in the rivers and re-excavation of canals on a regular basis is urgent. BIWTA, responsible for navigational dredging, has only eight dredgers for the purpose. Its capacity should be increased and dredging works must be coordinated with the BWDB.

Construction of Sluices and Navigation Locks:

Sluice gates should provide opportunity for boat operation during the monsoon season. Small and shallow openings should be arranged on submersible embankments along the important navigation routes. Navigation locks should be provided where needed.

Navigation Aids:

There are many routes, some seasonal and some perennial, in the Northeast Region which are used by country boats. These routes have never been systematically classified or catalogued. Local level plans should be prepared which describe the routes and assign priorities for their improvement.

To increase safety, obstacles and water depths should be marked with painted poles. Navigation lights should also be provided for the informal sector. The operators should be made aware of navigation rules.

Construction of Safe and Durable Berthing Facilities:

The number of boats attending the markets is increasing, congesting the ghats and making loading and unloading difficult. Long waits in the queue adds to transport cost.

Simple, durable berthing and mooring facilities would reduce the bottlenecks and make it much easier for the boats to offer the services required by the traders and the travelling public.

Integration of Country Boat Facilities into Growth Centres:

Growth centres are based on existing markets, many of which have been traditionally served by waterways. While improved road access has the potential to bring benefits to these centres, the combination of roads and better water access will be even more effective.

Credit Support for Improved Mechanization:

Mechanization of country boats ensures a higher rate of economic return. There are many boatmen who cannot afford the initial investment for buying and installing engines or gear boxes or timely repairs to their boats. Since an engine can double earnings and a gear box can increase speed and safety while reducing fuel consumption by 30%, the repayment capability of the boatman is very good. Efforts should therefore be made to organise a credit scheme to reach owner operators of country boats. Credit is also needed to make structural changes to boats, to strengthen them, or to buy new boats when old ones can no longer be repaired.

Training Need:

There is a strong need for training in boat and engine operations, maintenance, and repairs so that boats are operated safely, engines are maintained properly, and minor repairs are done by the boatmen/engine operators themselves. Training should be organized to include the boat operators and the rural mechanics and boat builders. Apart from technical issues, training can focus on social and economic issues involving group organization to handle credit and insurance as well as maintenance of routes and ghats.

Legal Support:

Registration by the GOB is necessary to allow country boats to grow smoothly as a distinct sector, without any unwanted treatment by any agency or unequal competition from other modes of transport.

Establishment of Boat Centres:

Boat centres should be established at strategically located river ports. These centres will have landing facilities; boat and engine repair shops; credit and insurance extension centres; depots for spare parts, lubricants and fuels; and training facilities for crew, carpenters, and mechanics.

Flood Preparedness:

During the floods, millions of rural people suffer due to the lack of communication and transport. Timely response through using country boats could be of great help to the affected people. CARE and ISPAN have considered initiating a Flood Preparedness program in association with the Bangladesh Country Boat Owners' Association.

People's Participation:

People's participation is an important issue. The people demanding an embankment in March and April might like to have deep cuts in it in October and November. The fishermen and boatmen need easy access to haors so cut down the embankments in places allowing the entry of boats, fish and sediments. People's demands should be positively considered; otherwise, public cuts will continue.

Navigability Maintenance and Homestead Protection:

It seems that people diving for sand, boulders, or shingles will keep some of the routes navigable by removing these obstacles to navigation. Of late, country boats are being increasingly used in the collection of soil for earth filling and boulders for homestead protection, another burning issue in the region. Therefore, this sort of activity should be encouraged.

Need for Detailed Study:

IWT is complementary to the other modes of transport as well as to agriculture, drainage, flood control, poverty alleviation, environment protection, and equitable distribution of income generated from the transport sector. But a large component of IWT, the country boat, is not incorporated into formal planning. When the overall developmental plan is initiated in the FAP, it is very important that navigation in general and country boats in particular are taken into consideration in the planning process.

No detailed study on the informal sector of IWT has been conducted so far. But for the sake of proper planning, a detailed information base is a necessity. Below are some of the important areas for careful investigation:

- The level of existing physical infrastructures such as ghats and jetties and their capacity to handle increasing transport demand.
- Natural and manmade obstacles created by roads, embankments, bridges, and sluices.
- Complementarity between water transport and water control structures, and between road transport and waterways.

- Social, economic and technical bottlenecks in boat operation.
- Fisheries development, environment protection, and bio-diversity requirements as related to navigation.
- Options and restrictions in equipment manufacturing, such as engines and gear boxes, availability of construction materials and their longevity and prices.
- Institutional requirements in project planning, and O & M of routes and ghats to enable people's participation in managing navigation issues.
- Institutional support to handle issues such as registration, license, security, credit, insurance, and training for the informal section of IWT.

ANNEX A

TABLES

Annexure - 1

TRANSPORT SECTOR STUDY
NORTHEAST REGIONAL PROJECT, FLOOD ACTION PLAN - 6
TRAFFIC COUNTING FOR COUNTRY BOATS

Name of the Market:..... Thana .....

1	2	3	4	5	6	7	8	9	10	11	12	13
Boat	Boat Capacity in mds	Type of Commodity	Volume Carrying in mds	Loading Place	Mcb/ Ncb	Journey Length in miles	Journey Length in hrs	Freight Rate per mds	Return Trip Cargo	Amnt in mds	Destination	No. of Crew

Name of the Enumerator: ..... Date of Interview: .....

Code: Mcb (Mechanized Country Boat) = 1, Ncb (Non-mechanized Country Boat) = 2

Destination/Loading Place: within the thana = 1, within the district = 2, within the NE Region = 3, Outside NE Region = 4

Commodity-wise Inflow (in tones) by Markets on *Hatday* in Dry Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Naraya nganj	Munshiganj	Katpatty	Barni	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	355	262		11	49	931	384	57	2					5	1				
Rice	38	18	3	324		105	168		3			4		18	2				
Wheat						4													
Flour						1													
Fish	9		4	10	12	2	14	7	1			4					2		
Dry Fish												3							
Onion	22						7	2											
Garlic																			
Turmeric	18																		
Cinnamon																			
Coconut	1				25	1		25											
Banana	1		2		39				7			11							
Tal					11														
Milk																			
Vegetable			14	9	17	16		6											
Chilly	60					6	11	40											
Potato	20		10	24	46	196	723	102	67			27					7		
Khira									1			1							
Tomato				3															
Brinjal					6			2											
Pumpkin					6														

Commodity-wise Inflow (in tones) by Markets on *Hatday* in Dry Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayanganj	Munshiganj	Katpatty	Barmi	Ajmiriganj	Habiganj	Markuli	Sachna	Sunamganj	Chhatak	Companiganj	Mahanganj	Chamraghat	Zakiganj	Sherpur
Dal	28					38	39												
Mustard	53				16		172										1		
Ground nut	9					69													
Biscuit	70																		
Salt	136	14	7		14			31											
Molasses							240	46	1			15							
Edible oil	16				11		9												
Sand		59			44	40							735	839					
Earth				5	9	35		51											
Wood	1		40	3	95		11	13				15					120		
Bamboo	1		19		11							2					41		
Jute good						14								27					
Bolder		20										222	158	5741	5917		29		
Brick	5	18		6	16	45	22	92						2					
Cement													1	9					
Rod	12			22			16						3						
Jute	5			15	88		11												
Cotton																			
Fire wood		5		19	77	22		39				1		2					
Petroleum	31		5		7														
Fertilizer	528	63	11		174	4		228	101										

Commodity-wise Inflow (in tones) by Markets on *Hatday* in Dry Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Naraya nganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Creosote		7																	
Empty drum	2				7														
Empty sack	33																		
Fodder					10														
Passenger	89	7	18	189	118	34	4	482	46		15	109	100	214	14		136		
Cattle																			
Tobacco												2							
Others	52			1	114	103	22	177	39			53	33	75	7		52		
Total	**1609**	**479**	**138**	**648**	**1035**	**1675**	**1860**	**1411**	**275**		**17**	**478**	**1035**	**6936**	**5942**		**391**		

Commodity-wise Inflow (in tones) by Markets on *Hatday* in Wet Season

Commo	Name of the Market																	
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Company ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	733	1702	18	281	44	31	2808	557	100	86	27	1	7	19		138	21		
Rice	72	226	4	531	9	28	561	26	14	4		14		24					
Wheat					465	2	31												
Flour	12		1	7			10					1		24		9			
Rice Cake	24	31					2												
Fish	1		1	2	7		22		1	1									
Dry Fish								11								7			
Onion	1		1		5		48												
Garlic																			
Turmeric					4														
Coconut							1												
Banana		1	57		30	1		1	22			15							1
Jack Fruit	18	17			143	37	125	226	116		22	51	5	3					2
Mango					22		4		6		8								1
Pine Apple					5			2	2		1			1					2
Tal					2		2												
Milk					2		2												
Vegetable			30	2	6		14	2	8		1	18	23			1			2
Chilly					11				1			1							
Potato	2	48	5	12	7	12	3		12			4				3			
Khira																			

Commodity-wise Inflow (in tones) by Markets on *Hatday* in Wet Season

Commo	Name of the Market																	
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Dal	15				20	8	171									4			
Mustard	26			2			94												
Ground nut	45			21	8		38	19	3	1	2					27			
Biscuit									2										
Salt	53	35	9	57			18	14	11					7		4			
Molasses					29		19	2											
Sugar					3														
Edible oil				2			13												
Sand		18		111	229	41	68						1050	50	208	14			20
Earth	68																		
Wood	1	16	1	3	11	1		3	22				12	16		16	58		
Bamboo	9		130						25			15	4				9		
Jute good	11				16														
Bolder	79	7					3						515	5070	15483				
Brick	51	42	22	42		95	45	74								45	48		
Cement	40	9				15	9							49		18			
Rod				5															
Jute					44														
Cotton							19					1							
Fire wood				3	31					3			1	1		1			
Petroleum	3	9		2	8				1					4		8			

Commodity-wise Inflow (in tones) by Markets on *Hatday* in Wet Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Fertilizer	81	5			2									1		44			
Empty drum	6																		
Fodder	3						33												
Passenger	551	20	61	668	1574	177	166	647	502	278	64	512	313	480	60	418	92	56	377
Cattle																			
Tobacco																			
Others	9	11	5	80	117	4	10	38	155	4	13	45	7	76		55	26		2
Total	1926	2203	352	1841	2869	462	4356	1633	1011	382	141	686	1942	5833	15753	822	257	57	411

Commodity-wise Inflow (in tones) by Markets on *Non-Hatday* in Dry Season

	Name of the Market																		
Commo	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chattak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	65	80				181	1573				7	4		4					
Rice		20		113	33		230	77				1							
Wheat							42												
Flour	1						3												
Fish	4		2	7	12	1	46	4				1					2		
Banana							30												
Wood apple					6														
Vegetable	5				8		40												
Potato				10	13	10	576					1		9					
Brinjal																			
Dal					42		187												
Mustard							83	29											
Ground nut							76												
Salt	88			16	24														
Molasses								74											
Sugar							2												
Edible oil							53												
Sand	61		7		144		117						735	775					
Earth							105												
Wood				4			34						2						
Bamboo	7								3										

Commodity-wise Inflow (in tones) by Markets on *Non-Hatday* in Dry Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chattak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Jute good					51		5							18					
Bolder	44												157	5199	5228		29		
Brick	159	7	3			7	101												
Cement	52	52																	
Jute					213			33											
Fire wood			2					7									5		
Petroleum	14	15					3	18	15										
Fertilizer	89	53	7	29			9	42			22	6					11		
Empty drum	2	1			1														
Fodder					19														
Passenger	104	1	6	157	123	7	73	108	13		1	32	21	201	9		87		
Cattle																			
Tobacco																			
Coal				37															
Others	152			53	34	79	299	22	106			6	49	15			32		
Total	854	233	30	429	732	287	3697	417	139		30	55	968	6223	5237		169		

Commodity-wise Inflow (in tones) by Markets on *Non-Hatday* in Wet Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	492	827	6			507	2366	195		135		16	1	11		8	22		
Rice	45	182		69	23	64	579	5		3		5		6		7			
Wheat					174		11												
Flour						4	20						1						
Rice Cake		12				7	82												
Fish	1			1	71		44												
Dry Fish																			
Coconut	3						12												
Banana					34	32								1					
Papaya					29														
Jack Fruit					287	44	127	67			2		3	4					
Mango					11	4												8	
Pine Apple					4												3		
Tal						11													
Milk																			
Vegetable		12			15		2					2	2	2					
Chilly													1						
Potato	19	38				2	9												
Dal	3				18		175												
Mustard							213												
Ground nut	74			5			4									12			
Salt	18	7				3								6					
Molasses					2		59	1						5					

Commodity-wise Inflow (in tones) by Markets on *Non-Hatday* in Wet Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Sugar					3														
Edible oil							12						4						
Sand		9			153	74							825	45	822		14		
Earth	66	11					37												
Wood				45	83		5	35	3				12	9		56			
Bamboo			1																
Jute good					2														
Bolder													358	5476	14038	30			40
Brick	5	61	20			42	18	28								11	18		
Cement					9									38		12			
Rod																			
Jute					99														
Fire wood	8			2	11			21					5	7		7			
Petroleum	16	21	2			3	16	3					1			24			
Fertilizer	35		3		29	4		2								14			
Empty drum					1	1													
Empty sack																			
Fodder					5		7												
Passenger	522	10	48	174	1919	107	85	281	85	172	26	170	385	248	35	222	132	17	
Cattle			4							4									
Others	5	4		7	39	24	19	6		3		2	14	4		4	11		
Total	**1322**	**1201**	**90**	**307**	**3033**	**942**	**3909**	**650**	**89**	**322**	**28**	**198**	**1621**	**5866**	**14896**	**413**	**203**	**17**	**48**

Commodity-wise Outflow (in tones) by Markets on *Hatday* in Dry Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	7	12					15	11											
Rice	72			116	205	334	73	7											
Wheat	3				192			1						29					
Flour	75			19	39														
Fish							4		1			1							
Dry Fish												2							
Onion	15																		
Turmeric								3											
Coconut			5																
Banana			1																
Vegetable						7													
Chilly	17																		
Potato	1					40			7			2							
Dal	16						36												
Mustard								12											
Biscuit																			
Salt	90			5	29	8		1											
Molasses							24	31											
Sugar	79																		
Edible oil						3	59					1							
Sand						37													
Earth						29													
Wood	1			5				45											

Commodity-wise Outflow (in tones) by Markets on *Hatday* in Dry Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Bamboo	1	1	93									2							
Jute good			2			31								2	4873				
Bolder														35					
Cement	178	3		1		5													
Rod	1			16	2														
Jute	1				148														
Cotton				2															
Fire wood	5																2		
Petroleum	50	1															7		
Fertilizer	465	148		22	342	17		27	1			1							
Empty drum	16					14	5												
Fodder																			
Passenger	80	8	17	173	95	23	5	478	19		8	95	62	147	12		114		
Cattle				2													10		
Tobacco	5																		
Others	481	3	6	6	19	52	41	311	7			18		9			49		
Total	1671	179	129	374	1075	604	267	933	37		8	125	62	224	4885		183		

Commodity-wise Outflow (in tones) by Markets on *Hatday* in Wet Season

Name of the Market																			
Commo	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	42	67				2	177	38	4	1		23	23			96	9		
Rice	6		2	44		2	201	9						3					
Wheat	7																		
Flour	54			20	24	7		6			11					4			
Rice Cake	1			1	18		22												
Fish																			
Onion	4																		
Garlic																			
Turmeric	4																		
Banana			11	1					5					2					
Jack Fruit		7			2			175		4									
Mango					15														
Pine Apple		5								1		2							
Vegetable			1				5		11	3									
Chilly	9																		
Potato	5						16												
Dal	18				5		7												
Mustard	1																		
Ground nut	2				1														
Biscuit	2			1	10														
Salt	147	1		16	145			24								2			
Molasses	17							7											
Sugar	5				13														

Commodity-wise Outflow (in tones) by Markets on *Hatday* in Wet Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Edible oil	27				13													5	
Sand																		7	
Earth														5		2			
Wood	3			2		7		7											
Bamboo	1		4		14														
Jute good															8779				
Bolder														4				2	
Brick						1								1	1				
Cement	60				5	14													
Rod				4															
Cotton				6	43		2									2			
Fire wood															2	2			
Petroleum	192	2			19	2	3	7											
Fertilizer	86	45		20				17											
Empty drum	2				4														
Fodder					9														
Passenger	414	18	75	637	1267	100	57	689	354	314	58	401	238	408	45	351	77	50	371
Cattle																			
Tobacco	18																		
Others	128		3	89	88	3	13	236	23	31	5	4	5	25	10	39	14		
Total	1267	147	98	849	1704	142	510	1219	400	355	74	431	266	453	8840	501	101	67	372

Commodity-wise Outflow (in tones) by Markets on *Non-Hatday* in Dry Season

	Name of the Market																		
Commo	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	48	7					7					3							
Rice	38			129			283												
Wheat	3																		
Flour				15	37			18											
Fish							4												
Vegetable							2												
Chilly																			
Potato						11	33	25											
Dal						89													
Mustard							85												
Salt	14				79		7	44											
Edible oil							109												
Sand						211													
Wood				16			1												
Bamboo				24	6														
Jute wood				3	16		19												
Boulder							1								4873				
Brick	12																		
Cement							1												
Rod																			
Jute					1410														
Cotton				14															
Fire wood								92											

Commodity-wise Outflow (in tones) by Markets on *Non-Hatday* in Dry Season

Commo	Name of the Market																	
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Compani ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Petroleum	13	12																	
Fertilizer	31	12		15			21	15			1								
Empty drum					1														
Passenger	105		5	131	63	3	45	118	11		1	13	15	139	8		73		
Cattle																			
Others	145			70	37		50	49						4	1		48		
Total	414	33	5	421	1654	225	764	364	11		2	17	15	143	4882		121		

Commodity-wise Outflow (in tones) by Markets on *Non-Hatday* in Wet Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Company ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Paddy	77						14									59			
Rice	3			5		10		1											
Wheat							17												
Flour	46				48		15												
Rice Cake	9	22				17	15												
Fish						1													
Onion	12																		
Garlic																			
Turmeric	3																		
Jack Fruit					2			131											
Mango					9														
Pine Apple					5														
Vegetable									1										
Chilly	9																		
Dal							42												
Ground nut	3				4		3												
Biscuit	1																		
Salt	75				2	1	149												
Edible oil	10	1					3												
Sand															141			3	
Earth																		7	
Wood	7					13		14						1		9	9		
Bamboo																			

Commodity-wise Outflow (in tones) by Markets on *Non-Hatday* in Wet Season

Commo	Name of the Market																		
	Bhairab	Ashuganj	Kuliarchar	Narsingdi	Narayan ganj	Munshiganj	Katpatty	Barmi	Ajmiri ganj	Habiganj	Markuli	Sachna	Sunam ganj	Chhatak	Company ganj	Mahan ganj	Chamra ghat	Zakiganj	Sherpur
Jute good							1												
Bolder	7													9	7886				61
Brick																		4	
Cement		21																	
Jute					57														
Pesticides					2														
Fire wood								16											
Petroleum	93	7			1	9		3											
Fertilizer	37	103		1	14	13		17											
Fodder					16														
Passenger	303	9	46	156	1474	87	74	266	58	167	19	118	307	209	28	170	102	13	
Others	226	3			54	22	11	1		2			2	2		4			
Total	928	170	46	163	1694	176	350	454	59	173	19	118	311	221	8056	243	112	29	61

Volume In and Out (in tons) with Origins and Destinations Against Markets (covering *Hatdays* and *Non-Hatdays* in dry Season)

Name of the Market	Volume In with Origin					Volume Out with Destination				
	1	2	3	4	Total	1	2	3	4	Total
Bhairab Bazar	355	119	1537	452	2464	150	174	1353	407	2085
Ashuganj	249	135	301	25	712	1	62	148	1	212
Kuliarchar	101	48	9	9	169		64	5	65	134
Narsingdi	470	320	38	249	1078	159	397	13	225	796
Narayanganj	587	69	91	1019	1767	727	30	4	1967	2730
Munshiganj	707	4	75	1174	1962	291	69	79	389	830
Katpatty	1991	252	225	3087	5557	328		19	685	1032
Barmi	323	486	491	527	1829	148	366	265	518	1298
Ajmiriganj	93	17	290	13	414	20	5	22		48
Habiganj										
Markuli		24	24		48		9	1		11
Sachna	230	171	92	39	533	38	85	18	1	143
Sunamganj	1920	30	27	24	2003	32	45			77
Chhatak	11031	1604	513	11	13160	7	267	89	3	368
Companiganj	11159		13	7	11181	9758		10		9769
Mahanganj										
Chamraghat	197	205	157		560	2	224	77		305
Zakiganj										
Sherpur										
Total	**29413**	**3484**	**3883**	**6636**	**43437**	**11661**	**1797**	**2103**	**4261**	**19838**

Volume In and Out (in tons) with Origins and Destinations Against Markets (covering *Hatdays* and *Non-Hatdays* in Wet Season)

Name of the Market	Volume In with Origin					Volume Out with Destination				
	1	2	3	4	Total	1	2	3	4	Total
Bhairab Bazar	1069	169	1340	671	3250	485	90	1153	467	2196
Ashuganj	306	448	2262	388	3405	3	20	200	93	317
Kuliarchar	29	174	44	194	442	20	69	10	44	144
Narsingdi	735	410	102	900	2148	512	347	53	99	1013
Narayanganj	3808	73	648	1373	5903	2743	58	214	383	3399
Munshiganj	444	69	247	643	1405	254	27	21	15	319
Katpatty	1664	83	1581	4936	8266	262	105	174	319	860
Barmi	664	381	138	1098	2283	387	311	196	779	1674
Ajmiriganj	507	153	396	44	1101	257	69	116	16	459
Habiganj	87	534	47	36	705	35	440	46	6	529
Markuli	23	30	90	25	170		26	66		93
Sachna	407	235	211	30	885	301	174	74		550
Sunamganj	2480	1015	68		3564	244	284	49		578
Chhatak	779	4910	6009		11700	424	150	100		675
Companiganj	30649				30649	89	16807			16897
Mahanganj	315	200	720		1235	229	111	404		744
Chamraghat	125	211	115	9	461	67	95	42	9	213
Zakiganj	74				74	96				96
Sherpur	455		4		459	361		72		433
Total	**44620**	**9095**	**14022**	**10347**	**78084**	**6769**	**19183**	**2990**	**2230**	**31172**

No.of Boats Against Market Places on the *Hatdays* with (their performances and earning) the Services Offered and Income Generated in their Incoming Trips of Dry Season

Name of the Market	No of Boats Attended	Volume Carried	Ton-miles Transported	Earning in the Incoming Trip	No. of Crew
Bhairab Bazar	289	1609	173320	295472	1157
Ashuganj	74	479	25541	68583	302
Kuliarchar	100	138	1469	13498	310
Narsingdi	189	648	8988	70930	601
Narayanganj	324	1035	50426	167958	785
Munshiganj	374	1675	192360	277897	1116
Katpatty	326	1860	104751	340049	903
Barmi	450	1411	26399	172725	1245
Ajmiriganj	101	275	18303	49331	332
Habiganj					
Markuli	16	17	146	4023	47
Sachna	130	478	23353	124465	410
Sunamganj	1113	1035	12068	176435	2290
Chhatak	1056	6936	102754	518134	2932
Companiganj	4021	5942	36931	979524	8865
Mahanganj					
Chamraghat	100	391	11625	116990	338
Zakiganj					
Sherpur					
Total	8663	23935	788440	3376022	21633

No. of Boats Against Market Places on the *Hatdays* with (their performances and earning) the Services Offered and Income Generated in their Incoming Trips of Wet Season

Name of the Market	No of Boats Attended	Volume Carried	Ton-miles Transported	Earning in the Incoming Trip	No. of Crew
Bhairab Bazar	701	1926	95910	232167	1926
Ashuganj	265	2203	127315	428954	1175
Kuliarchar	136	352	3908	40563	315
Narsingdi	575	1841	104550	294516	1744
Narayanganj	3266	2869	60916	250327	6042
Munshiganj	268	462	11829	50200	565
Katpatty	640	4356	357175	913449	1871
Barmi	603	1633	23463	221162	1837
Ajmiriganj	654	1011	18400	176441	1592
Habiganj	442	382	4179	118083	1214
Markuli	143	141	6699	32250	307
Sachna	1154	686	12683	186855	2134
Sunamganj	1281	1942	15987	270872	2908
Chhatak	2182	5833	54326	543210	5218
Companiganj	9630	15753	86128	1868354	21578
Mahanganj	475	822	20437	168076	1170
Chamraghat	149	257	7230	65153	418
Zakiganj	76	57	377	10290	176
Sherpur	1032	411	511	28217	2115
Total	**23672**	**42948**	**1012032**	**5899151**	**54305**

No. of Boats Against Market Places on the *Non-Hatdays* with (their performances and earning) the Services Offered and Income Generated in their Incoming Trips of Dry Season

Name of the Market	No of Boats Attended	Volume Carried	Ton-miles Transported	Earning in the Incoming Trip	No. of Crew
Bhairab Bazar	266	854	30118	105374	713
Ashuganj	40	233	14042	36259	157
Kuliarchar	20	30	224	4131	62
Narsingdi	180	429	20318	66446	590
Narayanganj	250	732	32011	112225	655
Munshiganj	102	287	20604	60311	307
Katpatty	716	3697	326446	594332	2059
Barmi	157	417	15159	72315	392
Ajmiriganj	36	139	6541	23349	128
Habiganj					
Markuli	7	30	2252	3512	25
Sachna	46	55	569	9451	133
Sunamganj	1039	968	7464	160187	2117
Chhatak	991	6223	33813	393961	2709
Companiganj	3981	5238	31926	933007	8656
Mahanganj					
Chamraghat	53	169	7070	56569	161
Zakiganj					
Sherpur					
Total	**7884**	**19507**	**548563**	**2631434**	**18864**

No. of Boats Against Market Places on the *Non-Hatdays* with (their performances and earning) the Services Offered and Income Generated in their Incoming Trips of Wet Season

Name of the Market	No of Boats Attended	Volume Carried	Ton-miles Transported	Earning in the Incoming Trip	No. of Crew
Bhairab Bazar	589	1322	41988	162761	1492
Ashuganj	140	1201	50143	208019	617
Kuliarchar	68	90	583	8720	149
Narsingdi	216	307	9043	40801	657
Narayanganj	4881	3033	39563	230436	8526
Munshiganj	391	942	66292	190878	787
Katpatty	475	3909	293174	836044	1456
Barmi	317	650	4665	57038	827
Ajmiriganj	117	89	772	22054	220
Habiganj	335	322	4201	81576	1047
Markuli	47	28	242	3468	97
Sachna	376	198	2000	36074	765
Sunamganj	1208	1621	13691	285455	2835
Chhatak	1774	5866	54011	521058	4300
Companiganj	8966	14896	81811	1744013	20047
Mahanganj	208	413	10273	79491	595
Chamraghat	284	203	4798	43367	647
Zakiganj	27	17	130	3531	68
Sherpur	33	48	594	5494	110
Total	**20452**	**35165**	**677984**	**4560286**	**45242**

Annexure - 12

TRANSPORT SECTOR STUDY
NORTHEAST REGIONAL PROJECT, FLOOD ACTION PLAN - 6
Origin-destination Survey
Yearly Movement of Major Commodities and their Intermodal Share

Name of the Market: ..... Thana .....

Incoming					Outgoing			
1	2	3	4	5	6	7	8	9
Sl.No of *Arots*	Name of Commodities	Amount in mds	Origin	Mode of Transport	Name of Commodity	Amount in mds	Destination	Mode of Transport

Name of the Investigator: ..... Date of Interview: .....

1 = Country Boat, 2 = Formal IWT, 3 = Road, 4 = Rail

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
PADDY

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	89185	89185			
Ashuganj	73777	73777			
Kuliarchar	8888	8888			
Narsingdi	6222	6222			
Narayanganj					
Munshiganj	154815	154815			
Katpatty	613333	84666	42666	486000	
Barmi	110189	47174		63015	
Ajmiriganj	18518	18518			
Habiganj	70926	69907		1018	
Markuli	4888	4888			
Sachna	18518	18518			
Sunamganj	9796	9796			
Chhatak	3333	3333			
Companiganj					
Mahanganj	27881	22548		5333	
Chamraghat	4444	4444			
Zakiganj	2037			2037	
Sherpur					
Total	**1216757**	**616686**	**42666**	**557404**	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
RICE

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	68481	14333	4777	1274	48096
Ashuganj	67444	67444			
Kuliarchar	5777	3466		2311	
Narsingdi	219259	134814	20148	55851	8444
Narayanganj	49342	17409		31933	
Munshiganj	1487	798		688	
Katpatty					
Barmi					
Ajmiriganj	408	408			
Habiganj	8999	2872		6127	
Markuli	308	308			
Sachna	3249		3249		
Sunamganj	6083			6083	
Chhatak	4114	3291		822	
Companiganj	3146	2761		385	
Mahanganj	2156	2156			
Chamraghat	74			74	
Zakiganj	681			681	
Sherpur	135			135	
Total	**441149**	**250065**	**28174**	**106368**	**56540**

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
WHEAT AND FLOUR

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	35822		35822		
Ashuganj	2296	918		1377	
Kuliarchar	874	332		541	
Narsingdi	7682	2260		5422	
Narayanganj	156518	31018		125499	
Munshiganj	705	705			
Katpatty	3463	1463	703	1296	
Barmi	11851	11851			
Ajmiriganj	185	129	55		
Habiganj	2993			2993	
Markuli	215	215			
Sachna	388	77	311		
Sunamganj	372		372		
Chhatak	433	433			
Companiganj	40	40			
Mahanganj	22222			22222	
Chamraghat	210	114		95	
Zakiganj	64			64	
Sherpur	37			37	
Total	**246378**	**49561**	**37265**	**159551**	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
JUTE AND JUTE GOODS

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	6666	6666			
Ashuganj	2111	2111			
Kuliarchar	2311	1386		924	
Narsingdi	14814	11148	2925	740	
Narayanganj	318889	253352		65537	
Munshiganj					
Katpatty					
Barmi	5925	5925			
Ajmiriganj	86	86			
Habiganj					
Markuli	115	115			
Sachna	38	8	29		
Sunamganj					
Chhatak					
Companiganj					
Mahanganj	2392	2392			
Chamraghat	577			577	
Zakiganj					
Sherpur					
Total	**353930**	**283194**	**2955**	67780	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
FERTILIZER

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	187037	18518	168518		
Ashuganj	110962	18518	92444		
Kuliarchar	1351	675	675		
Narsingdi	24301	7894		16407	
Narayanganj	444444	3749	440694		
Munshiganj	2142	1927		214	
Katpatty	1300		1300		
Barmi	31629	11070	20559		
Ajmiriganj	1185	1185			
Habiganj	433	1	16	414	
Markuli	1155	1155			
Sachna	5092		5092		
Sunamganj	1721			1721	
Chhatak	6111	3666			2444
Companiganj	277	277			
Mahanganj	25999	10344		15655	
Chamraghat	3555	3555			
Zakiganj	66			66	
Sherpur	22			22	
Total	**848789**	**82542**	**729301**	**34501**	**2444**

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
CEMENT

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	138666		138666		
Ashuganj	22222		22222		
Kuliarchar	1691	1691			
Narsingdi	6200	619		5579	
Narayanganj	80133			80133	
Munshiganj	1695	1695			
Katpatty	3284	3284			
Barmi	669			669	
Ajmiriganj	407	407			
Habiganj	8238	90		8148	
Markuli	114	114			
Sachna	648	648			
Sunamganj	1540			1540	
Chhatak	4613			4613	
Companiganj					
Mahanganj	1356	1356			
Chamraghat					
Zakiganj	614			614	
Sherpur	111	111			
Total	**272208**	**10019**	**160888**	**101300**	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
POL

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	124444		124444		
Ashuganj	28839		28839		
Kuliarchar	676	676			
Narsingdi	2074			2074	
Narayanganj	809768	10350	799418		
Munshiganj	2298	2068		229	
Katpatty	329	329			
Barmi	8320	1663		6655	
Ajmiriganj	470	470			
Habiganj	16560			16560	
Markuli	166	166			
Sachna	2370		2370		
Sunamganj	1333			1333	
Chhatak	1771			1771	
Companiganj	34	34			
Mahanganj	1185	585		599	
Chamraghat	115	115			
Zakiganj	162	48		114	
Sherpur					
Total	**1000921**	**16509**	**955072**	**29339**	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
SALT

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	58740	46992	11748		
Ashuganj	693	693			
Kuliarchar	2306	2306			
Narsingdi	4622	4414		207	
Narayanganj	277036	198459	78577		
Munshiganj	1837	1821		15	
Katpatty	112	112			
Barmi	15407	12325	3081		
Ajmiriganj	7318	7318			
Habiganj	1001			953	47
Markuli	925	925			
Sachna	1666		1666		
Sunamganj	831		831		
Chhatak	4200	1049	2520	629	
Companiganj	92	92			
Mahanganj	1662	562			1099
Chamraghat	115	77		38	
Zakiganj	509	101		407	
Sherpur	71			71	
Total	**379154**	**277255**	**98425**	**2325**	**1146**

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
MOLASSES

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	39911	16799			23111
Ashuganj	211	211			
Kuliarchar	98	98			
Narsingdi	4777	4538		238	
Narayanganj	18655	12186	162	6307	
Munshiganj	87	79		8	
Katpatty	38044	24984		13059	
Barmi	7407	5925		1481	
Ajmiriganj	192		192		
Habiganj	122			122	
Markuli	107	107			
Sachna	444	370	74		
Sunamganj	770		770		
Chhatak	272	272			
Companiganj	11	11			
Mahanganj	664			664	
Chamraghat	38			38	
Zakiganj	6			6	
Sherpur	9			9	
Total	**111834**	**65586**	**1199**	**21937**	**23111**

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Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
WOOD

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	53155	43333		9822	
Ashuganj	2322	2322			
Kuliarchar	770	385		385	
Narsingdi	59407	33822		25585	
Narayanganj	19399	12023		7375	
Munshiganj	2028	405	1622		
Katpatty	4412	1203	1816	1391	
Barmi	5866	5866			
Ajmiriganj	4766	4766			
Habiganj	7037			7037	
Markuli	111	111			
Sachna	288	288			
Sunamganj	3148	1574		1574	
Chhatak	5816	5816			
Companiganj					
Mahanganj	11822	11822			
Chamraghat	10229			10229	
Zakiganj	3333	166		3166	
Sherpur	33			33	
Total	**193948**	**123909**	**3439**	**66600**	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
SAND

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	9259	5555	3703		
Ashuganj	3518	1296	370	1851	
Kuliarchar	3703	3703			
Narsingdi	8592	7511		1081	
Narayanganj	1022555	521555	500999		
Munshiganj	12166	12166			
Katpatty	9462	9462			
Barmi	5555	5555			
Ajmiriganj	9259	9259			
Habiganj	7407	7407			
Markuli	14	14			
Sachna	2755555	1102222	1653333		
Sunamganj	202500	202500			
Chhatak	101388	101388			
Companiganj					
Mahanganj	4740	4740			
Chamraghat	3703	3703			
Zakiganj	7407	7407			
Sherpur					
Total	4166792	2005451	2158407	2933	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
BOULDER/SHINGLES

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	22222	5555	16666		
Ashuganj	54074		54074		
Kuliarchar	2962	2962			
Narsingdi	8296		8296		
Narayanganj	446422		446422		
Munshiganj					
Katpatty					
Barmi					
Ajmiriganj					
Habiganj	4000			4000	
Markuli					
Sachna					
Sunamganj	115925	115925			
Chhatak	2267476	2267476			
Companiganj	2267476	2267476			
Mahanganj	370	370			
Chamraghat	74074	74074			
Zakiganj					
Sherpur					
Total	5263301	**4733842**	**525459**	**4000**	

Yearly Inflow of Commodity (in tons) and its Intermodal Share against Markets
OTHERS

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	384669	113559	231476	39633	
Ashuganj	31761	14592		17119	49
Kuliarchar	37244	12216	2977	21133	916
Narsingdi					
Narayanganj	157452	67364	671	89415	
Munshiganj	36444	26666		9777	
Katpatty	84483	41980	4360	38142	
Barmi	277			277	
Ajmiriganj	9046	6402		2365	277
Habiganj					
Markuli	24172	23496		676	
Sachna	29303	13896	15407		
Sunamganj	10796	4835		5960	
Chhatak	9504	337		9166	
Companiganj					
Mahanganj	42557	35159	85	7142	169
Chamraghat	356	356			
Zakiganj					
Sherpur	666			666	
Total	**858738**	**360865**	**254979**	**241479**	**1413**

Annexure - 14

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
PADDY

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	89185	22296	66888		
Ashuganj	73777	62666		11111	
Kuliarchar	8888	5333		3555	
Narsingdi					
Narayanganj					
Munshiganj					
Katpatty					
Barmi					
Ajmiriganj	18518	18518			
Habiganj	60741			60741	
Markuli	4888	4888			
Sachna	18518	9259		9259	
Sunamganj	9796	2592		7203	
Chhatak					
Companiganj					
Mahanganj	21881	18147		3733	
Chamraghat	4444	2777		1666	
Zakiganj	2037			2037	
Sherpur					
Total	312677	146481	66888	99307	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
RICE

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	68480	68480			
Ashuganj	67444	27777		39666	
Kuliarchar	5777	1733		4044	
Narsingdi	207148	153805		53342	
Narayanganj	49342	9868		39474	
Munshiganj	103338	76537	25462	1338	
Katpatty	441333	330999	110333		
Barmi	79417	55525		23891	
Ajmiriganj	408	408			
Habiganj	16639			16639	
Markuli	308	154		154	
Sachna	3249	3249			
Sunamganj	6083	6083			
Chhatak	7447	4624		2822	
Companiganj	3146	922		2224	
Mahanganj	2097	2097			
Chamraghat	74	37		37	
Zakiganj	681	34		647	
Sherpur	135			135	
Total	**1062554**	**742340**	**135796**	**184417**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
WHEAT AND FLOUR

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	36399	30506	4160	1733	
Ashuganj	555			555	
Kuliarchar	874			874	
Narsingdi	6653	598		6055	
Narayanganj	104455	18279		86175	
Munshiganj	705			705	
Katpatty	2130	1000		1130	
Barmi	11851	7462		4388	
Ajmiriganj	185	185			
Habiganj	1808			1808	
Markuli	215	107		107	
Sachna	385	385			
Sunamganj	372	186		186	
Chhatak	438	438			
Companiganj	40	20		20	
Mahanganj	22222	22222			
Chamraghat	143	43		100	
Zakiganj	64			64	
Sherpur	37			37	
Total	**189541**	**81437**	**4160**	**103943**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
JUTE AND JUTE GOODS

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	6666	6555		111	
Ashuganj	2222			2222	
Kuliarchar	2311	1848		462	
Narsingdi	14814	11925	2200	688	
Narayanganj	318889	23333	218490	77064	
Munshiganj					
Katpatty					
Barmi	5925	5925			
Ajmiriganj	86	43		43	
Habiganj					
Markuli	115	57		57	
Sachna	38	38			
Sunamganj					
Chhatak					
Companiganj					
Mahanganj	2222	2222			
Chamraghat	577	577			
Zakiganj					
Sherpur					
Total	**353870**	**52529**	**220690**	**80650**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
FERTILIZER

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	187037	162611	814	23611	
Ashuganj	29868			29868	
Kuliarchar	1351	1351			
Narsingdi	15894	3713		12180	
Narayanganj	441667	259028	5555	177083	
Munshiganj	2142	642		1499	
Katpatty	1300	1040		260	
Barmi	31629			31629	
Ajmiriganj	1185	829		355	
Habiganj	433			433	
Markuli	1155	577		577	
Sachna	5092	1935		3157	
Sunamganj	1721	860		860	
Chhatak	1611	1208		402	
Companiganj	277			277	
Mahanganj	26000	15433		10566	
Chamraghat	3555			3555	
Zakiganj	66			66	
Sherpur	22			22	
Total	**752010**	**449231**	**6370**	**296408**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
CEMENT

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	138666	75733		62933	
Ashuganj	22221	1666	2962	17592	
Kuliarchar	1691	909		782	
Narsingdi	6200	1140		5060	
Narayanganj	80133	28275		51857	
Munshiganj	1695	84		1610	
Katpatty	3284			3284	
Barmi	947	625		322	
Ajmiriganj	407	407			
Habiganj	8238	122		8115	
Markuli	114	114			
Sachna	648	486		162	
Sunamganj	1540	924		616	
Chhatak	4151	276	3736	138	
Companiganj					
Mahanganj	1354	1284		69	
Chamraghat					
Zakiganj	614			614	
Sherpur	111			111	
Total	**272021**	**112051**	**6698**	**153271**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
POL

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	124444	117555	4444	2444	
Ashuganj	28814	1851		26962	
Kuliarchar	676	338		338	
Narsingdi	2074	2074			
Narayanganj	751503	53338	232820	465344	
Munshiganj	2298	919		1378	
Katpatty	329			329	
Barmi	8320	7904		416	
Ajmiriganj	470	470			
Habiganj	4393	405		3987	
Markuli	166	166			
Sachna	2370	2370			
Sunamganj	1333	999		333	
Chhatak	1697	848		848	
Companiganj	34	17		17	
Mahanganj	1111	622		488	
Chamraghat	115	92		23	
Zakiganj	162			162	
Sherpur					
Total	**930316**	**189975**	**237264**	**503076**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
SALT

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	58740	58740			
Ashuganj	693			693	
Kuliarchar	2306			2306	
Narsingdi	4622	4160		462	
Narayanganj	193926	51566		142359	
Munshiganj	1837			1837	
Katpatty	99			99	
Barmi	15407	12094		3312	
Ajmiriganj	7318	7318			
Habiganj	1001	74		926	
Markuli	925	925			
Sachna	1592	1592			
Sunamganj	831	415		415	
Chhatak	19500	11700		7799	
Companiganj	92	46		46	
Mahanganj	1662	1662			
Chamraghat	115	57		57	
Zakiganj	509			509	
Sherpur	71			71	
Total	**311257**	**150357**		**160900**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
MOLASSES

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	39911	28759		11151	
Ashuganj	211			211	
Kuliarchar	98			98	
Narsingdi	4685	4170		514	
Narayanganj	21546	6780		14765	
Munshiganj	87	8		79	
Katpatty	38034	35803		2230	
Barmi	7407	4740		2666	
Ajmiriganj	192	192			
Habiganj	122	11		110	
Markuli	107	53		53	
Sachna	444	444			
Sunamganj	770	385		385	
Chhatak	272	272			
Companiganj	11			11	
Mahanganj	664	664			
Chamraghat	38	19		19	
Zakiganj	6			6	
Sherpur	9			9	
Total	**114622**	**82307**		**32314**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
WOOD

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	53155	28253		24902	
Ashuganj	3255			3255	
Kuliarchar	4237	4000		237	
Narsingdi	56296	27414		28881	
Narayanganj	19777	988		18788	
Munshiganj	2027	1318		709	
Katpatty	4354	3462		892	
Barmi	5866	586		5279	
Ajmiriganj	4766	4766			
Habiganj	7037	188		6848	
Markuli	111	111			
Sachna	288	288			
Sunamganj	3148	629		2518	
Chhatak	5816	5816			
Companiganj					
Mahanganj	11822	11822			
Chamraghat	10229	10229			
Zakiganj	3333	166	633	2533	
Sherpur	333	33		299	
Total	**195858**	**100077**	**633**	**95147**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
SAND

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar					
Ashuganj	6851		1851	5000	
Kuliarchar	3703			3703	
Narsingdi	18325			18325	
Narayanganj	1022555			1022555	
Munshiganj	12166			12166	
Katpatty	9462			9462	
Barmi	5555			5555	
Ajmiriganj	9259	9259			
Habiganj	7407			7407	
Markuli	14			14	
Sachna	2733333	88888	2644444		
Sunamganj	202500		202500		
Chhatak	101388		40555	60833	
Companiganj					
Mahanganj	5185	5185			
Chamraghat	3703			3703	
Zakiganj	7407			7407	
Sherpur					
Total	**4148821**	**103333**	**2889351**	**1156136**	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
BOULDER/SHINGLES

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar					
Ashuganj	54074			54074	
Kuliarchar	2962			2962	
Narsingdi	8296			8296	
Narayanganj	446392		3650	442742	
Munshiganj					
Katpatty					
Barmi					
Ajmiriganj					
Habiganj	4000	2400		1600	
Markuli					
Sachna					
Sunamganj	115925		115925		
Chhatak	2105257	83333	1890347	131577	
Companiganj	2267476	2267476			
Mahanganj	370	370			
Chamraghat	74074			74074	
Zakiganj					
Sherpur					
Total	5078831	2353580	2009923	715327	

Yearly Outflow of Commodity (in tons) and its Intermodal Share against Markets
OTHERS

Commodity Market	Total Volume	Mode of Transport			
		Mode - 1	Mode - 2	Mode - 3	Mode - 4
Bhairab Bazar	384702	230121	19209	133729	1642
Ashuganj	23692	19548		4013	129
Kuliarchar	36996	30002		2369	4624
Narsingdi					
Narayanganj	143230	14993	10963	117273	
Munshiganj	36444	36444			
Katpatty	70249	40314	11638	18296	
Barmi					
Ajmiriganj	9046	7417		1629	
Habiganj					
Markuli	24150	23357	721	71	
Sachna	29290	24975		4314	
Sunamganj	10796	1685		9111	
Chhatak	9504		9166	337	
Companiganj					
Mahanganj	42557	4401		14915	23240
Chamraghat	356	319		37	
Zakiganj					
Sherpur	666			666	
Total	**821686**	**433582**	**51699**	**306766**	**29637**