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Development of Small-Scale Fisheries

PILOT SURVEY OF SET BAGNET
FISHERY OF BANGLADESH

BOBP/WP/34



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FISHERY OF BANGLADESH

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This paper describes the conduct and the findings of a pilot survey of the set bagnet fishery of Bangladesh which is believed to account for at least one third of the total catch from the marine small-scale fisheries.

The survey was planned by the BOBP's project officer in Bangladesh and executed by the staff of the Marine Fisheries Department, Chittagong, with the department's statistics officer as the team leader. He was assisted by three inspectors of fisheries. Between January and June 1983, when the survey was conducted, a total of 172 fishermen and *bahardars* all along the coast and at Dubla Char, Sonar Char and Sonadia Island, were interviewed.

The survey was by no means exhaustive, but it is hoped that it will throw some light on the present status of a traditional fishery which will continue to play an important role.

The survey was an activity of the small-scale fisheries project of the Bay of Bengal Programme. The project began in 1979 from Madras. It is funded by SIDA (Swedish International Development Authority), and executed by the FAO (Food and Agriculture Organization of the United Nations). Countries bordering the Bay of Bengal – Bangladesh, India, Malaysia, Sri Lanka and Thailand – are members of the project. Its main aims are to develop, demonstrate and promote appropriate technologies and methodologies to improve the conditions of small-scale fisherfolk in member countries.

This document is a working paper and has not been cleared either by the FAO or by the government concerned.

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Abbreviations used

BU	—	Number of bahardar units or fishermen units
MB	—	Number of motorized boats
MF	—	Number of marine fishermen engaged in fishing
MU	—	Number of motorized units
NMB	—	Number of non-motorized boats
NMU	—	Number of non-motorized units
SBN	—	Number of set bagnets

1. INTRODUCTION

Small-scale fisheries account for about 95% of the total marine catch of Bangladesh*. At least one third of the production is believed to be contributed by set bagnets, locally called *behundi*, which capture species such as ribbon fish, prawns, shad, anchovies, pomfrets and Bombay duck, in estuarine and marine inshore waters all along the coastline of Bangladesh.

During recent years, the set bagnet fishery has undergone changes, mainly through the introduction of motorized boats and synthetic material, which have extended its operational area further offshore and also led to the use of larger fishing units in terms of size and number of set bagnets, as well as size and number of boats, engaged in the fishing operation. This development, however has been brought about more or less indigenously without much outside assistance from national and international agencies concerned with fisheries development.

During the last three years, however, the small-scale fisheries project of the Bay of Bengal Programme, in cooperation with the Directorate of Fisheries, Bangladesh, has undertaken experiments to improve the *behundi* nets.

The experiments are aimed at testing the techno-economic feasibility of modified set bagnet designs as well as the cost effectiveness of cheaper polyethylene (PE) twine for fabrication of netting instead of polyamide (PA nylon).

In order to evaluate different development alternatives and to assess their potential impact and requirements, an up-to-date information base is necessary.

In the case of Bangladesh's set bagnet fishery, the latest available data were collected during the fisheries census in 1967/68. The sample survey presented in this working paper was carried out in 1983. It aims at describing the changes which have taken place in Bangladesh's set bagnet fishery since the last fisheries census.

By comparing the number of set bagnets and fishing craft in sample fishing villages (Appendix 1) with the census figures and by including a number of recently established fishing villages and camps, an estimate has been made of the total number of set bagnets and marine and estuarine fishing craft operated at present in Bangladesh. Besides updating old census figures, the survey also covers craft and fishing gear presently operated from the three most important seasonal centres of set bagnet fishing (Appendix 2) as well as the districts from where the fishing units originate.

Both parts of the survey show the extent to which motorized fishing boats have been introduced and the impact they have had on the operation of non-motorized boats.

Because of problems such as inaccessibility of some selected villages and non-availability of some selected fishing units during the time of data gathering, the sample finally chosen is not a representative one, if strict statistical criteria are applied. This is particularly so with regard to the technical specifications of set bagnets and the estimate of the total twine requirement.

Considering the remoteness and wide dispersal of set bagnet fishing camps and villages, their sometimes seasonal character, and the operational pattern (large units stay for weeks out in the sea), a truly representative sample survey would require considerable effort transportation facilities, staff, funds, etc.

Despite the shortcomings, this paper throws some light on the present status of a traditional fishery which is likely to play an important role in future too, to meet the ever increasing demand for fish in Bangladesh.

2. CONDUCT OF SURVEY

2.1 Method

The survey aimed at collecting the following information

- a) Number of set bagnet fishing units, set bagnets, motorized and non-motorized fishing craft, including those used for types of fishing other than the operation of set bagnets;
- b) Specifications of types of fishing craft;

*The term "small-scale fisheries" in Bangladesh covers craft up to 45 feet in length, including motorized fishing boats.

- c) Specifications of types of *behundi* nets;
- d) Cost/value of types of fishing craft and *behundi* nets;
- e) Size, composition and remuneration of crew;
- f) Particulars of fishing operations; and
- g) Catch composition and value of catch during the past 24 hours.

To collect this information, interviews and observations/measurements were carried out at various levels. The survey units were selected in two or three stages, depending on the type of information required. On the basis of a sample frame provided by the 1967/68 fisheries census*, 10% of all marine fishing villages/camps of each coastal district were selected at random,

When conducting the survey it was found, however, that some villages were inaccessible considering the transport facilities available and the travel schedule of the investigator teams. Therefore, in some cases, fishing villages originally selected were omitted without being replaced by other villages. In other cases, new villages, established only after the last census, were discovered and were also included in the sample, i.e., the 10% population-sample ratio was not strictly followed,

To collect the information on number of units, nets and craft, all heads of households or fishing units, residing in the village/camp were interviewed and wherever possible, their answers were checked by observation.

For detailed measurements of the nets, which have been used to classify them into large, medium and small nets, forming the base for the estimation of the total twine requirement, only some of the set bagnets owned by the respondents were selected as third stage sample units, according to the availability of nets at the time of the visit of the investigator team.

The selection of the second and third stage sample units was done purposively and not randomly and covered only a very small portion of the first stage sample units. The survey presented in this paper is, therefore, a pilot survey and not a fully representative one, with regard to information obtained under (b) to (g).

The results obtained with regard to (a) should also be considered with some caution, because of the difficulties in implementing the sample scheme mentioned earlier.

2.2 Execution of survey

The survey was planned by the Project Officer, BOB P. and executed by the staff of the Marine Fisheries Department based at Chittagong. The work was carried out during the period January – June 1983. The survey of the centres of Dubla Char, Sonar Char and Sonadia islands was carried out in January while the 51 villages on the coast were surveyed from January to June. The Statistics Officer of the Marine Fisheries Department was the team leader and he was assisted by three Inspectors of Fisheries. Two officers formed one investigator team.

A total of 172 *tishermen/bahardars* were interviewed and one questionnaire was completed for each respondent. Information on the number of boats and nets and the number of family members engaged in fishing was collected from the heads of all fisherfolk households of the 51 surveyed villages (see Appendix 1).

3. PRIMARY INFORMATION

3.1 Fishing operation

The set bagnets or *behundi* nets are fixed tapering nets, which are set in tidal currents by attaching them to holdfasts. A *behundi* has a rectangular mouth opening. It is made up of four panels. Two wings extend the sides of the mouth to increase the effective fishing width of the net and to herd fish into the mouth opening. The mesh size decreases from mouth to codend (see Appendix 3).

The census was carried out by a FAO/UNDP project, and presented in "Report on Marine Village Identification Survey in Bangladesh 1967/68". UNDP Project Publication No. 2, Pre-Investment Survey for the Development of Fisheries in Bangladesh, 1972.

To keep the mouth of the net open, two vertical bamboo poles are fastened to the forward corners of the upper and lower panels which are reinforced by gussets of netting. The length of the bamboo poles varies with the size of the nets, and varies from five to seven metres. The diameter of the poles ranges from 12 to 16 cm. The net is held in fishing position against the current by linking the wing tips to holdfasts by means of long bamboo poles and steel wires. The set bagnet catches species of fish which drift with the current or do not swim fast enough to stem the current and maintain a fixed position in relation to the sea. At each change of tide, the net comes to the surface. It is emptied and reversed in the opposite direction ready for fishing. Because of the difficulties of embedding the wooden stakes in the seabed, this method of fishing is restricted to waters about 20 metres in depth.

Behundi fishing is carried out in river estuaries, in the sea close to the shore, or further out in the sea. The depth of water and the distance from the shore determine whether small, medium or large units of *behundi* are operated, as well as the number and size of boats and nets.

A small unit consists of one country craft, locally called dinghy, operating one or two small *behundi* nets in a river.

A medium unit has one or two country crafts and one or two medium size *behundi* nets which are set in inshore waters close to the shore. A large unit consists of one large country craft or motorized carrier boat, propelled by a small (22 hp) diesel engine, plus one or more country crafts and operates 4 to 10 large *behundi* nets in inshore waters at some distance from the shore. (Locations are indicated in Appendix 2.)

Large units usually stay out in the sea throughout the fishing season except during rough weather or when faced with net or boat damages or other calamities, while a carrier boat takes the catch ashore and returns with supplies for the crew members. The carrier boat is also used for changing the crew.

The operation of set bagnets in the sea requires calm weather. Therefore, large units operate generally from September to February while medium and small units setting their nets in estuarine areas operate throughout the year.

3.2 Working pattern

A typical feature of set bagnet operations involving large units, is the temporary fishing camp, which is established at the beginning of the season in September or October and wound up again in February at the end of the season. In case of large units, the complexity of the operation as well as the size of the required capital investment has led to the need for an elaborate management and ownership function performed by the bahardar*. A bahardar is a fishing entrepreneur who is usually not engaged in fishing himself, nor spends all his time in the fishing camp. He recruits the members of the fishing unit, provides the country craft and the carrier boat necessary for the set bagnet operation, advances loans to crew members, and supplies the fishing gear, nets, bamboos, holdfasts, steel wires, mending twines, etc. He takes care of shore expenses, such as construction of units, fences, mats and drying racks and arranges for procurement of supplies and the sale of catch.

The overall management of the fishing unit at the fishing ground is entrusted to a person called 'changua' (manager), who, besides exercising overall charge, stays in the fishing camp in the absence of the bahardar and instructs the shore labourers ('dulanga', 'faltu'), who sort and dry fish, handle supplies, repair equipment, etc. A cook (baburchi) completes the shore team.

In charge of the fishing operations at sea is the 'bara majhi' (head fisherman). He decides on the location where the nets are to be set. Under him one or several 'chhota majhis' are in charge of the other boat/boats engaged in the operation. The crew members of each boat are called 'danti'. The crews usually take turns in either attending the net in the sea or carrying the catch ashore.

In case of small and medium units, a small crew operating in a smaller non-motorized boat carries out both functions, i.e., attending to the net and carrying the catch ashore. Since these units usually do not operate from temporary camps but from their home village, shore labourers are not required.

A detailed description of the organization of a fishing unit is given by Raychaudhuri in "The Moon and Net. Study of a Transient Community of Fishermen at Jambudweep," Anthropological Survey of India, Calcutta, 1980.

3.3 Remuneration

Basically there are two systems of remuneration : on share basis or a fixed salary basis. Systems and rates, however, vary widely between different coastal districts and also within each district.

Some typical differences can be observed between large and medium units. The figures given below are, therefore, only indicative and should not be generalized.

– Large units

Wage System : Head fishermen get a basic salary of Tk 6,500-16,500 per fishing season. An engine driver of motorized fishing boats earns Tk 4,500-10,000, a crew member Tk 3,000-4,500 and a shore labourer Tk 1,500-2,500 per fishing season.

Share system : Three common systems were observed during the survey, the first one being a genuine sharing system, the second one a combination of a sharing and a wage system, and the third one a sharing system where boats and nets are rented or contributed by members of the unit. They are listed below:

1. Boats	2 shares for each boat of the unit
Nets:	2 shares for each net of the unit
Majhis (master fishermen)	1.5 shares each
Engine drivers	1.25 shares each
Crew and shore labourers	1 share each
2. Boats:	1 share each
Nets	1 share each
Head majhi	Fixed wage
Engine driver, crew and shore labourers:	Monthly/seasonal wage
3. Boats:	Rent on monthly or lunar cycle basis
Nets:	Contributed by bahardar or crew members or rented
Majhis	1.25 – 1.5 shares each
Engine Drivers:	1.0 – 1.25 shares each
Crew and shore labourers	Monthly/seasonal wage or 1 share each

– Medium and small units

Sharing system : Separate shares for boat and net (each one share) are taken by the owners and the rest is **equally divided among fishermen**. In the case of small and medium units the wage system hardly plays any role*.

4. RESULTS

4.1 Marine fishing villages/camps

The fisheries census of 1967/68 shows a total of 706 marine fishing villages in the five coastal districts. In course of the survey of 51 sample villages, 105 new set bagnet fishing villages have been identified (see Appendix 5). Thus the number of marine fishing villages in Bangladesh stands at 811 with indications that even more new fishing villages would be discovered if a comprehensive survey were undertaken.

The newly identified villages/fishing camps are all situated in the districts of Barisal, Patuakhali, Khulna and Jessore, the majority being located in the Khulna district.

- Changes in traditional sharing systems and their causes are discussed by Raychaudhuri, 1980 p. 20ff. He also compares wage and sharing systems with regard to working patterns of fishing units.

4.2 Fishing units

Different types of motorized and non-motorized boats are used in set bagnet operations.

Motorized boats (engine nauka) are made of wooden planks 13-15 m in length and fitted with 22-33 hp engine.

Non-motorized boats are called 'bor-na', and 'dinghy'.

Bor-na is a dugout or plank-built boat of up to 15 m in length with a draft of 0.80-1.00 m. Part of the deck is made of planks and the rest may be decked with split bamboo or kept open for fish and net storing.

Dinghy is also a plank-built shallow vessel between 5 and 12 m in length with a draft of 0.70-1.00 m with pointed bow and stern. Some are dugout.

During the survey, however, it was not possible to distinguish between boats which are used exclusively for set bagnet fishing and boats which are used with other types of fishing gear. Table 1 summarizes the survey results.

Comparing the position of the sample villages in 1966/67 and 1982/83 in various districts, it turns out that the introduction of motorized boats has been more or less limited to Chittagong district, even though some of these boats are also operating from seasonal offshore fishing centres in other districts.

Boats based in the other coastal districts, i.e., Noakhali, Barisal, Patuakhali, Khulna and Jessore, are non-motorized, the exception being five motorized boats in the Khulna and Barisal districts. Their number has increased considerably during the last 15 years. Chittagong is the only district where the number of non-motorized fishing craft has declined since the last census in 1967/68, most probably due to the introduction of motorized craft.

While the total number of fishing boats according to the census of 1967/68 was 9563, comprising exclusively non-motorized boats, the present number can be estimated at 12,926, containing a considerable number of motorized fishing craft.

4.3 Set bagnets

Much more than the number of fishing boats, the number of set bagnets has increased over the last 15 years, as observed in the sample villages. While 4712 *behundis* were counted in the fishery census in 1967/68, the present number can be estimated as 15,696 (see Table 3). Considering the fact that the number of boats has not increased as rapidly, the steep increase in set bagnet fishing indicates a shift from other fishing methods to this type of fishing. A particularly steep increase, ranging between 517 and 806%, could be observed in the Noakhali, Patuakhali and **Khulna districts**.

Table 4 shows the number of fishing units, craft, gear and fishermen observed at the three biggest seasonal offshore set bagnet fishing centres in Bangladesh, i.e., Dubla in Khulna district, Sonar Char in Patuakhali district and Sonadia in Chittagong district. Dubla in Khulna district is the largest centre with 4811 fishermen and 224.8 set bagnets, followed by Sonadia in Chittagong district, with 2607 fishermen and 549 set bagnets, and Sonar Char in Patuakhali district with 578 fishermen and **289** bagnets. Motorized boats based in Chittagong district are operating from all three centres.

From Dubla island, units from almost all coastal districts except Noakhali operate. Sonadia has fishing units from Chittagong district only, and Sonar Char has units from Barisal and Chittagong districts.

A total of 3086 set bagnets are operated from the three centres — about a fifth of all *behundi* nets in Bangladesh (see Table 4).

4.4 Specifications of set bagnets

Set bagnets operated in different fishing areas from the coastal and seasonal bases are generally categorized in respect of length into three groups, namely, large (30-46 m), medium (18-30 m) and small (9-18 m) sizes.

The nets are usually made of tyre cord (PA), nylon multifilament (PA) twine and polyethylene (PE) and polypropylene (PP), the twines having different sizes ranging from 6 to 66 ply of 210 denier.

are generally used in the front part of the net while thinner twines are used at the throat part. Thicker twines are also used in the cod-end part of the net.

On the basis of the statement of 172 bahardar units using 489 nets (see Table 5) in different fishing areas of the five coastal districts, the lengths of nets ranges from 9 m to 56 m with a vertical opening (using bamboo poles for mouth opening) ranging from 2.5 m to 9 m. Also from the statements of respondents and the observations of the survey team it was found that the mesh sizes (stretched) of the front part (first part) of the net range from 25 mm (1") to 127 mm (5"), whereas at the cod-end the mesh sizes range from 4.25 mm (1/6") to 13 mm (Y2").

Table 5 shows that the largest *behundis* by far are operated in Chittagong district, extending up to a length of 46 m with a mouth opening up to 9.0 m. Comparatively smaller *behundis* are operated in Patuakhali district, with a maximum length of 14.0 m and a maximum mouth opening of 3.5 m.

On the basis of the measurement of 224 nets and the classification into large, medium and small nets, the size distribution shown in Table 6 was obtained.*

Of the *behundis*, 25.9% fall in the category 'large *behundis*', 28.6% in the category 'medium *behundis*' and 45.5% in the category 'small *behundis*'. Assuming that the size distribution of the 224 nets measured is representative, Table 6 estimates the total twine requirement for all set bagnets in Bangladesh at 889,040 kg. The estimate should, however, be taken only as a very rough indication, since the sample is too small and since it was not randomly selected at all stages. Assuming a life span of 5 years and also assuming that five per cent of the total would be required as mending twine, the annual requirement of twine would be of the order of 192,625 kg.

4.5 Crew

The crew size varies according to the size of the fishing unit which is operated. Large *behundis* are operated by large fishing units comprising two or more larger motorized and non-motorized boats each operating about four large *behundi* nets. The average crew size for large units was found to be 26.3, and the number of crew members per large *behundi* net, 4.8.

Small and medium units consist of one or two small country craft, operating one or two small or medium *behundi* nets in a river mouth or very close to the shore.

According to the survey, they have a crew of two to three members (2.6 in case of units operating medium-sized *behundis* and 2.8 in case of units operating small *behundis*) with a ratio of 1.5 fishermen per medium sized net and 1.8 fishermen per small sized net. The figures show that only large sized set bagnets are operated by large crews described earlier as *bahardar* units, while small and medium sized nets are operated by small crews, which could be called fishermen units.

4.6 Costs and earnings

Investment costs for large, medium and small units are given below (in Tk)

Type	Boats	Nets	Engines	Other fishing materials (rope, steel wire, bamboo etc.)
<i>Large unit</i>				
— motorized	100-150,000	50-65,000	75-100,000	50-75,000
— non-motorized	40- 60,000	50-55,000	—	50-60,000
<i>Medium Unit</i>	20- 30,000	5- 8,000	—	5- 7,000
<i>Small Unit</i>	7- 25,000	3- 4,000	—	2- 3,000

To get an idea about operational costs and returns of different types of fishing units, the 172 selected bahardars were asked about their catch during the past 24 hours and the operational costs incurred. Table 7 shows the catch as well as the sales proceeds per net.

* Large nets have a length of 30.5 to 46 m, medium nets have a length of 18.5 to 30.4 m, and small nets range from 9 to 18.4 m in length.

There is a great difference between large *behundis*, which caught during the 24 hours prior to the interview an average of 130.4 kg at a value of Tk 529.3 on the one hand, and small and medium *behuridis*, which caught only 8.2 and 14.3 kg, respectively, valued at Tk 66.3 and 1k 76.0, respectively, on the other. The table below shows the sales proceeds minus the operational costs.

Type	BU	Sales proceeds (Tk)		Operational cost* (Tk)		Balance (Tk)
		Total	Ave/unit	Total	Ave/unit	
Large	50	154,552	3,091	40,802	816	2,275
Medium	33	4,259	129	1,978	60	69
Small	89	9,350	105	5,000	56	49

- Expenses for food and fuel only.

The figures indicate that the value of the annual catch of the set bagnet fishery accounts for a major part of the value of the total marine catch of Bangladesh, assuming 90 fishing days in a year and considering the present number of units.

To obtain a reliable estimate, however, a representative sample survey, covering a number of sample days spread over the entire fishing season as well as incorporating observations on catch composition, weight of catch and sales prices, is necessary.

Table 1

Number of fishing boats in marine fishing villages in 1982/83¹

Districts	Total no. of villages	Boats in sample villages				Per cent increase over 1967/68	Estimated no. of boats in census villages	Newly identified villages				Total estimated no. of boats
		No. of villages	Motorized boats	Non- motorized boats	Total no. of boats			No. of villages	Motorized boats	Non- motorized boats	Total no. boats	
Chittagong	361 (361)	28	145	731 (1188)	876 (1188)	—26.3	4370	—	—	—	—	4370
Noakhali	43 (43)	3	—	64 (58)	64 (58)	10	1062	—	—	—	—	1062
Barisal	107 (91)	6	—	127 (89)	127 (89)	43	1461	16	1	173	174	1635
Patuakhali	175 (164)	6	—	98 (30)	98 (30)	227	3885	11	—	161	161	4046
Khulna	122 (46)	8	—	225 (116)	225 (116)	94	869	76	4	913	917	1786
Jessore	3	—	—	—	—	—	—	2	—	22	22	22
Total	811 (705)	51	145	1245 (1481)	1390 (1481)		11652	105	5	1269	1274	12926

¹ fishing boats are not exclusively used in set bagnet fishing but are employed for other fishing methods as well.

Note : Figures in parantheses refer to the 1967/68 census.

Table 2

Number of set bagnet units in sample villages/fishing camps in 1982/83

Districts	Population villages/camps as in 1967/68	Sample villages/camps	Set bagnet fishing units				
			MU		NMU		% increase
			1967/68	1982/83	1967/68	1982/83	
Chittagong	361	28	—	145	1188	731	— 26.25
Noakhali	43	3	—	—	58	64	10
Barisal	91	6	—	—	89	127	43
Patuakhali	164	6	—	—	30	98	227
Khulna	46	8	—	—	116	225	94
TOTAL	705	51	—	145	1481	1245	

Table 3

Number of set bagnets operated in 1982/83

District	Census 1967/68				1982/83					
	Total number of fishing villages	Total number of SBN operated	Sample villages	SBN operated	SBN operated in sample villages	% Increase in sample villages	Estimated number of SBN in census villages	New fishing villages identified	SBN operated	Estimated number of SBN in all villages
Chittagong	361	3709	28	1248	2608	109	7752			7752
Noakhali	43	213	3	22	195	786	1887			1887
Barisal	91	248	6	51	85	67	414	16	293	707
Patuakhali	164	404	6	12	74	517	2493	11	243	2736
Khulna	46	138	8	53	480	806	1250	76	1316	2566
Jessore								2	47	47
TOTAL	705	4712	51	1386	3442	148	13796	105	1899	15696

Table 4

Distribution of set bagnets and fishing craft in the three major seasonal offshore fishing centres by district during 1982/83.

Seasonal base	DUBLA						SONADIA						SONAR CHAR					
Home district of fishermen	BU		MB	NMB	SBN	MF	BU		MB	NMB	SBN	MF	BU		MB	NMB	SBN	MF
	MU	NMU					MU	NMU					MU	NMU				
Chittagong	59	—	78	148	701	1247	77	—	76	102	549	2607	18	—	15	44	141	578
Noakhali	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Barisal	1	57	1	114	151	343	—	—	—	—	—	—	—	36	—	59	148	535
Patuakhali	—	7	—	16	32	59	—	—	—	—	—	—	—	—	—	—	—	—
Khulna	4	398	4	913	1316	3078	—	—	—	—	—	—	—	—	—	—	—	—
Jessore	—	9	—	22	48	84	—	—	—	—	—	—	—	—	—	—	—	—
	64	471					77	—					18	36				
TOTAL	535		83	1213	2248	4811	77		76	102	549	2607	54		15	103	289	1113

Craft and gear listed here are also incorporated in Tables 1 to 3, in the figures for the respective home villages of the fishermen.

Table 5

Specifications of set bagnets

District	Number of BU's interviewed	Number of set bagnets operated by BU's interviewed	Size		Stretched mesh size	
			Length (m)	Mouth opening (m)	Mouth (mm)	Cod-end (mm)
Chittagong	110	378	9-46	2.5-9.0	38- 120	4.25- 13.0
Noakhali	20	36	12 - 18	2.5 - 5.0	38 - 45	6.35 - 8.5
Patuakhali	21	30	10 - 14	2.5 - 3.5	25 - 38	6.35 - 8.5
Barisal	15	25	10 - 15	2.7 - 4.0	25 - 38	4.25 - 8.5
Khulna	6	20	13 - 23	3.7 - 5.5	38 - 127	6.35 - 13.0
TOTAL	172	489				

Table 6

Size distribution of set bagnets and estimation of twine requirement

Size of net	Length range (ml)	No. of nets measured	%	Twine size (denier)	Average twine/ net (range) (kg)	Estimated SBN	Estimated twine requirement (kg)
Large	30.5 - 46	58	25.9	210 d 18 - 66	102.5 (75 - 130)	4065	416,662.5
Medium	18.5 - 30.4	64	28.6	210 d 12 - 36	57.5 (40 - 75)	4489	258,117.5
Small	9.0 - 18.4	102	45.5	210 d 6 - 18	30 (20 - 40)	7142	214,260
TOTAL		224	100			15696	889,040

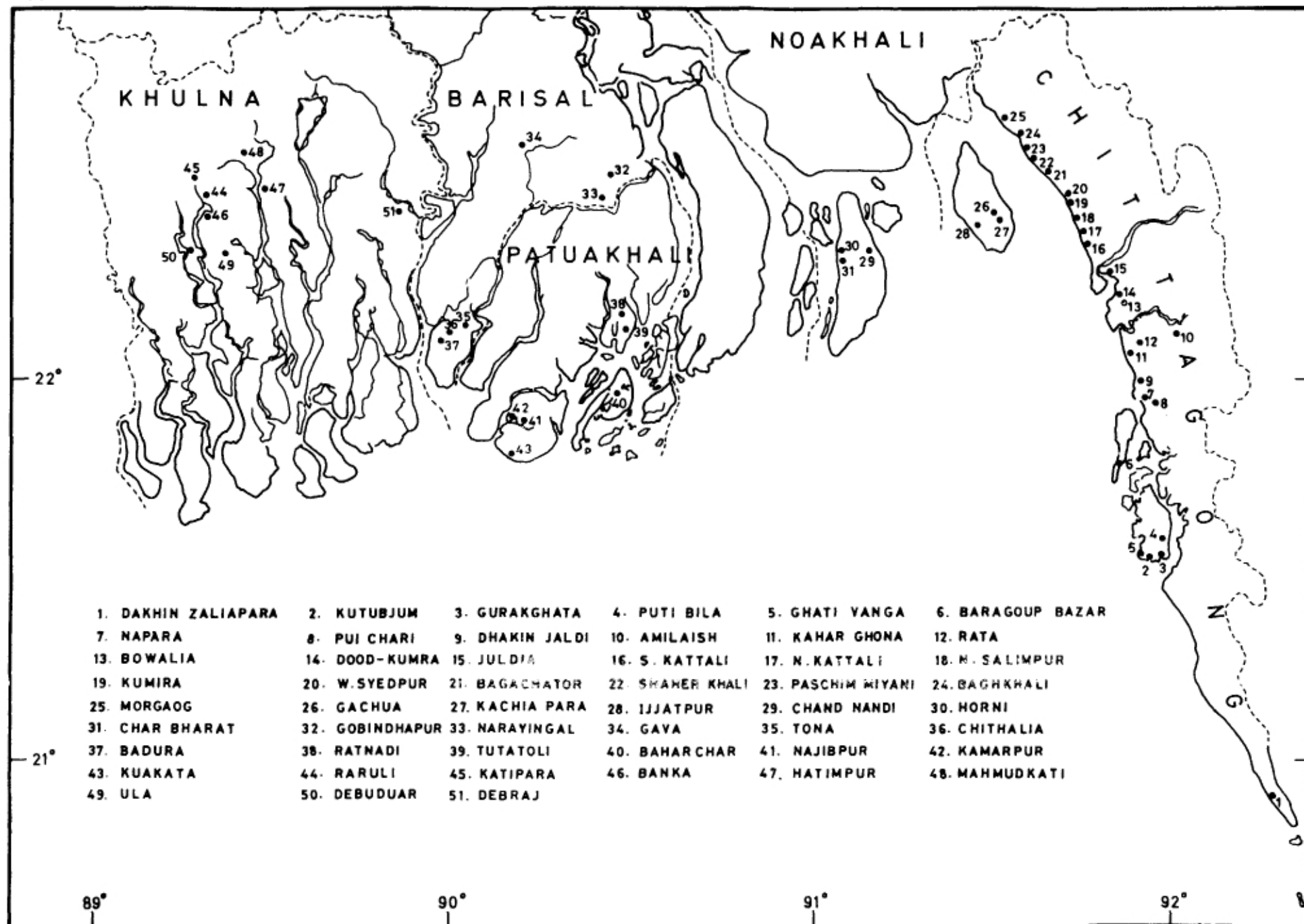
The estimation shown in the table should be considered as a very tentative one, which gives not more than an idea about the total twine requirement, since the 224 nets measured Out of the 3442 set bagnets operated in the sample villages have not been selected randomly but according to accessibility. The tentative character of the estimation is particularly true with regard to the categorization into large, medium and small nets.

Table 7

Value of catch during the last 24 hours prior to data collection

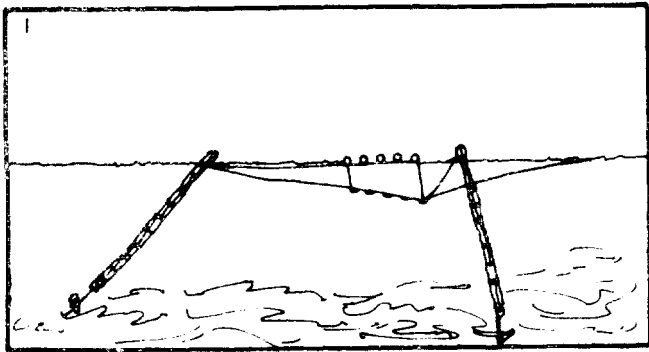
Size of net	PU		Total fishermen	Total for 24 hours		Catch/net, ' 24 hrs.	Sales/net (Tk)
				Catch (kg)	Sale proceeds (Tk)		
Large	50	292	1317	38080	154,552	130.4	529.3
Medium	33	56	85	800	4259	14.3	76.0
Small	89	141	251	1153	9350	8.2	66.3
TOTAL	172	489	1653				

Appendix 1 LOCATIONS OF 51 SURVEYED SET BAGNET FISHING CAMPS/VILLAGES FROM COASTAL DISTRICTS OF BANGLADESH

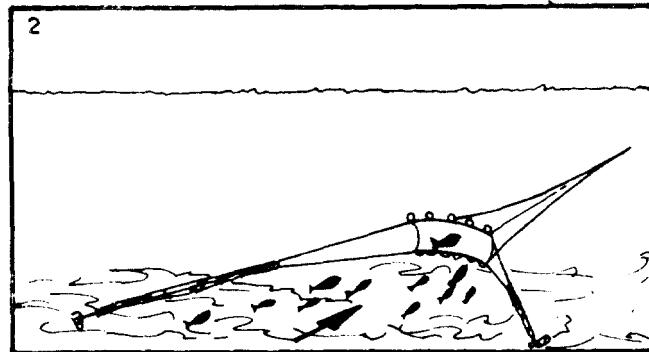


Appendix 3

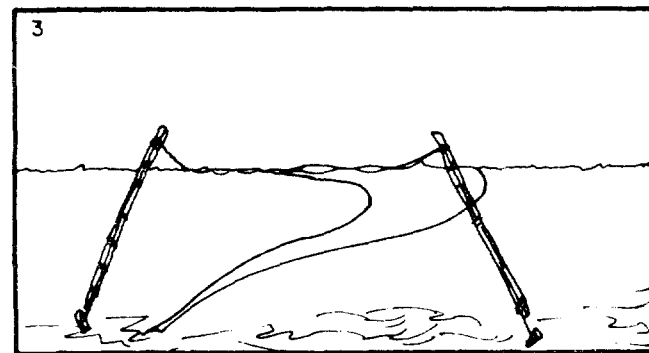
HOW THE BEHUNDI NET IS OPERATED



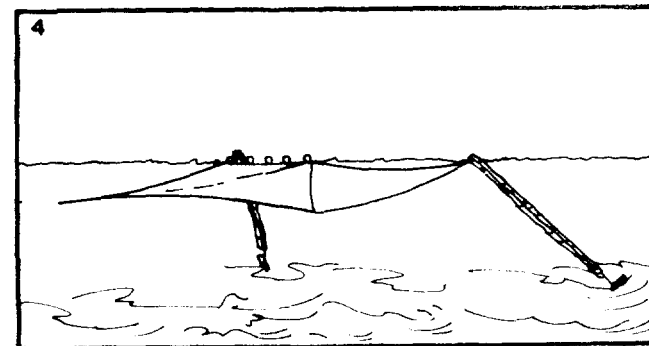
1. During the intertidal period the net is set in the current by attaching it to holdfasts. The net floats on the water surface.



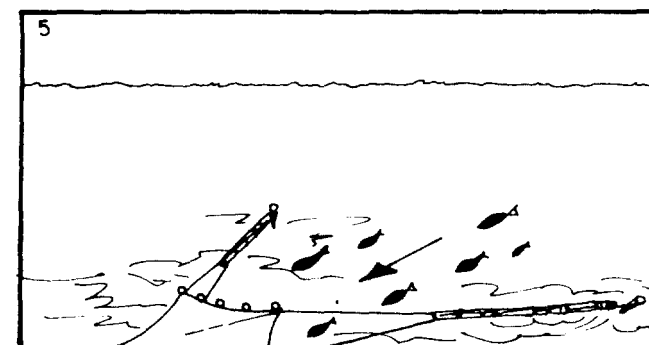
2. When the current gets strong, the net sinks and stretches. Fish drift in with the current.



3. During a subsequent intertidal period the net comes up to the surface and is emptied of catch.



4. The current reverses itself, and the net is set in the opposite direction.



5. As the current gains strength, the net once again sinks and stretches, this time in the opposite direction.

Note : This sequence of operations may be repeated as long as

- (a) good catches are available.
- (b) the gear remains undamaged, and
- (c) the weather remains good.

Appendix 4

SCHEDULE FOR SET BAGNET FISHERY SURVEY

Fishing Village/Centre : P.S., District :

1. Particulars of fishing boat, crew and labourers engaged :

Type of boat Et expected life	No. of boats	Length of boats with HP if any & cost/value	Crew and labour			
			Category	No.	Numeration System	Rate
Motorized			Engine driver Fishermen Labourer			
Non- Motorized			Fishermen Labourer			
			Shore Labourer			

2. Particulars of behundi nets operating :

Measurement of net		Mesh size at		No. of nets	Netting material Et counts Ply	Weight with wire and rope	Weight twine only	Self-made or pur- chased/ readymade & value
Length from mouth to cod-end	Mouth opening (pong)	Mouth	Cod-end					

3 Particulars of **fishing** operation : Expected life of net :

- (a) Date of starting fishing this season Expected date of end :
- (b) Fishing area : distance from shore : Depth of water :
- (c) No. of hauls of each net in 24 hrs. Times:
- (d) Total lifts of all nets in 24 hrs. : Nos. :
- (e) Fishing days in the month : days. Non-fishing days in the month :
- (f) Why fishing is not done on non-fishing days :

4. Catch particulars, past 24 hours lifts of net :

Main species	Quantity in fresh condition (maundsl)	Value of fresh condition (Tk)

5. Operational cost :

Item Price :

Fuel

Ice

Signature and date :

Appendix 5

NEW SET BAGNET FISHING VILLAGES IDENTIFIED DURING SAMPLE SURVEY OF 1982/83

District	Fishing Thana	Fishing Village	BU	M B	N M B	SBN	MF
Khulna	Daulatpur	Rayermahal	31	—	27	7	250
		Chankinimahal	31	—	31	6	70
	Bagherhat	Farajipara	1	—	3	3	6
		Bashanbati	45	3	15	13	75
		Arjur Badar	1	—	2	2	7
	Tala	Tikarampur	3	—	8	4	48
		Harinagar	1	—	4	7	12
		Kaikhali	1	—	3	5	9
		Kazipara	2		6	10	25
		Dhania	2		2	4	8
		Sreemanthakali	11	—	27	40	80
		Nalta	16	—	39	52	119
		Magura	2	—	2	4	9
		Baokhola	1	—	4	7	13
		Palashpur	2	—	9	17	32
		Paranpur	5	—	21	41	52
		Mobarakpur	13		47	87	181
		Jalalpur	4	—	10	20	39
		Jethua	16	—	36	77	117
	Majon	Majon	1	—	3	4	10
		Joymani	1	—	2	3	6
	Kalaroa	Fasherchanda	2		3	6	13
		Dewara	3	—	5	8	16
	Dacob	Banishaya	2	—	7	13	19
	Mahal	China	1		3	4	18
	Sarankhola	Tafalbari	2		4	8	16
		Badal	5	—	12	18	36
		Hajapur	4		16	28	55
		Khada	1		4	5	11
		Khontakata	1	—	2	2	5
	Fakir Hat	Khajra	1	1	4	14	30
		Lakpur	2		4	5	16
	Koirā	2 No. Koirā	1		1	1	3
		Gobra	1		4	5	9
		Modinabad	1	—	1	2	4
	Paigacha	Agarghata	2	—	3	6	11
		Boalia	13	—	33	72	115
		Kheshra	1	—	2	4	8
		Kashimpur	5		13	25	35
		Noakati	10		41	69	114
		Falsinagar	1	—	3	6	12
		Asarkhata	1		1	2	5
		Bagay	1		1	2	6
		Ram Nathpur	1	—	4	7	10
		Sree Rampur	2	—	9	17	26
	Dumuria	Chuknagar	1		2	4	9
		J hona	1	—	3	3	7

District	Fishing Thana	Fishing Village	BU	MB	NMB	SBN	MF
Khulna (Contd.)	Mongla	Khaitala	1	—	2	3	6
		Perikhali	12	—	43	47	103
		Dargapur	1		1	1	4
		Ehoianathpur	4	—	7	3	37
		Khajra	9	—	20	10	110
		Khari Hati	3		7	8	31
		Sreedhampur	10	—	12	10	64
		Buria	1	—	4	11	13
		Raotara	2	—	3	2	18
		Khalia	1	—	1	2	4
		Chakla	9	—	25	56	101
		Ram Nagar	10	—	27	26	120
	Morelgong	Kalikabari	1	—	3	5	6
		Sreenikhali	9	—	33	51	109
		Dhona	6	—	13	27	53
		Dolmaria	1	—	2	5	8
		Cabtala	1	—	3	6	9
		Chandipur	1	—	3	5	15
		Sankibhanga	1	—	2	4	8
		Sonakhali	9	—	47	56	92
		Baraikhati	17	—	79	108	185
		Harkhati	2	—	9	7	9
	Rampal	Kholkura	1	—	2	3	4
		Banstala	1	—	6	8	13
		Gileytala	1		2	2	6
		Jhanjania	1	—	4	8	12
		Sreefaltala	27	—	55	83	132
	Rupsa	Alaipur	2	—	3	3	16
		Deyara	3	—	9	13	24
		Total	76	402	4	913	1316
Barisal	Kotali	Sagardi	16	—	22	27	31
	Sarupkati	Shehangal	21	—	35	25	71
	Bhola	Unknown village	36	—	59	142	535
	Indhurkhali	Paratoshi	1		1	1	4
		Parer Hat	1	—	7	12	34
	Bhandaria	Kholburia	1	—	2	4	8
		Atarkhali	1		2	4	12
		Julia	1	—	7	11	20
		Golbunia	1		1	2	5
	Math baria	Tushkhali	7		15	22	40
		Chotomachua	3	1	6	15	54
		Kalikabari	1		2	4	7
		Burirchar	1	—	3	6	10
		Shapa	1		2	4	8
		Habapati	1	—	7	9	29
		Dhanipasa	1	—	2	5	10
		Total	16	94	1	173	293

District	Fishing Thana	Fishing Village	BU	MB	NMB	SBN	MF
Patuakhali	Golachipa	Char Mamtaz	12	—	11	21	31
		CharAnda	2	—	2	2	5
		Koralia	4	—	4	9	15
		Samadabad	58	—	58	126	151
		Gongipara & S. Rangabali	2	—	2	2	7
		Mardan	3	—	7	9	18
		Bibir Hawla	1	—	2	2	3
	Betagi	Sherishamuri	2	—	4	8	15
		Betmore	5	—	12	24	44
	Khepupara	Khepupara (Nachnapara/ Nayapatty)	26	—	59	40	155
		Total	11	—	161	243	444
Jessore	Keshobpur	Chingla	1	—	3	6	12
		Sagardari	8	—	19	41	72
		Total	2	—	22	47	84

Appendix 6

COMPARATIVE STATEMENT OF MOTORIZED AND NON-MOTORIZED BOATS AND SET BAGNETS IN SAMPLE FISHING CAMPS/VILLAGES OF 1967/68 AND 1982/83.

District	Fishing Thana	Fishing Village/ Camp	1967/68			1982/83		
			Boats		Nets	Boats		Nets
			MB	NMB	SBN	MB	NMB	SBN
Chittagong	Mirsarai	Shaherkhali	—	16	23	—	8	33
		Margaog	—	30	25	—	15	27
		Paschim Mayani	—	47	42	—	12	45
		Bashkhali	—	32	45	—	36	40
	Sitakunda	Bagachator	—	9	40	—	10	73
		W. Syedpur	—	31	18	—	8	81
		North Salimpur	—	30	33	—	17	40
		Kumira	—	57	120	—	60	210
	Halisahar (Doble Mooring)	N. Kattali	—	2	4	—	13	60
		S. Kattali	—	14	28	—	30	150
	Bandar (Patiya)	Juldia (Juldak)	—	9	11	—	7	22
	Anowara	Dood-Kumra	—	21	12	—	7	23
		Bowalia	—	5	3	—	1	—
	Sandip	Ijjatpur	—	13	13	—	27	79
		Kachia Para	—	10	12	—	4.6	150
		Gachua	—	26	50	—	20	79
	Teknaf	Dakhin Zaliapara	—	32	24	—	37	21
	Banskhali	Kahar Ghona	—	18	30	2	19	75
		Dhakin Jaldi	—	24	11	119	54	180
		Rata	—	17	19	11	24	124
		Napara	—	55	50	17	37	174
		Pui Chari	—	50	40	12	26	103
	Satkania	Amillaish	—	20	3	1	3	10
	Kutubdia	Baragoup	—	152	102	24	76	265
	Moheshkhali	Ghati Vanga	—	117	203	19	72	207
		Puti Bila	—	61	60	17	16	98
		Gurakghata	—	118	70	19	17	108
		Kutubjum	—	172	1504	32	130	
		Sub Total	—	1188	1241	145	731	2607
Noakhali	Hatiya	Char Bharat	—	9	—	—	15	56
		Chand Nandi	—	15	15	—	18	64
		Horni	—	34	7	—	31	75
		Sub Total	—	58	22	—	64	195
Barisal	Bakargonj	Gobindhapur	—	10	12	—	40	11
		Naryingal	—	11	10	—	26	6
	Jhalakati	Gava	—	15	15	—	34	26
	Pirojpur	Chithalia	—	15	6	—	9	12
		Badura	—	30	8	—	14	20
		Tona	—	8	—	—	4	10
		Sub Total	—	89	51	—	127	85

District	Fishing Thana	Fishing Village! Camp	1967/68			1982/83		
			Boats		Nets	Boats		Nets
			MB	NMB	SBN	MB	NMB	SBN
Patuakhali	Golachipa	Baharchar	—	15	6	—	2	3
		Ratnadi	—	6	—	—	20	4
		Tulatoli	—	1	—	—	26	—
	Kalapara	Nazibpur	—	6	6	—	24	45
		Kamarpur	—	2	—	—	26	22
		Kuakata	—	—	—	—	—	—
		Sub Total	—	30	12	—	98	74
Khulna	Paikgacha	Ula	—	6	4	—	7	10
		Mahmudkati	—	6	—	—	31	55
		Banka	—	15	—	—	52	100
		Raruli	—	41	25	—	49	117
		Katipara	—	21	10	—	49	121
		Hatimpur	—	10	7	—	3	9
		Debduar	—	13	7	—	30	64
	Morelgonj	Debraj	—	4	—	—	4	4
		Sub Total	—	116	53	—	225	480
		Grand Total		1481	1379	145	1245	3441

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