Socioeconomic conditions of estuarine set bagnet fisherfolk in Bangladesh

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THE SOCIOECONOMIC CONDITION OF
THE ESTUARINE SET BAGNET FISHERFOLK IN BANGLADESH

by

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This working paper describes the socioeconomic survey of selected estuarine set bagnet (ESBN) fishing villages in Bangladesh. It deals with village profiles, households and population structured according to sex, age and education. The households have been stratified according to income-generating activities and income. Fishing households were stratified even further on the basis of the craft and gear combinations owned, owned and operated, or operated only and their income estimated on a monthly basis. Variations in income within the community of ESBN fishermen and relative income from different sources are also discussed with opportunities for generating income from sources other than the ESBN fishery.

The survey was based on a sampling of six villages, each one identified in each of the six strata into which the estuarine areas of Bangladesh was divided.

This survey was conducted to obtain baseline socioeconomic parameters that are relevant to the management of the ESBN fisheries and forms the input, along with the information on their fisheries interacting with it (BOBP/WP/89), for the 'Biosocioeconomic assessment of the impact of estuarine set bagnet fisheries on other marine fisheries in Bangladesh' (BOBP/REP/62).
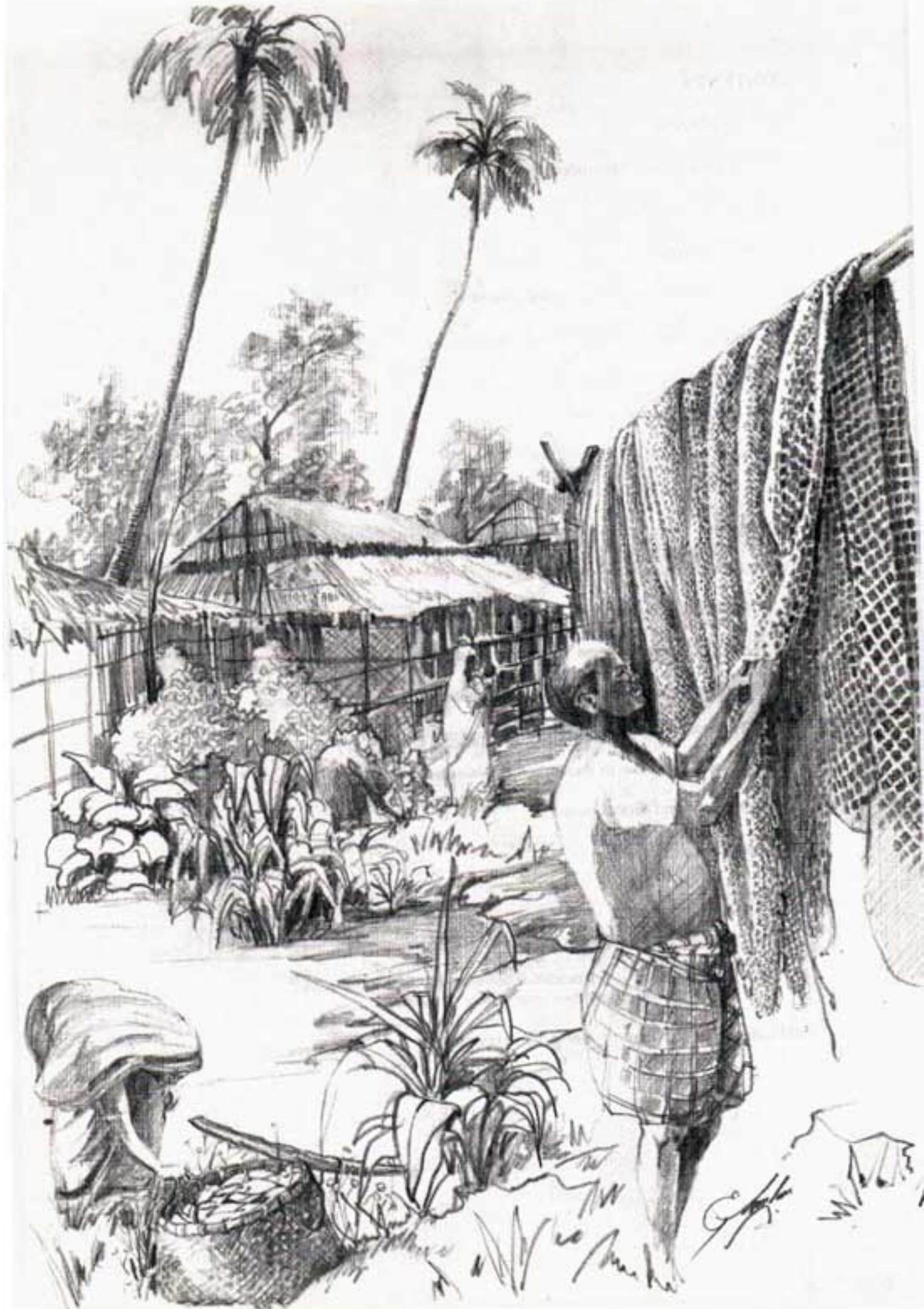
The Bay of Bengal Programme (BOBP) is a multiagency regional fisheries programme which covers seven countries around the Bay of Bengal   Bangladesh, India, Indonesia, Malaysia, Maldives, Shri Lanka and Thailand. The Programme plays a catalytic and consultative role: it develops, demonstrates and promotes new technologies, methodologies and ideas to help improve the conditions of small-scale fisherfolk communities in member countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, and also by UNDP (United Nations Development Programme). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

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

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1. INTRODUCTION

The estuarine set hagnet *(behundi jal)* fisherfolk of Bangladesh have, over the years. been subject to a variety of natural arid socioeconomlc stresses that have had a serious impact on their economy and society. Faced with the problem of survival, the majority of these fisherfolk generally resort to methods of fishing that might be destructive to the fishery resources   for example. esiLiarine set bagnets (ESBN). which rank high in this category.

Traditionally, set hagnets have been used in the rivers (freshwater), estuaries and coastal marine ssaters of Bangladesh. The estuarine set hagnets contribute about 20 per cent of the total fish landings of the country. But many studies have shown that set bagnets land a lot of juveniles. especially shrimp, and if this practice goes unregulated there is hound to occur serious biological degradation of fishery resources (Ahmed. 1981: Islam. 1987). However, these observations were made without evaluating the economic impact and the sociopolitical cost of introducing remedial regulations in the fisheries.

An empirical study was sponsored in 1989-90 by the Bay of Bengal Programme (BOBP) to provide, using an interdisciplinary framework of analysis. a better understanding of the complex sets of interrelationships in the biological and socioeconomic spheres of the Bangladesh estuarmne set hagnet fisheries and the people involved (see *Bay of Bengal News.* Issue No. 47. 1992: Khan *et al,* 1993 for details). The estuarine waters of Bangladesh were divided into six strata and a station selected in each for the bioeconomic assessments. The stations were Maiskhali in Cox's Bazar District. Kumira in Chittagong, Hatia in Noakhali. Khepupara in Patuakhali. Morrelganj in Bagerhat and Kaliganj in Satkhira District (Figure 1). One village in each of these stations (Gorakghata. Kumira. Harni. Badurtali. Dhona and Bazargram respectively) was selçcted l'or a corresponding socioeconomic analysis (see Figure 1).

Fiq 1. The location of the six villages surveyed in the six strata
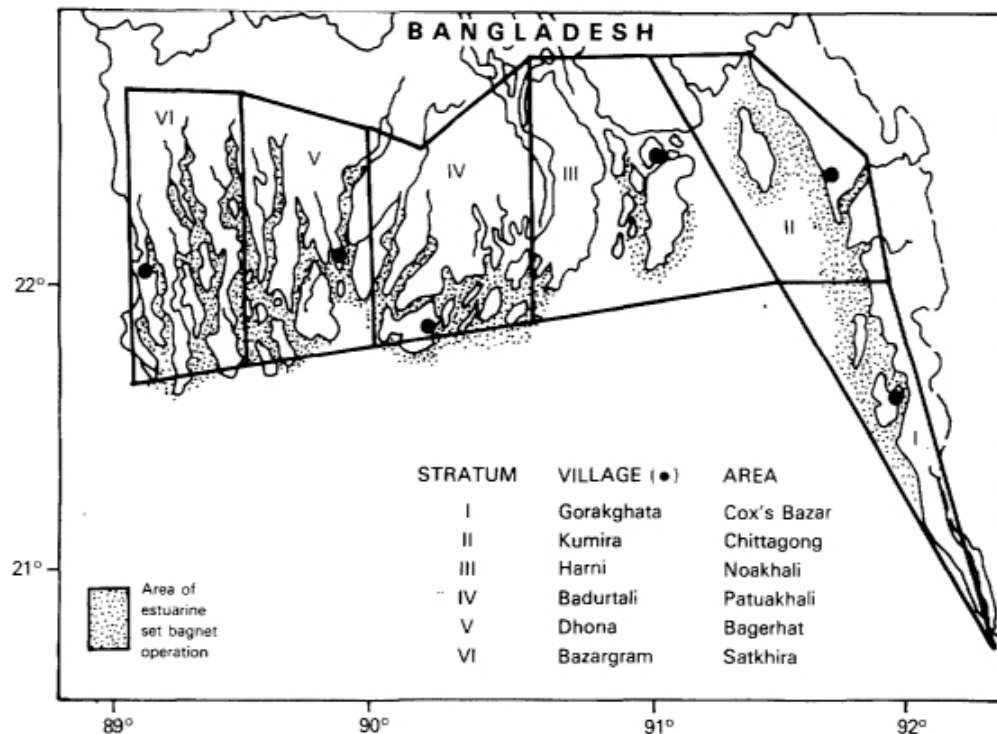
Besides investigating the general socioeconomic conditions of the fisherfolk in these villages, the study particularly aimed at:

— Making a quantitative assessment of income of fishing households, on a seasonal basis;

— Determining the distribution of income by activities; and

— Analyzing the nature of inequality in, and consequences of, the distribution of income among major groups of resource users.

2. *APPROACH AND METHODOLOGY*

The overall biosocioeconomic study resorted to two distinct modes of scientific enquiry — bioeconomic and socioeconomic — to generate the necessary data base.

From the resource point of view, the bioeconomic enquiry concentrated not only on the estuarine set bagnet fisheries but also conducted supplementary investigation of other fisheries interacting with it and generated all the necessary biological and economic data (BOBP/REP/62). In particular, the enquiry provided accurate estimates of catch rates, number of fishing days and monthly distribution of net earnings by classes of estuarine set bagnets.

The socioeconomic enquiry, which was conducted in three stages during 1989-90, collected information (both qualitative and quantitative) on the social life and income-generating activities of people at the village level, as follows:

— **During the** first stage, a frame survey was conducted in six villages to collect such general statistics as population, households, geographical divisions, craft and gear, owners and employees, merchants, moneylenders, and intermediaries, and nature of social facilities such as infrastructure, housing, health, education, etc.

During **the second** stage, a stratified random sampling of a little over 10 per cent of the households were interviewed for detailed data on the composition of a fishing household, involvement of family members in different fisheries and other activities, distribution of households by age, education and sex, ownership of different craft-gear combinations, modes of marketing, etc. Structured questionnaires were used.

— **During the third stage,** assessments of the proportion of household income from other fishing and monthly variations of income from fisheTy-related and nonfishery activities were made.

The findings of the socioeconomic and bioeconomic surveys were later integrated to provide a better understanding of the complex biosocioeconomic processes in the villages.

The 'unit' selected for the analysis was the 'household'. The final analysis, at the level of 'households', showed how individual households earned income from the various opportunities (like ESBN fishery, other fisheries, fishery-related activities and nonfishery activities) available within the limits of their environment. The total household income was then calculated by adding the incomes earned by individual members from various economic activities. Symbolically,

$$\mathbf{Y\ hh\ =\ Ysbn\ +\ Yof\ +\ Yfr+Ynfr}$$

(where, Yhh = Total income of the household; Ysbn = Income from set bagnet fishing; Yof = Income from other fisheries: Yfr = Income from fishery-related activities; and Ynf = Income from nonfishery activities.)

Stratification of fishing households into various socioeconomic categories was then attempted, based on the ownership of assets and distribution of monthly income from all economic activities.

3. THE STUDY AREAS

The number of fishing and nonfishing households, population by sex, and the number of house-holds selected for stratified sampling, in the selected villages are given in Table 1.

Table 1: Distribution of households, population and sample size in selected villages

Stra-tum	Name of village	Number of households			Population			Number of households
		Fishing	Nonfishing	Total	Male	Female	Total sampled	
I	Gorakghata	68	26	94	306	288	594	24
II	Kumira	224	36	260	978	907	1885	25
III	Hami	205	30	235	783	599	1382	23
IV	Badurtali	72	0	72	187	212	399	22
V	Dhona	35	0	35	90	72	162	16
VI	Bazargram	15	1	16	44	42	86	16
	Total	619	93	712	2388	2120	4508	126

3.1 Location

Gorakghata, in Cox's Bazaar District, is situated on the west bank of the Maiskhali channel. The village comprises of three small settlements *(paras)* locally known as South Jaladas Para, North Jaladas Para and Thakurtala New Jaladas Para.

Kumira, which lies on the banks of Chittagong-Sandwip channel, is situated about 29 km north-west of the city of Chittagong. The channel divides the village into two hamlets, Bara Kumira and Kazi Para. Kumira is a relatively large fishing village, having 224 fishing and 36 nonfishing households and a population of 1885.

Harni is located at the southern end of Hatia Island in Noakhali District. It is about 30 km from the district headquarters and is where the river Meghna enters the sea. Harni is a relatively large village, with a population of 1382.

Badurtali is on the banks of the rivers Andharmanik and Badurtali Khal in Patuakhali District. Seventytwo fishing households here are divided into three small settlements. Two of the settle-ments (the north and south parts) are close to Badurtali Khal, while the third is in the middle. There are no nonfishing households.

Dhona is on the banks of Panguchi River in Bagerhat District. It is 1.5 km from the Morrelganj Upazilla headquarters. All 35 households (population 162) in Dhona are active fishing households.

Bazargram, belonging to Kaliganj Upazilla in Satkhira District, is on the banks of the Kakshiali River, whose western end is linked to the Kalindi River. There are only 16 households here and they have a population of 86. A major proportion of the set bagnet households is settled near the river bank (see Figure 1).

All the fisherfolk in Gorakghata and Kumira are Hindus, while Harni and Bazargram are predomi-nantly (85-90 per cent) Hindu settlements. Badurtali and Dhona are Muslim villages.

3.2 Characteristics of fishing households

Data from the baseline socioeconomic survey, on age distribution of population, level of education and family size, are summarized in Appendix I.

HOUSEHOLD SIZE

The average size of a fishing household is 6.5. However, in the three easternmost villages, Gorakghata, Kumira and Harni, the average family size is 7.3. In the three western villages, Badurtali. Dona and Bazargram, the family size is smaller, 5.6.

EDUCATION

Facilities for primary level education are available in all villages, while secondary schools are located nearby. However, higher secondary education facilities are not available in many areas. The survey revealed a high degree of illiteracy in the fishing villages, the overall average being 63 per cent. As in the case of family size, there is a distinct difference between the eastern area (71 per cent) and the western area (47 per cent). It should also be noted that illiteracy among women is higher (about 75 per cent) than among men (about 50 per cent).

DISTRIBUTION BY AGE

The distribution of the sample population by age shows that 37 per cent belong to the age group 0-10 years and 4 per cent exceed the age of 60, leaving about 59 per cent of the population in the age group between 11 and 60. They constitute the potential work force in the villages. Potential variations between the villages is shown in Appendix I. The involvement of the potential work force in different productive activities is discussed in Section 4.

RESIDENCE. WATER AND SANITATION FACILITIES

More than five million people, including about 125,000 fishermen, live in the coastal districts of Bangladesh (World Bank, 1991:156). Their houses are temporary huts, with few facilities. The survey confirmed this picture: details are given in Appendix II. Most of the houses in Gorakghata, Kumira. Harni and Badurtali were severely damaged during the cyclone in April 1991.

The survey noted a shortage of adequate drinking water facilities and the need for urgent improvement of sanitary facilities.

4. ORGANIZATION OF ECONOMIC ACTIVITIES

Although fishing is the major source of income, most of the fisherfolk in Bangladesh undertake occasionally a variety of fishery-related (e.g. traditional fish processing. marketing etc.) and nonfishery activities (e.g. wage labour in other sectors like agriculture, livestock- and poultry-rearing, construction, petty trade, employment in private/public and government sectors etc.). These income-augmenting opportunities, however, are not accessible to all, for various reasons. Various income-generating activities in the villages, the combinations of fishery, fishery-related and nonfishery activities and the income earned from these by individual households are discussed in the paragraphs that follow.

4. 1 Fishing activities

About 185 species of fish are exploited by fishermen operating estuarine set bagnets. These include 15 species of penaeid shrimp, three nonpenaeids, nine freshwater prawns. three crabs., three molluscs, 90 pelagic finfish and 62 demersal finfish (see Islam *et al.* 1992 for details). Many of the finfish and shellfish species are also caught by other major interactive gear, such as marine set

bagnet, beach seine, pushnet, trammelnet, bottom longline and trawl. A few finfish species are caught either as targeted species or by-catch, by the *Ililsa* gillnet operated in the marine sector.

The estuarine set bagnet fishery has traditionally been organized as a family enterprise in many parts of Bangladesh. There is a high degree of involvement of family members in its operation and repair. Marketing and traditional processing are also taken up by family members.

The low cost of initial capital investment has made estuarine set bagnets the most popular fishing equipment in Bangladesh. They were divided into four different size classes for the purpose of the study (BOBPfWP/89) and the findings on them are presented in Table 2.

Table 2: Basic features of estuarine set bagnets

Features	Size class of estuarine set bagnets			
	(a)	(b)	(c)	(d)
Distance between poles as a measure of the width of the mouth opening (m)	<6	6-10	10.1-15	>15
Appx. area of mouth opening (m2)	<15	16-50	51-90	>90
Cost per unit of gear (1k)	7,000 to 10,000	10,000 to 14,000	15,000 to 25,000	20,000 to 35,000
Crew (no)	2	3 or 4	(8 to 12 or 16 to 20)**	

* **US $ 1 = Tk 30 appx. (1989-90)**
** **Depending on the type of boai and number of neis. *Source:* BOBPIWP/89.**

Hilsa gillnet fishing operations require 3 or 4 persons per unit. Here too, the operations are mainly family-oriented. Trammelnet fishing requires 6-8 persons per unit, beach seining 11-15 persons and bottom longlining 8-13 persons on board. These traditional systems of operation are more labour-intensive and, therefore, require hiring help either from the same village or from neighbouring villages (see BOBP/WP/89 for details).

The distribution of various craft and gear in the selected villages is given in Table 3. There are very few motorized fishing craft; 93 per cent of the craft are nonmotorized.

Table 3: Distribution of craft, set bagnets, *Hilsa* gillnets and other gear

Village	No. of craft			No. of estuarine set bagnets (according to size class)				Total set bagnets	Hilsa gillnets	Other gear	Total gear units
	M	NM	Total	a	b	c	d				
I. Gorakghata	2	36	38	0	8	22	0	30	6	31	67
2. Kumira	13	84	97	564	37	0	0	601	691	135	1427
3. Hami	2	55	57	19	61	1	0	81	19	136	236
4. Badurtali	0	41	41	2	13	0	0	15	1	103	119
5. Dhona	2	37	39	0	6	34	2	42	2	1	45
6. Bazargram	0	14	14	13	13	0	0	26	0	0	26
Total	**19**	**267**	**286**	**598**	**138**	57	2	795	719	406	1920

Note : M = Motorized ; NM = Nonmotorized
***Source* : BOBP/WP/89**

The composition of fishing gear shows that 41 per cent of the total number of units of gear are set bagnets, 38 per cent are *Hilsa* gillnets and the rest belong to the 'other gear' category, which includes trammelnets, longlines, other gillnets, beach seines etc.

The predominant types of estuarine set bagnets in the villages surveyed are the 'a' and 'b' classes, It is only in Gorakghata and Dhona that the 'b' and 'c' classes are operated. It may be mentioned that 'c' and 'd' class SBN are capital-intensive and the operations require more organizational skills than 'a' and 'b' types, which are more family-oriented.

Table 3 also shows inter-village variations in the types of fishing gear used. Many households make a seasonal shift from set bagnet fishing to *Hilsa* gillnet, trammelnet, beach seine or bottom longline fishing, according to seasonal changes in the availability of various fish species. This phenomenon is reflected in the gear composition itself. In Kumira, for instance, 42 per cent of the gear are SBN, 48 per cent are *Hilsa* gillnets and the rest are 'other gear'. In Badurtali, the dominant category of gear (87 per cent) consists of 'other gear', while in Bazargram there are only set bagnets. Since income from fishing differs with the kinds of fishing gear operated, the differences in the gear composition also influence income distribution among fishing households.

4.2 *Occupational structure*

The survey showed (Table 4) that only 35 per cent of the population are involved in productive activities; 37 per cent are children below the age of 10, and 28 per cent (both male and female) do not have any employment. This shows a high rate of dependency on the income-earning population. But there are significant differences between the villages. The unemployment in Harni is as low as 10 per cent, while it is as high as 39 per cent in Gorakghata.

Table 4: Distribution of working and non-working population and family **size**

| Name of village | Nonworking population | | | | | | Working population | | Total population | | No. of families | Avg. no. of working members! family | Family size |
| | Children below 10 yrs | | Unemployed | | Total | | | | | | | | |
	Number	(%)	Number	(%)	Number	(%)	Number	(%)	Number	%			
Gorakghata	61	37.4	63	38.7	124	76.1	39	23,9	163	100	24	1.6	6.8
Kumira	67	35.1	72	37.7	139	72.8	52	27.2	191	100	25	2.1	7.6
Harni	72	42.4	17	10.0	89	52.4	81	47.6	170	100	23	3.5	7.4
Badurtali	50	38.2	34	25.9	84	64.1	47	35.9	131	100	22	2.2	6.0
Dhona	26	31.0	31	36.9	57	67.9	27	32.1	84	100	16	1.7	5.3
Bazargram	32	37.2	14	16.3	46	53.5	40	46.5	86	100	16	2.5	5.4
All villages	**308**	**37.3**	**231**	**28,0**	**539**	**65.3**	**286**	**34.7**	825	**100**	**126**	**2.3**	**6,5**

Table 5 shows the distribution of sample households by occupation. The table reveals that 34 per cent of the households are engaged solely in active fishing and do not combine any other income-supplementing activities. The proportion of households engaged in 'fishing only' is very high in Kumira (60 per cent), and Dhona (56 per cent) and low in the other villages (17 per cent in Gorakghata, 13 per cent in Harni, 36 per cent in Badurtali and 25 per cent in Bazargram). This would indicate that about two-thirds of the fishing households combine subsidiary income-gener-ating activities to supplement their household incomes. Of these, 41 per cent combine their fishery activities with fishery-related activites, like marketing, small-scale processing etc. and 22 per cent combine fishery with nonfishery activities related to agriculture, poultry- and cattle-rearing or salaried jobs in private or public sector undertakings.

Table 5: Distribution of households by income-generating activities, in the six villages

Activities	Gorakghata		Kumira		Harni		Badurtali		Dhona		Bazargram		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
I. Fishing only	4	17	15	60	3	13	8	36	9	56	4	25	43	34
II. Fishery and fishery-related	18	75	7	28	11	48	8	37	4	25	5	31	53	41
III. Fishery and nonfishery activities	0	0	3	12	8	35	6	27	3	19	7	44	27	22
* Agriculture					3	13	4	18	2	13	2	13	11	9
* Livestock-rearing					5	22					5	31	10	8
* Salaried jobs			3	12					1	6			4	3
* Agricultural labour							2	9					2	2
IV. Nonfishery activities only	2	8	0	0	1	4	0	0	0	0	0	0	3	3
Total	**24**	**100**	**25**	**100**	**23**	**100**	**22**	**100**	**16**	**100**	**16**	**100**	**126**	**100**

4.3 Ownership of craft and gear

Ownership of craft and gear is an important determinant of household income. Table 6 shows distribution of households by ownership of craft/gear. On an average, about 82 per cent of fishing households own either a craft or gear (mainly SBN) or both. It is, however, noted that 25 per cent of owner households in Gorakghata, 22 per cent in Harni and 23 per cent in Badurtali own gear other than set bagnets also.

Table 6: Distribution of households by ownership of craft and gear

Activities	Gorakghata		Kumira		Harni		Badurtali		Dhona		Bazargram		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Set bagnet owners with craft and a-size ESBN	-		9	36	2	9	1	4.5	-	0	7	44	19	15
a- and b-size ESBN	-		3	12	2	9	1	4.5	-	0	2	13	8	6
b-size ESBN	8	33	1	4	7	30	5	23	3	19	5	31	29	24
b- and c-size ESBN	-		0	0	0	0	1	4.5	2	13			3	2
c- cr c- and d- or d-size ESBN	4	17	0	0	0		0	0	6	37	0	0	10	8
Set bagnet owners without craft	0	0	7	28	0	0	2	9	0	0	1	6	10	8
Owners having only other gear with craft	6	25	3	12	5	22	5	23	0	0	0	0	19	15
Owners having only othergear	1	4	0	0	0	0	4	18	0	0	0	0	5	4
Employees	3	13	0	0	3	13	2	9	5	31	1	6	14	11
Nonfishing	2	8	2	8	4	17	1	4,5	0	0	0	0	9	7
Total	24	**100**	23	**100**	23	**100**	22	**100**	16	**100**	16	**100**	126	**100**

It may be emphasized that the survey revealed a low incidence of households whose members are purely employees. The highest proportion of such households was recorded in Dhona (31 per cent).

4.4 Other economic activities

Although fishing is the major economic activity in the estuarine villages, fisherfolk have periodically participated in a number of other activities to supplement their incomes. These activities were divided into fishery-related activities (fish drying, fish marketing, cleaning, salting, icing of fish, gear and craft maintenance and repair, fixing poles in the estuaries for setting bagnets etc.) and nonfishery activities, The major nonfishery activities identified were agriculture, livestock- and poultry-rearing, salaried jobs in private, public and government sectors, petty tradefbusiness in goods other than fish, and wage labour in agriculture, construction and service industries. **We have** already indicated (in 4.2) that many households combine fishing with some fishing-related and/or nonfishery activities in selected villages. In the following section, we shall quantify the proportion of income contributed by these other economic activities to individual households.

5. *INCOME FROM FISHING AND OTHER ECONOMIC ACTIVITiES*

The fishing income of a household depends on a number of factors *viz,* catch rate of different species, ownership of craft and gear, involvement of family labour in the work process, number of active fishing days, price of fish and a competitive exchange relationship with merchants and consumers. The bioeconomic study has taken all these factors into consideration to arrive at an accurate estimate of household income from ESBN fishing. Incomes from other fishing, fishery-related and nonfishery activities were estimated using structured socioeconomic questionnaires.

Before analyzing the earnings, it should be noted that the bioeconomic component of the study revealed that the productivity of the ESBN in the Maiskhali area was much higher than at the other stations. The catch rate (kg/haul) and, consequently, the earnings per gear unit was 4-5 times higher than the average of the others. Details are given in Table 7.

Table 7: Average catch rate and net income of estuarine set bagnets

Station (village)	Catch rate (kg/haul)	Net income per ESBN (Tk/month)
Maiskhali (Gorakghata)	15.10	17,183
Kumira (Kumira)	3.10	2,700
Hatia (Hami)	4.65	3,166
Khepupara (Badurtali)	3.53	4,293
Morrelganj (Dhona)	4.98	5,465
Kaliganj (Bazargram)	2.35	1,963

Note: Calculations based on BOBPIWP/89

5.1 Total income

Three of the villages (Gorakghata, Dhona and Bazargram) are dependent on set bagnets for the bulk of their income, while the other three (Kumira, Harni and Badurtali) derive a significant portion of it from other fishing activities (see Table 8).

Table 8: Annual income from major categories of income-generating activities, in the six villages surveyed.

Activity	Gorakghaea (Tk)	%	Kumira (Tk)	%	Harni (Tk)	%	Badurtali (Tk)	%	Dhona (Tk)	%	Bazargram (Tk)	%
Set bagnel fishing	4,924,467	86	927,330	51	488,333	29	362,822	24	113,370	87	526,482	67
Other fishing	317,400	6	537,600	29	724,600	43	800,940	53	43,400	3	4,000	
Fishing related activities	420,600	7	109,105	6	384,776	22	231,000	16	101,200	8	113,000	14
Nonfishery activities	64,200	1	264,080	14	94,620	6	112,360	7	32,975	2	137,748	8
Total	5,726,667	100	1,838,115	100	1,692,329	100	1,507,122	100	1,311,276	100	781,230	100
Sample households	24		25		23		22		16		16	
Average annual income per household	238,611		73,525		73,580		68,506		81,955		48,827	
Relative ranking of villages based on average annual income per household	1st		4th		3rd		5th		2nd		6th	

On an average, nonfishery activities contribute only 5 per cent of the household income, while fishing-related activities contribute about 11 per cent.

The table also shows the level of household income per annum from all economic activities. Gorakghata ranks highest, with an income of Tk 238,611. All the others have much lower incomes, explained by the lower productivity of the nets in those areas.

5.2 Monthly income

The distribution of household income from various economic activities *(viz,* set bagnet fishing, other fishery-related and nonfishery activities) during the year is graphically presented in Figures 2.1 to 2.6 (see below and on following pages).

The set bagnet income in Gorakghata (Figure 2.1) exhibits a peak, in March and July and two lean periods — in January and May-June. During the rest of the year the income fluctuates around the average income of about Tk 500,000.

Income from sources other than set bagnet fishing does not have any substantial influence on the overall income structure in the village.

Fig 2.1. Income by sources (Gorakghata village 1990)

SBN	=	Set bagnet fishery	Income of	□	SBN
OF	=	Other fishery		+	SBN+OF
FRA	=	Fishery-related activities		o	SBN+OF+FRA
NF	=	Nonfishery activities		◇	SBN+OF+FRA+NF
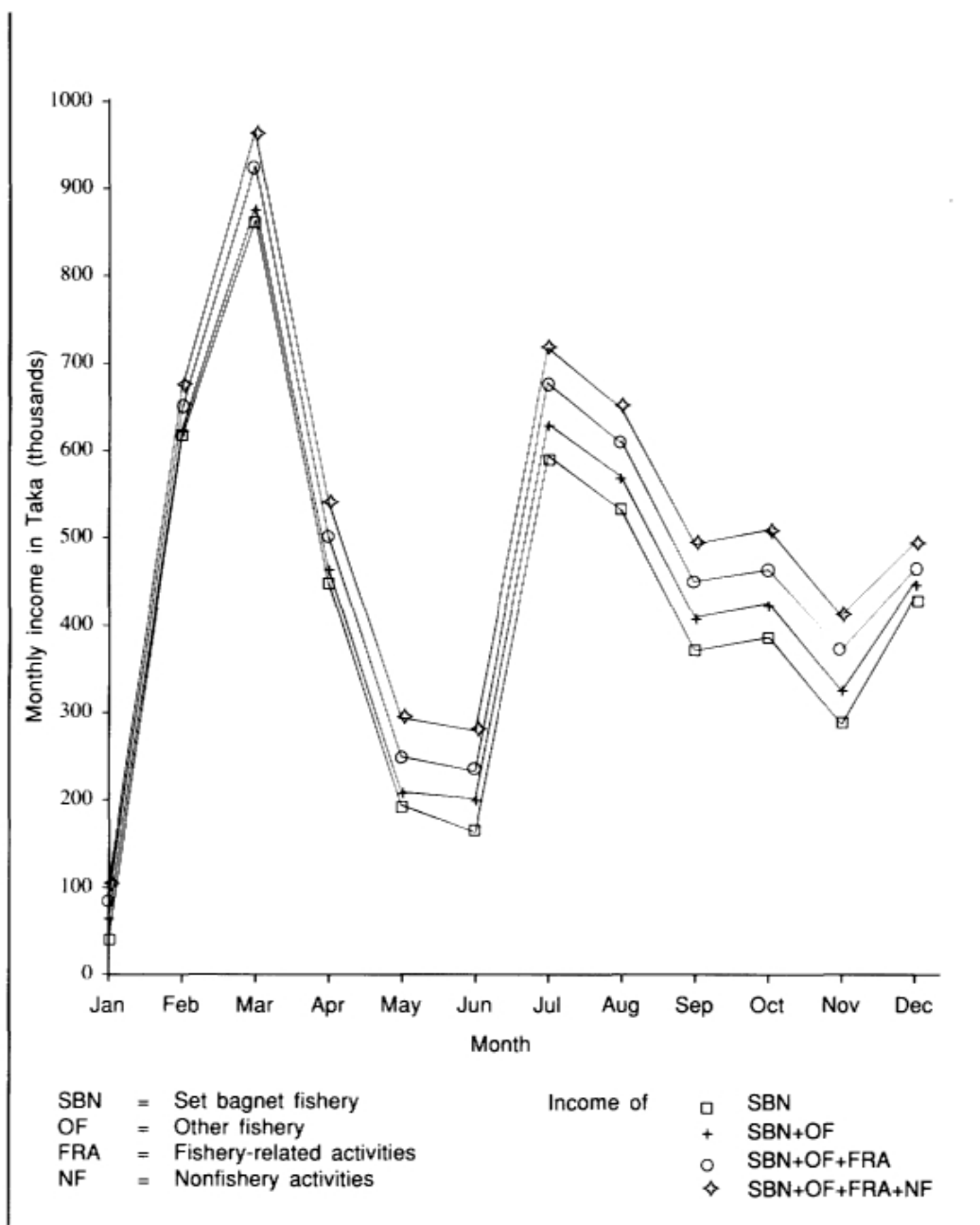
In Kumira, the set bagnet fishing season lasts from November till May with a peak in April. During this period the income from other sources is not very significant. However, the contribution of other fishing' is substantial from June to October. In other words, the importance of set bagnet fisheries as a contributor to the household income reduces considerably between June and October, when fishermen shift from set bagnets to mainly operations with *Hilsa* gillnets and other gear. During this period, other fishing contributes about 56 per cent of the total income, while set bagnets contribute only 20 per cent. In the same period, it is worth noting that. 20 per cent of the income is derived from nonfishery related activities.

Fig 2.2. Income by sources (Kumira village 1990)

SBN	=	Set bagnet fishery		Income of	□	SBN
OF	=	Other fishery			+	SBN+OF
FRA	=	Fishery-related activities			o	SBN+OF+FRA
NF	=	Nonfishery activities			◇	SBN+OF+FRA+NF
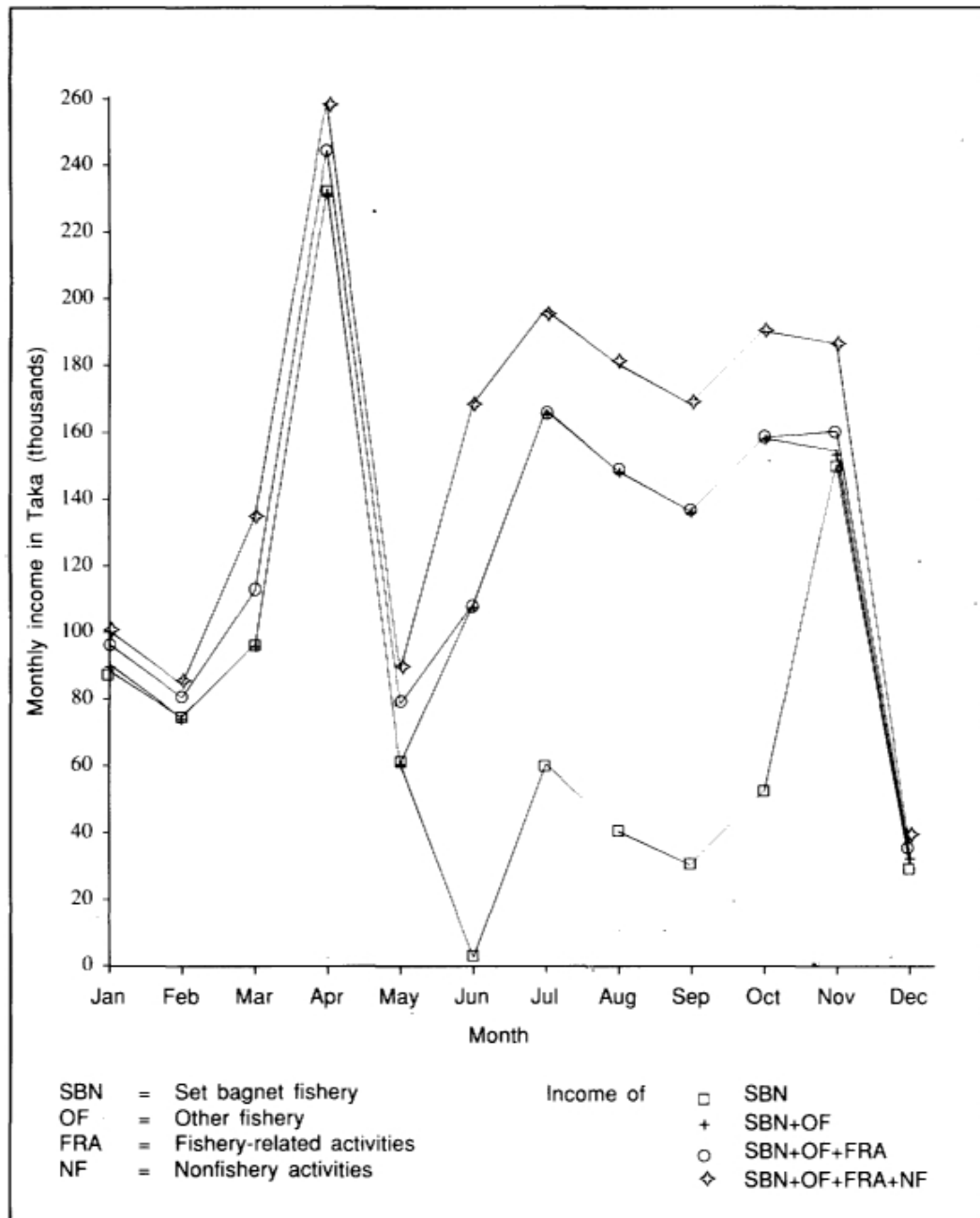
In Harni, set bagnet fishing is the main source of income only for about four months (February-May). Its contribution from June till September is negligible and other fishing, particularly *Hilsa* gillnet fishing, contributes about 80 per cent of the income. The income from fishery-related activities is significant from June through January with a high of *45* per cent during October-December.

Fig 2.3. Income by sources (Harni village 1990)

SBN	=	Set bagnet fishery	
OF	=	Other fishery	
FRA	=	Fishery-related activities	
NF	=	Nonfishery activities	

Income of □ SBN
+ SBN+OF
○ SBN+OF+FRA
◇ SBN+OF+FRA+NF
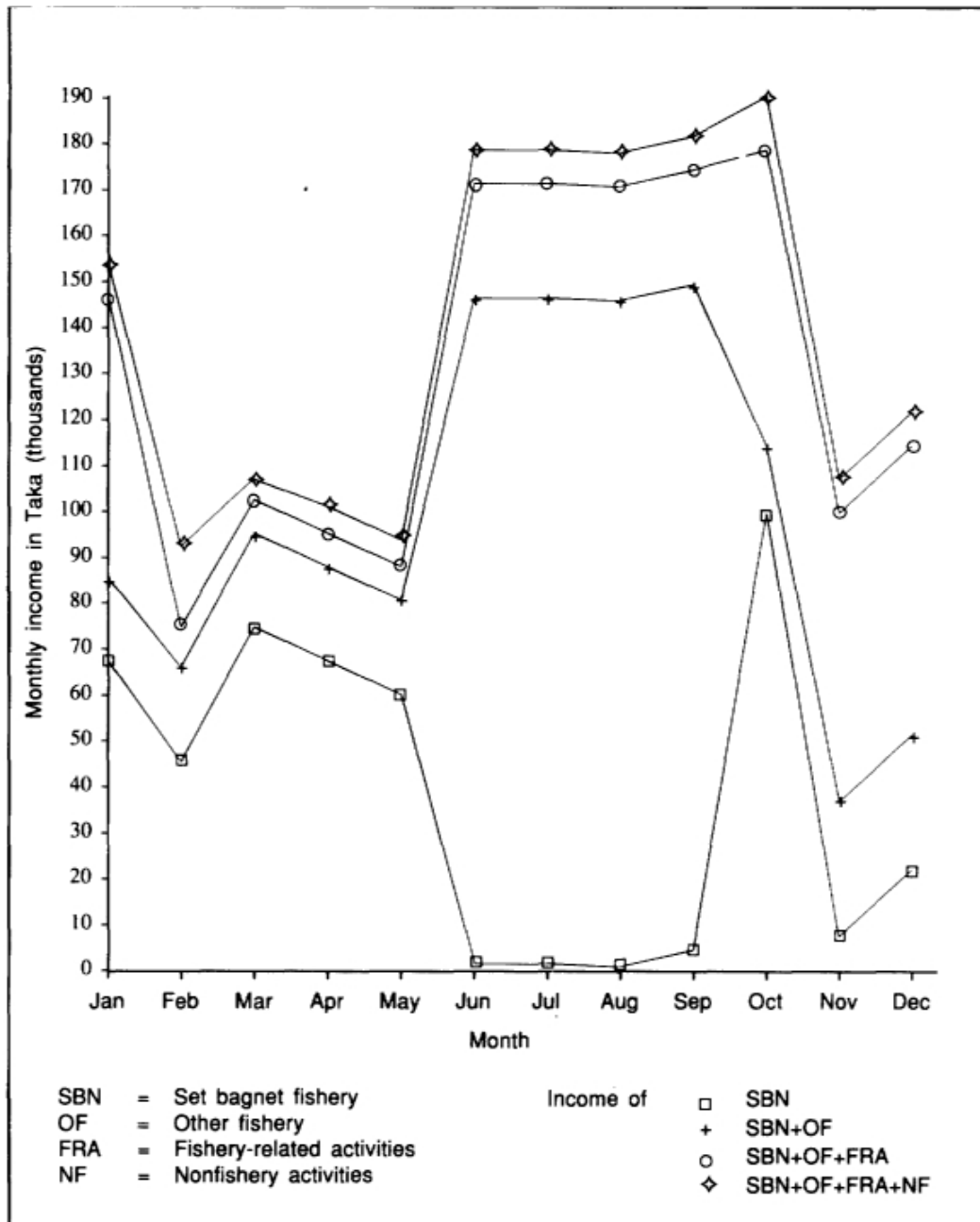
The income in Badurtali is fairly evenly distributed over the gear, except for a peak in March on account of set bagnet fishing. The relative contributions from the different sources is seen to be uniform throughout the year. The major portion of income (53 per cent) is contributed by other fisheries', including the *Hilsa* gillnet fishery, longline, castnet, other gillnet and seine fisheries.

Fig 2.4. Income by sources (Badurtali village 1990)

SBN	=	Set bagnet fishery	Income of	□	SBN
OF	=	Other fishery		+	SBN+OF
FRA	=	Fishery-related activities		○	SBN+OF+FRA
NF	=	Nonfishery activities		◇	SBN+OF+FRA+NF

(13)
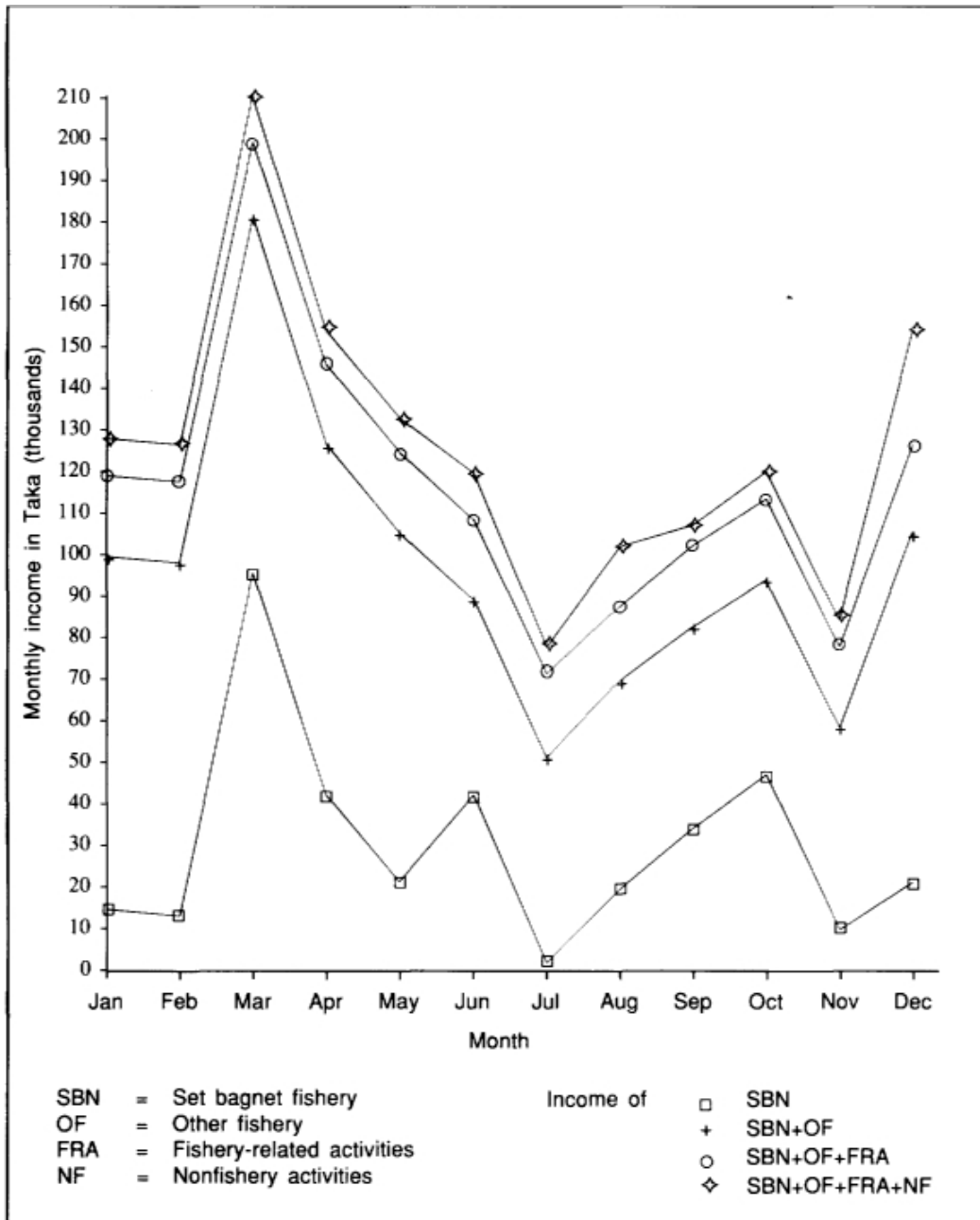
In Dhona, there appear to be wide fluctuations in the flow of SBN income, with three peaks (April, July and November) and three troughs (March, May and October). Other activities do not have a crucial role to play in shaping the overall structure of incomes.

Fig 2.5. Income by sources (Dhona village 1990)

SBN = Set bagnet fishery
OF = Other fishery
FRA = Fishery-related activities
NF = Nonfishery activities

Income of
□ SBN
+ SBN+OF
○ SBN+OF+FRA
◇ SBN+OF+FRA+NF
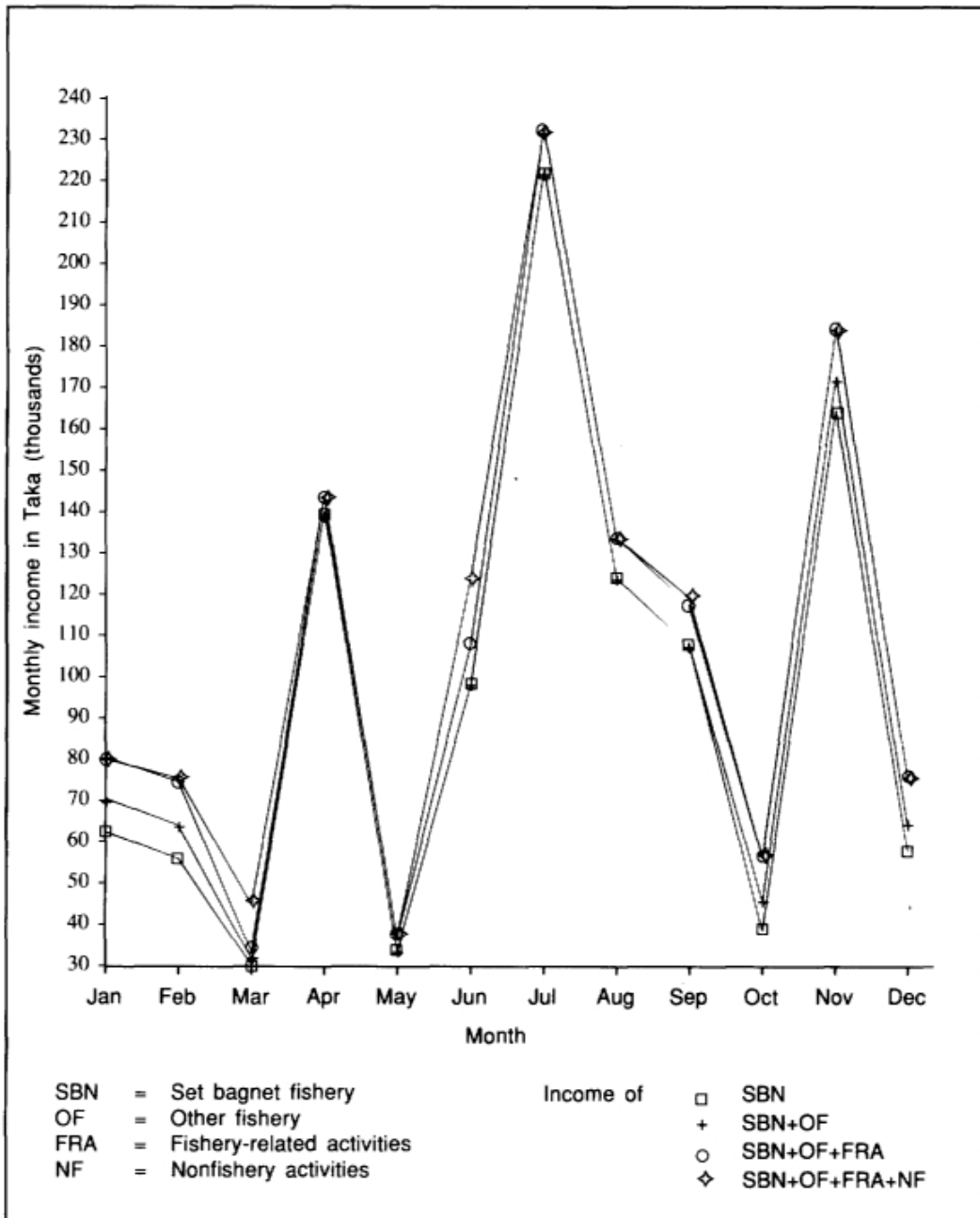
Set bagnet income in Bazargram fluctuates during the year and reaches a peak in November. 'Other fishing' does not have any influence on the income structure. Fishery-related activities have a definite influence on the total income, especially during June-September. Income from nonfishery activities is also significant, with a peak contribution in October of 58 per cent.

Fig 2.6. Income by sources (Bazargram village 1990)

SBN	=	Set bagnet fishery	Income of	□	SBN
OF	=	Other fishery		+	SBN+OF
FRA	=	Fishery-related activities		o	SBN+OF+FRA
NF	=	Nonfishery activities		◇	SBN+OF+FRA+NF
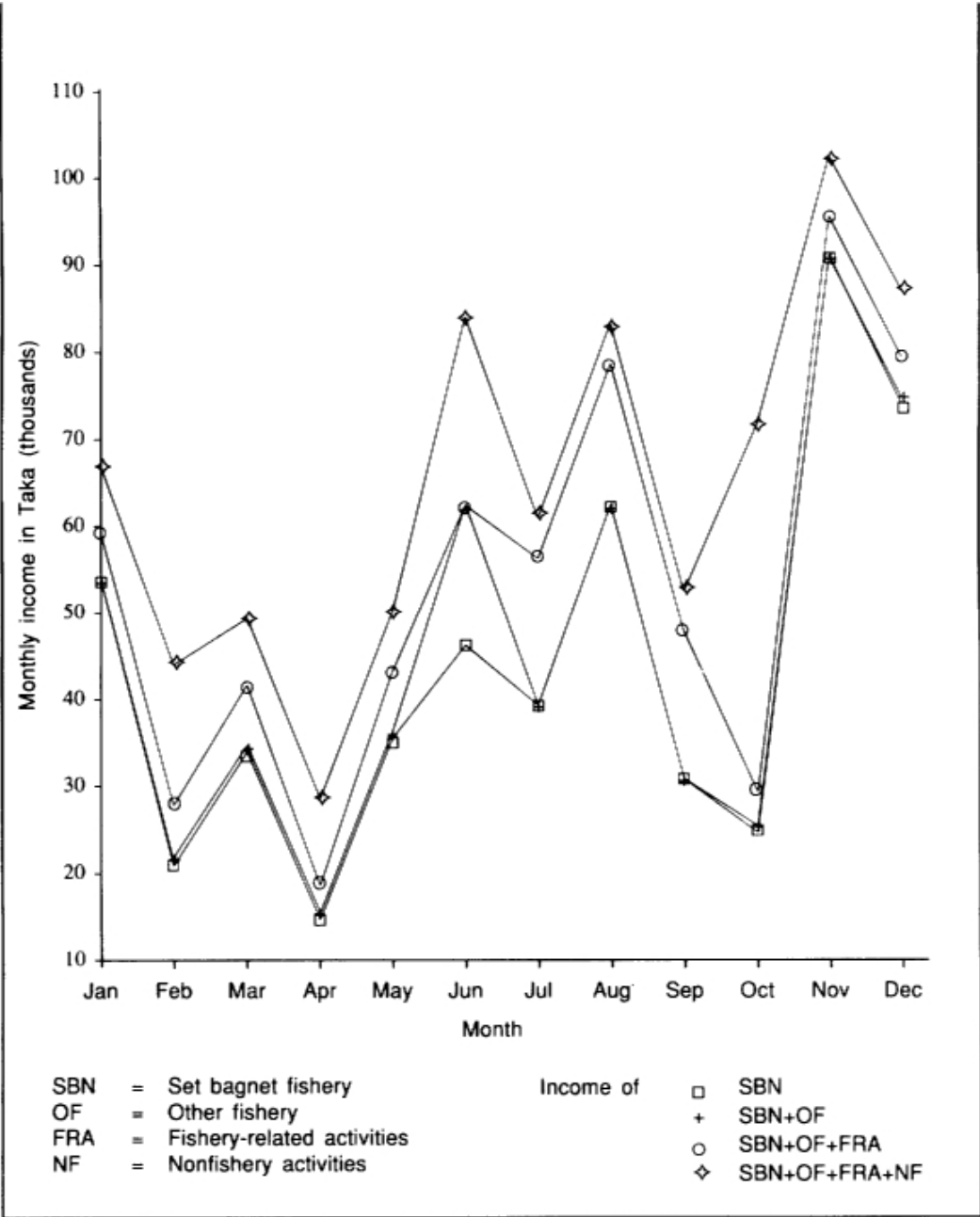
6. DISTRIBUTION OF INCOME AMONG FISHING HOUSEHOLDS

Studying distribution of income within a village is useful for many reasons. First, it helps to classify the village households into different income groups, and this is useful for evaluating the differential impact of management measures (closed seasons, ban on certain fisheries, quotas, taxes or any other measures aimed at redistributing income) on different sections of the population. Secondly, the analysis not only enables identification of groups engaged in intensive use of fishery resources, but also the most vulnerable sections (labourers, petty traders and marginalized fisherfolk without adequate fishing equipment), who cannot make a comfortable living from the process of appropriation. This section deals with the classification of fishing households by level of income from estuarine set bagnet fishing and other economic activities.

6.1 Distribution of ESBN owner households by income from set bagnets

Table 9 shows the distribution of set bagnet owner households by income from set bagnet fishing. The results reveal the existence of a sharp regional inequality in the distribution of income between fishing households in Gorakghata and the rest of the villages. All ESBN-owner households in Gorakghata earn an income above Tk 90,000, with the average about Tk 375,000. Comparing this scenario with the rest of the villages we find that 95 per cent of ESBN-owner households in Kumira, 100 per cent in Harni and Bazargram, 90 per cent in Badurtali and 55 per cent in Dhona earn incomes of Tk 90,000 or less. It may be recalled (see Table 7) that the Maiskhali (Gorakghata village) sector shows an exceptionally high catch, much more than the rest of the areas, and this explains the extreme disparity between Gorakghata and the other villages in the income-earning capabilities of ESBN-owner households, price of fish and the number of fishing days per year.

Table 9. Distribution of estuarine set bagnet owning households by income from estuarine set bagnet fishing

Level of annual income (TK)	Gorak. ghata	Kumira	Harni	Badur- tali	Dhona	Bazar- gram	Total
<10,000	—	2	1	3	0	1	7
10,000-20,000	—	1	1	1	1	3	7
20,000-30,000	—	4	3	1	0	3	11
30,000-40,000	—	2	1	1	3	4	II
(Percentage)	(0.00)	(45.0)	(54.5)	(60.0)	(36.4)	(733)	(45.6)
40,000-50,000	—	3	1	2	0	1	7
50,000-60,000	—	1	2	0	0	2	5
60,000-70,000	—	1	2	0	0	0	3
70,000-80,000	—	3	0	0	2	0	5
80,000-90,000	—	2	0	1	0	1	4
90,000-100,000	1	1	0	0	0	—	2
100,000-150,000	0	0	0	1	2	—	3
150,000-200,000	2	0	0	—	2	—	4
200,000-300,000	4	—	0	—	0	—	4
300,000-400,000	1	—	—	—	1	—	2
400,000-500,000	1	—	—	—	—	—	1
500,000-600,000	1	—	—	—	—	—	
600,000-700,000	0	—	—	—	—	—	0
700,000-800,000	1	—	—	—	—	—	
800,000-900,000	0	—	—	—	—	—	0
900,000-1000,000	1	—	—	—	—	—	
Subtotal	12	20	11	10	11	15	79
	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Other households	12	5	12	12	5	1	47
Total	24	25	23	22	16	16	126

Note: Percentages are given in brackets

Looking at the other side of the income ladder, we find that 73 per cent of the ESBN owners in Bazargram, 60 per cent in Badurtali, 55 per cent in Harni, 45 per cent in Kumira and 36 per cent in Dhona earn annual incomes less than 1k 40,000*

We mentioned in Section 4.2 that the struggle for survival compels many fishermen to undertake a variety of activities to supplement income. Table 10 is designed to show the influence of income from 'other fishing' and 'other sources' in the income of ESBN owners and to identify the proportion of such households earning above subsistence levels of income *(i.e.* Tk 40,000) in each of these groups.

Table 10. Distribution of estuarine set bagnet owning households by income from different sources

Level of annual income	Gorakghata			Kumira			Harni			Badurtali			Dhona			Ba:argram			Total		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
<10,000				2	0	0	1	0	0	3	0	0	0	0	0	1	1	1	7	1	1
10,000-20,000				1	1	0	1	1	0	1	0	0	1	1	0	3	3	0	7	6	0
20,000-30,000				4	1	1	3	3	2	1	1	0	0	0	1	3	3	2	II	8	6
30,000-40,000				2	4	3	1	1	2	1	3	2	3	3	2	4	4	4	II	IS	13
(Percentage)	(0.0)	(0.0)	(0.0)	(45)	(30)	(20)	(55)	(45)	(36)	(60)	(40)	(20)	(36)	(36)	(27)	(73)	(73)	(47)	(46)	(38)	(25)
40,000-50,000				3	3	2	1	1	1	2	2	2	0	0	0	1	1	3	7	7	8
50,000-60,000				1	0	2	2	1	1	0	1	1	0	0	1	2	2	1	5	4	6
60,000-70,000				1	2	3	2	1	2	0	0	1	0	0	0	0	0	2	3	3	8
70,000-80,000				3	1	0	0	0	0	0	0	0	2	1	1	0	0	1	5	2	3
80,000-90,000				2	2	3	2	1	1	1	0	0	0	1	0	1	1	0	4	7	4
90,000-100,000	1	1	0	1	1	1	0	1	0	0	1	3	0	0	0			0	2	3	2
100,000-I50,000	0	0	1	5	2		0	0		1	1		2	2	3			1	3	8	10
150,000-200,000	2	1	1	0	2		0	0					2	2	2				4	3	5
200,000-300,000	4	4	3			1	1	1					0	0	0				4	5	5
300,000-400,000	1	2	3										1	1	1				2	3	4
400,000-500,000	1	1	1																1	1	1
500,000-600,000	1	1	1																I	I	I
600,000-700,000	0	0	0																0	0	0
700,000-800,000	1	1	1																I	I	I
800,000-900,000	0	0	0																0	0	0
900,000-1000,000	1	1	1																I	I	I
Total	12	12	12	20	20	20	11	11	11	10	10	10	11	11	11	15	15	15	79	79	79

A = ESBN income; B = Total fishing income; C = Income from all source
(Note: Percentages are given in brackets)

Excluding Gorakghata, where all households are above the subsistence level, we find that 21 per cent of ESBN-owner households have raised their economic standards above subsistence levels by undertaking 'other fishing' and jobs related to fishing and nonfishery activities. Eight per

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* The Bangladesh Bureau of Statistics (1986 and 1990) estimated that a monthly per capita income of TK 226 was necessary to consume 2200 calories/day/person in 1981-82. Taking into account the inflation rate between 1981-82 and 1989-90, we estimated that an annual income of TK 40,000 in 1989-90 would be required for a family of 6.5 members to consume 2200 calories/day/person.

cent of this mobility is caused by undertaking 'other fishing'. the rest coming from fishery-related and nonfishing employment. The highest proportion (40 per cent) of ESBN-owner households who have moved above subsistence level by such activities is in Badurtali and the lowest (9 per cent) is in Dhona. In Bazargram and Dhona, 'other fishing' has not raised the income above subsistence level.

6.2 Distribution of households by income from a/I actzutzes

Table 11 presents the distribution of all sample households by income from all economic activities. On an average. about 39 per cent of the fishing households are below the poverty line and form the vulnerable section of the fisherfolk community associated with the ESBN fishery in Bangladesh. Harni shows a high of 52 per cent and Badurtali a low of 23 per cent. It may be recalled (Table 10), that only 25 per cent of set bagnet-owner household are below the poverty line. A rise in the proportion of people below the poverty line shows that most of them belong to the crew households and households engaged in some petty trade.

Table 11: Distribution of all types of households, in the six villages, by income from all economic activities

Level of annual income (TK)	Gorak. ghata	Kumira	Harni	Badur- tali	Dhona	Ba:ar- gram	Total
<10,000	0	2	1	0	1	0	4
10,000-20,000	1	0	5	2	1	1	10
20000-30000	4	2	4	1	3	2	16
30,000-40,000	4	5	2	2	2	4	19
(Percentage)	(37.5)	(36.0)	(52.2)	(22.7)	(43.8)	(43.8)	(38.9)
40,000-50,000	0	2	2	3	1	3	II
50,000-60,000	1	2	2	2	1	2	10
60,000-70,000	1	3	2	1	0	2	9
70,000-80,000	1	0	0	4	1	1	7
80,000-90,000	0	3	1	0	0	0	4
90000100000	0	1	1	1	1	0	4
100,000-150,000	1	2	0	6	2	1	12
150,000-200,00	1	1	0	-	2	-	4
200,000-300,000	3	2	2	-	0	-	7
300,000-400,000	3	-	1	-	1	-	5
400,000-500,000	1	-	-	-	-	-	
500,000-600,000	1	-	-	-	-	-	1
600,000-700,000	0	-	-	-	-	-	0
700,000-800,000	1	-	-	-	-	-	
800,000-900,000	0	-	-	-	-	-	0
900 000 1000 000	1						
.	.	.	-	-	-	-	-
% above subsistence	(62.5)	(64.0)	(47.8)	(77.3)	(56.2)	(56,2)	(61.1)
Total	24	25	23	22	16	16	126
	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Note: Percentages are given in brackets

6.3 Inequalities due to seasonality of activities and gear

Seasonality of economic activities in fishing villages causes wide variations in the flow of household incomes and aggravates the socioeconomic vulnerability of the different socioeconomic classes. Some classes not only earn below subsistence levels during a few months but also do not generate enough surplus during the good fishing season to compensate. There are other groups/classes which do. Apart from pure nonfishing workers, the classes which earn incomes below the subsistence level include fishermen without enough nets and craft to participate in different fisheries. Those who generate enough surplus obviously own enough gear and are able to participate profitably in different fisheries.

In order to understand the differential impact of seasonality on various classes of people, we divided the estuarine set bagnet fishing households into six socioeconomic classes based on the capabilities of the groups to earn the minimum monthly subsistence (Tk 3333/month) income.

Table 12 shows the classification of estuarine set bagnet households into different socioeconomic classes. It also shows the nature of the economic mobility of these classes brought about by income from other sources. Classification of households based on the level of income from set bagnet fishing shows that only 1.2 per cent of the households earn an above-subsistence income throughout the year, while 21.5 per cent earn below-subsistence incomes during one or two months. A third category, which manages family expenses through accumulated surpluses earned during 7-9 months. is 12.7 per cent in extent. The rest find it difficult to make both ends meet.

Table 12: Classification of set bagnet fishing households into socioeconomic classes and the pattern of their upward mobility

Period classesl groups (h'holds) earn surplus incomes (in months)	Gorakghatu		Kumira		Harni		Hadurtali		Dhona		Ba:argram		Total				Remarks Period of earning below subsistene level of Tk 3333/ h'hold! month (montlts)
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	
All 12	0	0	0	2	0	0	0	1	1	1	0	2	1	1.2	6	7.6	Never
10-11	9	9	3	9	0	2	0	2	4	4	1	0	17	21.5	26	32.9	1-2
7-9	3		2	2	1		2	2	2	2	0	4	10	12.7	15	19	3-5
4-6	0	0	7	7	7	5	4	5	3	3	6	7	27	34.2	27	34.2	6-8
1-3	0	0	7	0	2	2	1	0	1	1	6	2	17	21.5	5	6.3	9-11
- (All 12)	0	0	1	0	1	0	3	0	0	0	2	0	7	8.9	0	0	Always
Total	12	12	20	20	11	11	10	10	11	11	15	15	79	100	79	100	

Note: A = ESBN income only; B = Income from all sources: - = deficit.

Classification of households based on income from all sources reveals that the percentage of households belonging to the first three classes has increased from 35.4 per cent to 59.5 per cent. while the proportion of households in the other three classes reduced from 64.6 per cent to 40.5 per cent. This would imply that about 24.1 per cent of the households moved economically upwards by supplementing their set bagnet fishing income, either by shifting to other fisheries or to fishery-related and nonfishery-related activities. Inter-village comparisons revealed that income from other sources did not have any significant impact on raising the economic position of any of the socioeconomic groups in Gorakghata and Dhona. In all other villages, 'other activities' play a positive role in improving the economic standards of different socioeconomic groups.

(19)

Table 13 shows classification of all sample households into various classes and the average surplus! deficit income of each category over the level of subsistence. While 12.7 per cent of the households always earn above subsistence, about 19.8 per cent never earn enough to meet their subsistence needs. The top four classes made an average surplus of Tk 73,657, Tk 201,359, Tk 81,503 and Tk 3,882 respectively, while the two lowest classes were in deficit by Tk 10,730 and Tk 20,672 respectively.

Table 13: Classification of sample households into various socioeconomic classes and their average surplus/deficit income in Tk '000s

Period classesl groups (h'holds) earn surplus incomes in months)	Gorakghata No. HHs	Avg. HH (Tk +/-)	Kurnira No. HHs	Avg. HH (Tk +/-)	Harni No. HHs	Avg. HH (Tk +/-)	Baduriali No. HHs	Avg. HH (Tk +/-)	Dhona No. HHs	Avg. HH (Tk +/-)	Bazargram No. HHs	Avg. HH (Tk +/-)	Total No. HHs	Avg. HH (Tk +/-)	Remarks Period earning below subsis-tence level of Tk 33331 h'holdl month (months)
All 12	2 (8.3)	23.9	2 (8.0)	165.4	0 (0)	0.0	9 (40.9)	45.3	1 (6.2)	279.0	2 (12.5)	56.8	16 (12.7)	+73.7	Never
10 - II	9 (37.5)	430.3	9 (36.0)	63.5	2 (8.7)	137.5	2 (9.1)	61.4	4 (25.0)	98.2	0 (0.0)	0.0	26 (20.6)	-201.4	1 - 2
7 - 9	4 (16.7)	133.6	2 (8.0)	28.4	4 (17.4)	154.5	2 (9.1)	52.5	2 (12.5)	42.8	4 (25.0)	16.8	18 (14.3)	+8 1.5	3 - 5
4 - 6	l (4.2)	38.0	9 (36.0)	-2.0	7 (30.40	7.9	6 (27.3)	8.0	5 (31.3)	0.9	7 (93.8)	1.1	35 (27.8)	+3.9	6 - 8
- 3	l (4.2)	-3.1	0 (0.0)	0.0	2 (8.7)	-12.1	0 (0.0)	0.0	l (6.2)	-16.9	2 (12.5)	-10.1	6 (4,8)	-10.7	9 -II
- (All 12)	7 (29.1)	-12.4	3 (12.0)	-28.6	8 (34.8)	-23.0	3 (13.6)	-19.9	3 (18.8)	-24.7	1 (100)	-26.6	25 (19.8)	-20.7	Always
Total	24 (100)	183.5	25 (100)	34.2	23 (100)	32.2	22 (100)	28.3	16 (100)	42.0	16 (100)	8.8	126 (100)	+59.0	

Note: HH = Household; % in brackets: - = deficit

(20)

The nature of inequality is further demonstrated in the form of a Lorenz curve (Figure 3). Income inequalities are very wide in Gorakghata, Harni, Dhona and Kumira, while in Bazargram and Badurtali, the extent of inequality is relatively low.

Fig. 3. Distribution of household income in Bangladesh fishing villages: Lorenz curves
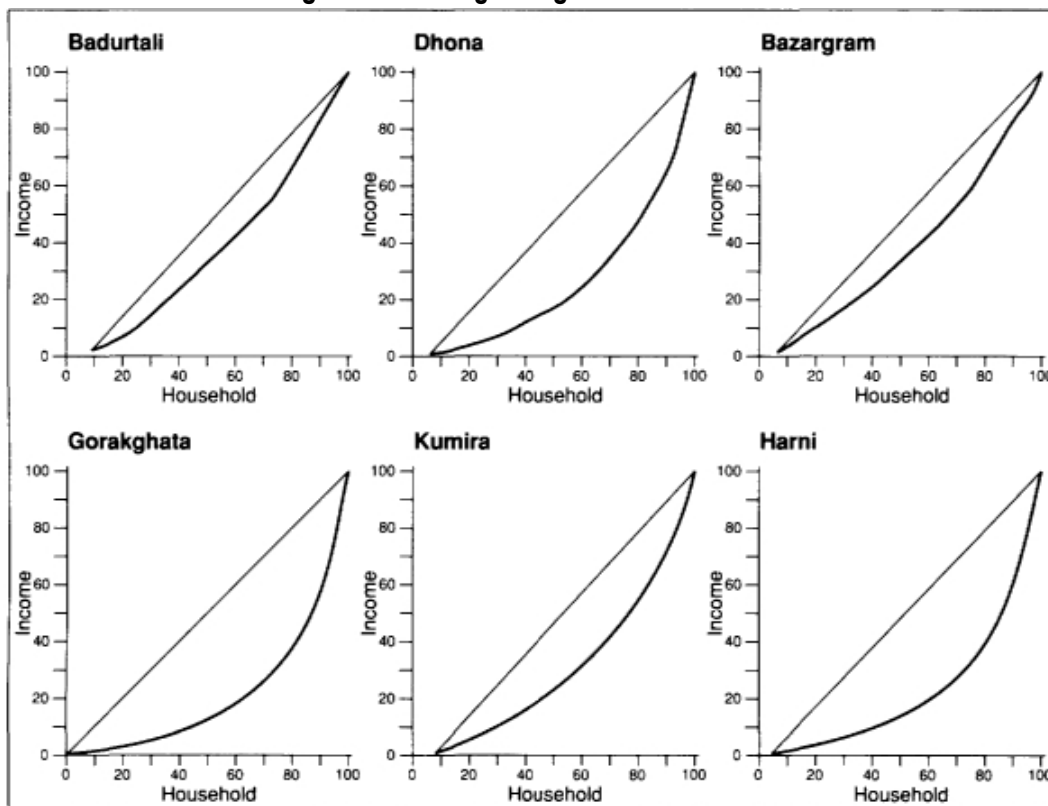
This socioeconomic scenario, although not totally unexpected, is primarily due to an unequal distribution of fishing gear among the ESBN households. Table 14 shows the concentration of estuarine set bagnets among the sample households in the study areas.

Table 14: Concentration of set bagnets among sample households, in the six **villages**

No. of ESBN *Households*

No of set hagnets owned perh'h	Gorakghata		Kumira		Harni		Badurtali		Dhona		Ba:argram		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
	3	25	7	35	4	36	3	30	4	36	8	(53)	29	37
2	4	33	7	35	4	36	4	40	4	36	7	(47)	30	38
3	1	9	2	10	3	28	0	(0)	1	9	0	0	7	9
4	4	33	1	5	0	0	0	0	1	9	0	0	6	7
Sormore	0	0	3	15	0	0	3	30	1	9	0	0	7	9
Total	12	100	20	100	11	100	10	100	11	100	15	100	79	100

It is evident from the table that 37 per cent of ESBN households own only one gear unit, while 9 per cent own five units or more. The majority own one or two units. Most of the surplus-earning ESBN households also have a tendency to diversify their fishing activities by investing in other gears such as marine set bagnets, trammelnets, *Hilsa* gilinets, bottom longlines, pushnets, bottomset large mesh gillnets etc. particularly in Kumira, Harni and Badurtali. In Dhona and Bazargram, fisherfolk expressed a strong desire to shift to marine set bagnets if such opportunities were biologically and economically viable. In Gorakghata, on the Other hand, the tendency was to invest more on estuarine set bagnets rather than to diversify into other fisheries. This was because of a high catch rate, favourable prices and higher income.

In short, concentration of estuarine set bagnets and the desire of households with surplus earning to invest in other craft-gear combinations are responsible for the skewed distribution of income among various classes of fishing communities in each village. Despite the disparities, the present socioeconomic scenario does not exhibit any immediate signs of social disintegration or internal confrontation among various income classes.

7. *SUMMARY AND CONCLUSIONS*

The assessment of the socioeconomic conditions of estuarine fisherfolk was made primarily by conducting a detailed bioeconomic enquiry into the operations of ESBN fisheries and other fisheries and by examining how certain social features/relations (family size, participation of family members in fisheries, fishery-related and nonfishery jobs, distribution and ownership of fishing assets, sharing of catch value etc.) have affected the living standards of these fisherfolk. The following findings emerged:

> Fishing households in Bangladesh have a higher family size than the national average (Bangladesh Bureau of Statistics, 1990).

> Fishing villages are characterized by a high rate of illiteracy, especially among women.

- There is low female participation in the work process, especially in fishery-related and nonfishery activities.

- There is a high dependency on earning members in these villages.

> There is a lack of facilities for higher education, which may tie down the younger generation to the same old activities and increase human pressure on resources.

Estuarine set bagnet fishing is organized as a family enterprise, with active participation of family labour in fishing, marketing and processing. Although it is practised almost round the year, fishermen seasonally shift to other fisheries also, to increase their income. They also undertake marketing, traditional processing, petty trading and a variety of nonfishery activities as part-time sources of additional income.

Among the four classes of set bagnets studied, (c) and (d) are primarily meant for marine set bagnet fishing, which is highly seasonal. These nets are operated in the estuary during the rest of the year, otherwise they will lie idle. No one fabricates these nets for operation in estuaries. The study noted a general tendency to operate the (c) and (d) type set bagnets due to high 'operating profits' and income. However, the shift from (a) and (b) nets to (c) and (d) may be further delayed because of the considerable capital investment and the high operational costs of the latter. Locational disadvantages of certain villages may also slow down the process of diffusion.

The study revealed that about two-thirds of the fishing households combine fishery and nonfishery activities with fishing activites. Almost all the rest concentrate only on fishing.

Although 82 per cent of the ESBN fishermen in Bangladesh are owners of their gear and craft, the study revealed that there was nevertheless a high degree of poverty among them. There is also a high degree of inequality in the distribution of household incomes. It is estimated that about 39 per cent of the households during 1989-90 were below the poverty line. Lack of proper craft-gear combinations to take up fishing as an economically viable occupation round the year may be the major reason for the high incidence of poverty among fisherfolk. Natural disasters, low catch rates and lack of sufficient supplementary income-generating activities also contribute to this sad state of affairs.

Any effort to regulate fisheries will, hence, have a high social cost, endangering the survival of the marginalized and poorer fisherfolk in Bangladesh. However, the desire expressed by many ESBN fishing households to shift to other fisheries and the general tendency among the households to make a surplus income by diversifying their fishing activities are welcome indications of the future course of action.

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