FAP 17

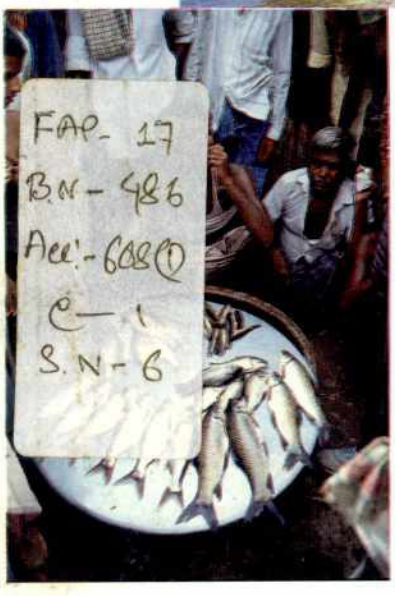
Fisheries Studies and Pilot Project

FINAL REPORT

(Draft)

JUNE 1994

Supporting Volume No. 14



VILLAGE STUDY

THE KAI PROJECT AND DEKKER HAOR

Prepared for the Government of Bangladesh

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A-31

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AND PILOT PROJECT

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ACKNOWLEDGEMENTS

The field work which formed the basis for the following report was carried out by the FAP 17 socio-economic research team in the North-East Region, supported, during the course of a more intensive village appraisal, by other socio-economic team members based in Dhaka. Other information was collected by various members of the FAP 17 team during the course of *ad hoc* surveys. Additional data from census, baseline and monitoring surveys were analysed in Dhaka and incorporated into this report. All contributed in different ways to the following report. The contributors' names, positions on the team and areas of expertise are as follows :

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SUMMARY OF FINDINGS

1. Impacts of submersible embankments on fisheries resources

The impacts of the submersible embankment of the Kai Project on fisheries in Bara *haor* is not particularly serious to date. Local fishermen say that fisheries production has declined but the submersible embankment in itself is thought to have had only a limited effect. Certain species are identified as having suffered as a result of the obstruction of free flooding, but these impacts are regarded as the cumulative result of embankment, road and homestead building. Other factors, such as increased fishing by non-traditional fishermen, the conversion of the *haor* to cultivable land and more indiscriminate harvesting of important *beel* using mechanical dewatering techniques have had a greater impact on fisheries.

Specific water access routes connecting the *haor* areas with the main rivers play a more important role in sustaining the stock of high-value, migratory fish than overbank, sheet flooding. Fish fry and fingerlings are carried into the *haor* during early flooding through these channels. In the case of the Kai Project, most of these channels are still open. Local fishermen feel that once planned water control structures on the principal *khal* are in place, they will have an important negative impact on fisheries. The closing off of an important *khal* connecting the "outside" area of Dekker *haor* with the Surma River is reported to have led to a major decline in fisheries resources.

2. Impacts on fisheries dependence

The peak of fisheries dependence for the broadest cross-section of local people is during the pre-monsoon and early flood season fishery. This usually occurs in the months of *joisthya* (May/June) and *ashar* (June/July) when local weather conditions coupled with a slackening of leaseholders' controls give rise to an active, open-access fishery. During this period, fishing makes an important contribution to the livelihoods of households in all socio-economic groups. Usually this fishery would not be affected by submersible embankments as these usually overtop by the end of *baishak* (April/May), before the peak of this early season fishery. In some years, under certain conditions, there is fishing earlier which would be negatively impacted by submersible embankments although this fishery is more dependent on fish moving from *beel* onto floodplains rather than from river into *beel*.

3. Conflicts between agriculture and fisheries

Flood control measures, road construction, natural siltation and the increased demand for cultivable land have all resulted in important changes in the *haor*. Many low-lying areas in both Bara *haor*, inside the Kai Project, and in Dekker *haor* have been converted from permanently fallow to cultivable land over the last twenty years. Most areas of wetland forest, which played an important part in the productivity of the *haor* system, have been cleared to make room for *boro* rice during the winter months. This has increased the area free of vegetation which can be fished during the flood season and has led to conflicting demands on water resources during the winter.

The area of the *haor* under private control has also been extended. This has partly taken place through normal bureaucratic channels which have redistributed previously *khas* land to both local people and new settlers, and partly through unofficial occupation of these lands. There is an increasing tendency for landholders in low-lying areas to exploit the fish resources which "graze" on their lands during the period when they are inundated. New settlers, who tend to own lower land, are less subject to social restrictions on fishing activity by farmers and often fish seasonally. Landowners also trap fish as the water recedes, either by bunding or the excavation of *dubi* (fish pits). This has considerably increased the levels of fisheries exploitation on the floodplain and led to conflicts between farmers and fisheries lease-holders over the "ownership" of fish resources in the *haor*.

4. Patterns of fisheries involvement

In the past, fishing for income by anyone except professional, traditional fishermen is limited for much of the year due to the strict control of access to fisheries resources and the low social status associated with the activity. There has been an increase in fishing activity by non-traditional fishermen in the area over the last 10-15 years. Both for landowners and landless households, the levels of fisheries involvement are slightly less inside the Kai Project, but the contribution of the scheme to this difference is limited.

Altogether, 59% of landholders in Akhtapara (inside) and 63% in Mahmudpur are seasonally involved in fishing. Even more fish on a very occasional basis which does not contribute significantly to their household livelihoods. The involvement of landless agricultural labourers in fishing is **proportionally** less compared to small landholders. This is due to access being limited by landholders on the one hand and fisheries leaseholders on the other. 41% of

landless households in Akhtapara were engaged in some fishing activities while the figure was 58% in the outside village of Mahmudpur.

5. Impacts of submersible embankments in traditional fishing communities

The economic condition of traditional fishing communities has been negatively affected by the increase in competition for the fisheries resource which is influenced indirectly by embankments. The increasing intrusion of agricultural activities into the lower parts of the *haor* is encouraged by flood control and this negatively affects open-access fisheries on the floodplain as lowland farmers get involved in fishing themselves.

Most perennial waterbodies are under leasing arrangements, with the result that fishermen's access to fisheries resources is highly dependent on leaseholders. Fishermen excluded from these important *beel*-fisheries are reliant on fisheries in *khal*, rivers and on the floodplain. Submersible embankments should not affect the area under leaseholding as they only influence the timing of flood, not the extent or depth. Where interruption of early seasonal flows of migratory fish has a negative impact on *beel* fisheries, fishermen's (and leaseholder's) income would be adversely affected.

Seasonal agricultural labour and fish marketing are common alternative strategies which are taken up by traditional fishing households.

6. Control of access rights to fisheries

The distribution of fisheries benefits in the *haor* region is strongly conditioned by the extremely rigid restriction of access to fisheries resources in the area. The most productive *beel* fisheries are tightly controlled by a well-established and extremely powerful group of fisheries leaseholders. These fisheries elites have been able to maintain their hold on the principal *beel* in spite of numerous adjustments to the official mechanisms governing fisheries access and attempts to give fishermen themselves more control over the resource. Traditional patterns of leaseholder control is now being eroded by changes in the land-use and porperty rights in the *haor*.

Traditional fishing communities are often highly dependent on these leaseholders for employment and tied to them by links of indebtedness and patronage. As the areas available

for open-access fishing decrease and competition for the resource increases, especially on the floodplain, this dependence is becoming stronger and makes fishermen vulnerable to exploitation. Leaseholders often provide the only guarantee of fisheries access for traditional fishermen as they can mobilise the bureaucratic connections and finances necessary to obtain leases and hire fishermen to fish for them. Any decline in the condition and productivity of the *beel* held by leaseholders, or a decline in numbers of waterbodies under lease, would have an important negative impact on a large number of fishermen even if these waterbodies are controlled by leaseholders.

INTRODUCTION

The principal aims of the socio-economic component of the FAP 17 Fisheries Studies are to establish how changes in fisheries caused by flood control measures affect the livelihoods of different groups of people living in the floodplains of Bangladesh. It has frequently been stated that fisheries, whether as a full-time occupation, a seasonal stop-gap or an occasional source of food, constitutes an essential part of the livelihood strategies of many rural households living in floodplains areas. There is concern that the massive expansion of areas protected from flooding by various flood control measures, as envisaged under the Bangladesh Flood Action Plan (FAP), would cause a significant reduction in the fisheries resources available to these people. The possibility that poorer rural households in particular might be highly dependent on seasonal access to open-water fisheries in flooded areas has caused particular concern and raised doubts that the negative impacts to fisheries caused by flood control might actually outweigh the benefits arising through improved agricultural production and protection from flood damage.

The FAP 17 study is therefore analysing the role of fisheries in the livelihood strategies of different social and occupational groups in floodplain communities and how this has been affected by flood control measures. To do this, communities inside and outside existing flood control schemes, but located in areas with comparable agro-ecological characteristics, have been selected for a detailed study covering four regions of the country. Near each randomly selected village, one or more specialised fishing communities have been identified which share fisheries resources with the main community. Each of these groupings of main village (usually principally agricultural) and nearby fishing communities has been regarded as a "village cluster". In each of these clusters, a quantitative survey of a stratified sample of households, looking at labour, income and consumption was carried out over a one-year period. This has been supported by a village appraisal which has looked at the historical and social processes in and around the study villages and their effects on fisheries. Given the complexity of the fisheries environment and the number of factors which influence it, this more qualitative information has provided a vital context for the quantitative data collected during the long-term monitoring of the study villages.

The following report covers two of the village clusters studied, one inside a flood control scheme, one outside. It compares the fisheries resources and the fishing activities carried out in both and attempts to describe and assess the impact which different processes, structures

and events have had on the interaction between local people and the fisheries resource. The report combines data collected both during the village appraisals and the various quantitative surveys carried out during the study. It is one of a series of seven Village Study Reports published by FAP 17 as supporting volumes for the project's Final Report.

VILLAGE STUDY
The Kai Project and Dekker *haor*

1 DESCRIPTION OF AREA

1.1 Location

Two main villages, each with two associated fishing communities, were selected in Sunamganj District, in the *haor* basin of the North-East Region. They are located in the *haor* areas south and east of the Surma River.

Akhtapara was selected as a village "protected" by flood control. The Kai Project in which it is located is a submersible embankment scheme designed to provide protection against early floods, reducing risks to the winter *boro* rice crop but allowing normal flooding during the rest of the season. The Kai Project encloses an area known as Bara *haor* which contains several *beel* with significant fisheries.

Two nearby fishing villages, Doradhar, located about half a kilometre to the east across the Mahasingh River, and Harinagar, located downstream about two kilometres, were selected as satellite fishing communities. Doradhar is a hindu *matsya das* community while the fishermen of Harinagar are all Muslim *maimul* fishermen.

For comparison, a village located about four kilometres to the north-east, Mahmudpur, was identified, located in an area unprotected by major flood control works on the edge of Dekker *haor*. This is an extensive *haor* area to the north and east of the main Sylhet-Sunamganj highway. Two nearby *maimul* fishing communities on the banks of the Mahasingh River near Pagla *bazar*, Chandpur and Enaetnagar, were identified as satellite fishing communities.

The location of the study area in Bangladesh is shown in Figure 1. The Kai Project and Dekker *haor*, the clusters of study villages and the principal local waterbodies are shown in more detail in Figure 2.

Figure 1
Location of Akhtapara and Mahmudpur in Bangladesh

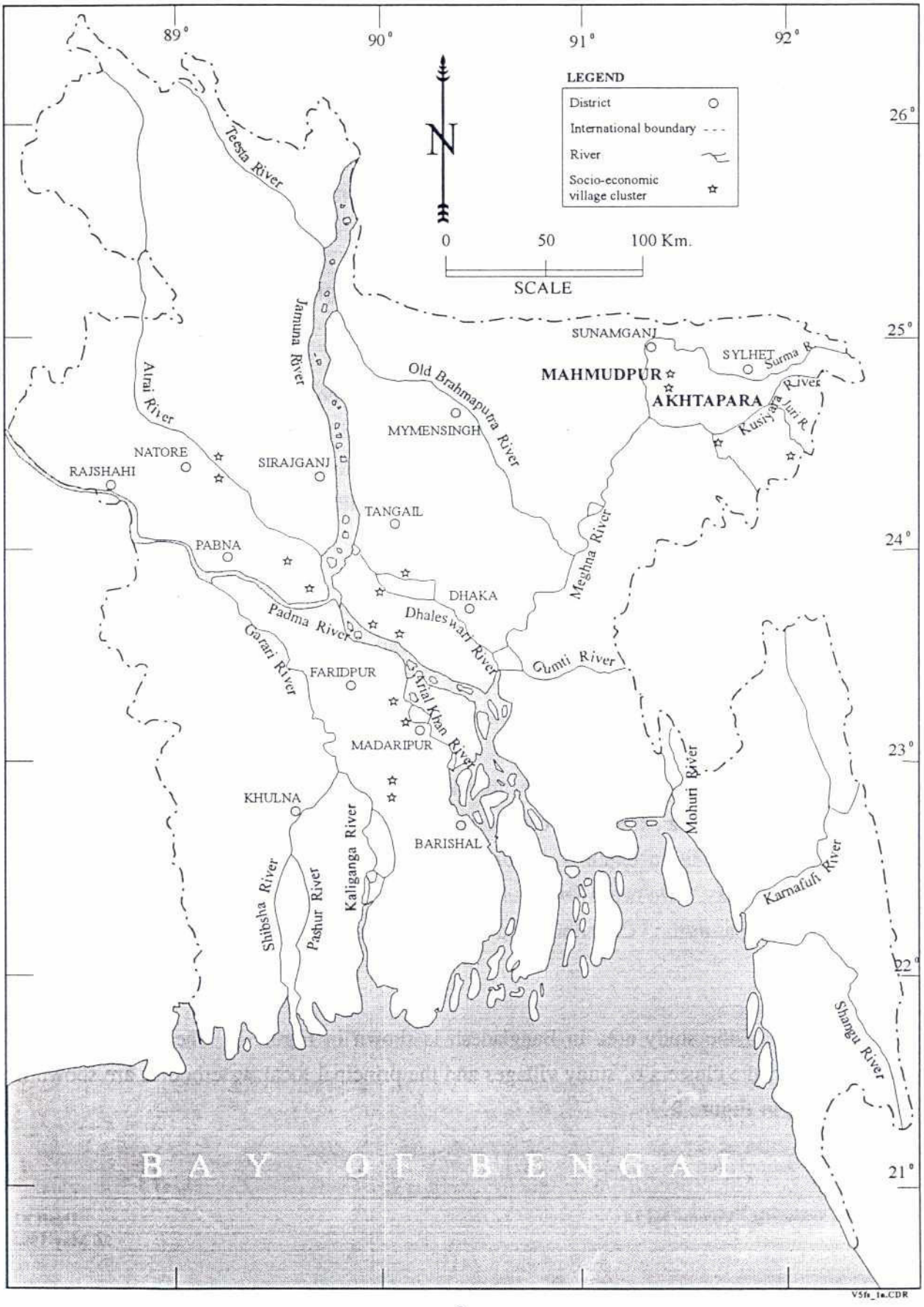
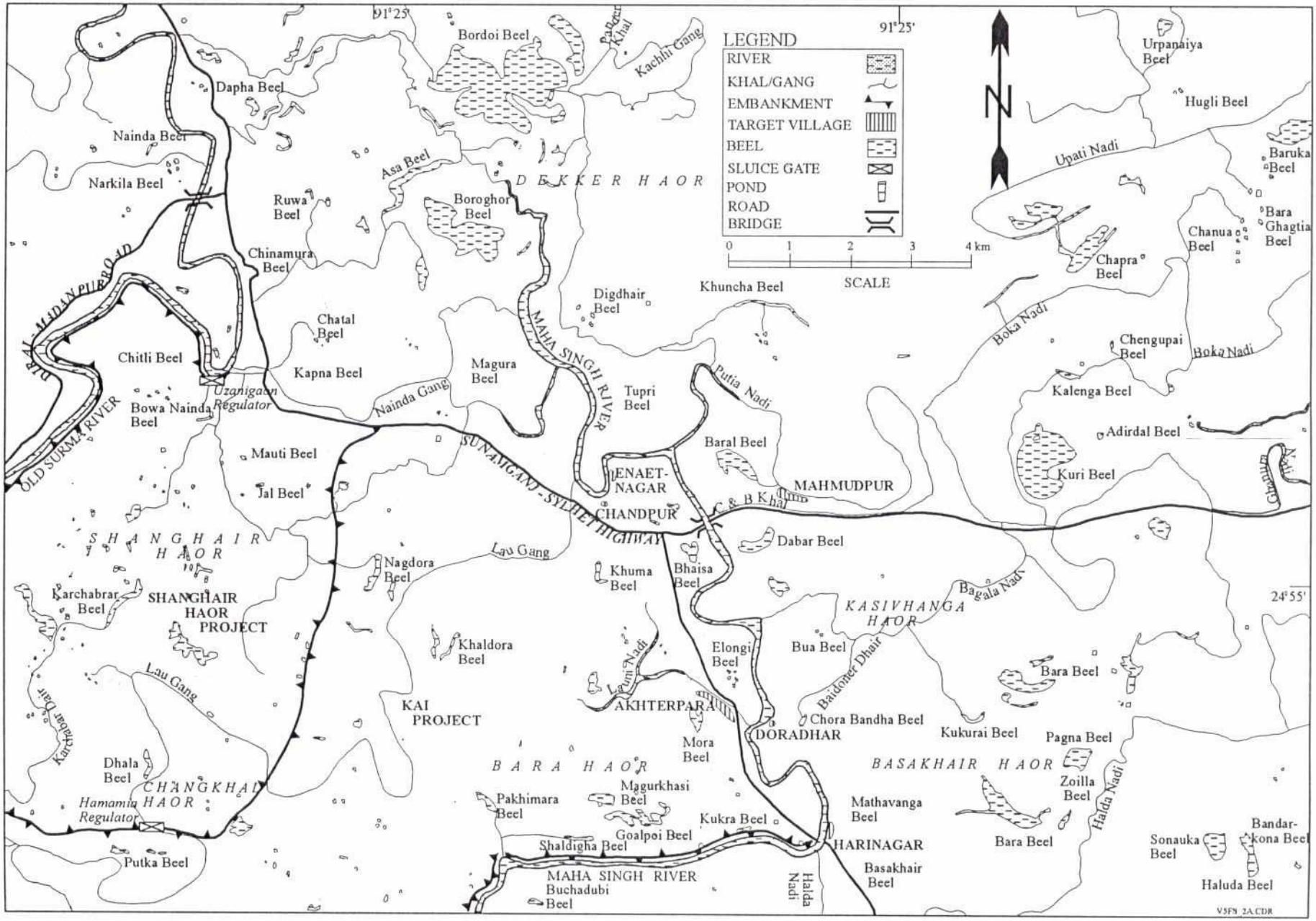


Figure 2
The Kai Project, Dekker Haor, location of
study village and principal local waterbodies



Kai Project

The area of the Kai Project is flooded principally by water from the Mahasingh River. The project is situated immediately south of the Sylhet-Sunamganj highway and extends from the highway southwards, more or less following the course of the Mahasingh River, up to its' junction with the Old Surma. The Dabor-Jagannathpur road, which runs from the main highway south to Meena Bazar and then on to the Mahasingh River opposite Harinagar, constitutes a flood embankment although there are three gaps in it where small *khal* and the Launi River connect the main river with the *haor* area inside the scheme.The southern side of the project is protected by a submersible embankment. This is still incomplete due to delays in constructing a planned sluice-gate at Birgaon, on the south side of the project. This will eventually control water entering the *haor* through the Shaldigha *khara* (canal) which connects the network of *beel* to the south of Akhtapara with the Mahasingh River. The west side of the Kai Project borders directly with another submersible embankment project, the Shanghair Haor Project. The northern part of the embankment separating the two is formed by a roadway connecting Shantiganj *bazar*, on the main highway, with Dungria village. The embankment is submersible to the south, down to the point where it meets the Old Surma River .

Akhtapara village is located at the extreme eastern side of the Kai Project, just south of the Launi River and overlooking one of the principal groups of *beel* in Bara *haor*. Although the submersible embankment surrounding Bara *haor* has not yet been entirely closed, much of the area immediately adjacent to Akhtapara is already protected by a submersible dyke built by local people and maintained by the union *parishad* of Durgapasha union. Many of the expected impacts of the scheme on agriculture are already taking effect.

Dekker *haor*

Dekker *haor* is an extensive area of wetland and perennial *beel*, bounded on the northern and western side by the Surma River, with the district and *thana* headquarters of Sunamganj located at the north-western corner. The southern edge of the *haor* is marked by the Sylhet-Sunamganj highway. The *haor* area is made up of a complex series of perennial and seasonal *beel*, interconnected by *khal* and traversed by the Mahasingh River which rises in the *haor* and drains out of it at Dabor *ghat* at the south-eastern corner. The broad expanses of wetland in the centre of the *haor* are largely uninhabited and all the villages in the area are located on the surrounding ridges and along the levees of rivers and *khal*.

The "unprotected" villages studied in this area are located just north of the Sylhet-Sunamganj highway around the point where the Mahasingh River drains southwards out of the *haor* complex. Mahmudpur is strung out along the north side of the Sylhet-Sunamganj road immediately east of Dabor Bridge. It is separated from the road by the C & B *khal*, the borrow pit excavated for the construction of the highway. On the north side, the Putia River lies between the village and the open *haor*.

The two adjacent fishing communities of Chandpur and Enaetnagar are situated on the south bank of the Mahasingh River west of Dabor Bridge and about half a kilometre east of Pagla *bazar* where the local union council and market are located. Both villages are about two kilometres west of Mahmudpur.

1.2 Community profile

Tables 1 and 2 review basic socio-economic data on the population of the main villages and satellite fishing communities. For the main villages this is disaggregated by landholding category, while for the satellite fishing communities it is disaggregated by fishing category. These categories are explained below.

The higher proportion of landless in Akhtapara, 63% of the 205 households, is notable. Akhtapara is a relatively new community within Durgapasha *mauza*, and has attracted some settlers from outside the area. The social divisions between such settlers, who have mostly moved in from Mymensingh within the last one or two generations and are known locally as *abadi*, and the "original" *haor* inhabitants, or *stanio*, are of considerable significance for fisheries.

Mahmudpur is an older village with fewer recent in-migrants and a considerably lower level of landlessness; 55% of the 140 households in the village.

1.3 Agroecology

The two main villages occupy the same agro-ecological unit. These agricultural units have been defined by the Bangladesh Land Resource Survey (FAO, 1988) which is based on Soil

Table 1

Akhtapara, Harinagar and Doradhar

Community Profile

NE3-1 Akhtapara — Main village — Inside

Land Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H Members	Earn members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
Large	9	49.3	5.8	14.6	1.7	100.0	0.0	21	2004	15	38	2078
Medium	28	47.0	3.8	7.9	1.6	100.0	0.0	12	401	5	5	423
Small	38	47.5	1.7	6.8	1.8	100.0	0.0	8	116	2	1	127
Landless	130	42.1	0.3	5.9	1.4	100.0	0.0	4	4	1	0	9

Source: FAP17 Village Census

* Landholding categories are defined in relation to total land owned as follows:
Large >7.5 acres; Medium 2.5-7.49 acres; Small 0.5-2.49 acres; Landless <0.5 acres;

NE3-2 Harinagar — Satellite fishing community — Inside

Fish Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H members	Earn. members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
F1	18	41.6	0.3	5.6	1.4	100.0	0.0	3	0	0	0	3
F2	65	38.2	0.4	6.5	1.7	100.0	0.0	4	16	0	0	20
F3	6	47.3	0.0	7.8	1.5	100.0	0.0	3	0	0	0	3

Source: FAP17 Village Census

NE3-3 Doradhar — Satellite fishing community — Inside

Fish Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H members	Earn. members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
F1	1	52.0	0.0	6.0	2.0	0.0	100.0	2	0	0	0	2
F2	22	43.4	0.3	6.4	1.8	0.0	100.0	5	9	0	0	14
F3	1	48.0	0.0	2.0	1.0	0.0	100.0	2	0	0	0	2

Source: FAP17 Village Census

* Fishing categories are defined as follows:
F1 = Fishing as only source of income
F2 = Fishing as primary source of income but with other subsidiary source of income as well
F3 = Fishing as secondary source of household income.

Table 2

Mahmudpur, Chandpur and Enaetnagar

Community Profile

NE4-1 Mahmudpur — Main village — Outside

Land Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H Mem-bers	Earn mem-bers	% Muslim	% Hindu	Home-stead	Culti-vable Land	Ponds	Other	Total
Large	12	49.3	3.8	10.6	2.3	100.0	0.0	48	1133	8	9	1198
Medium	16	53.8	2.6	10.9	2.5	87.5	12.5	26	412	4	9	451
Small	35	50.7	0.6	7.3	1.9	91.4	8.6	17	111	2	0	130
Landless	77	42.5	0.6	5.9	1.5	93.5	6.5	7	3	0	0	10

Source: FAP17 Village Census

* Landholding categories are defined in relation to total land owned as followes:
Large >7.5 acres; Medium 2.5-7.49 acres; Small 0.5-2.49 acres; Landless <0.5 acres;

NE4-2 Chandpur — Satellite fishing village — Outside

Fish Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H mem-bers	Earn. mem-bers	% Muslim	% Hindu	Home-stead	Culti-vable Land	Ponds	Other	Total
F1	17	38.4	0.0	5.6	1.4	100.0	0.0	4	0	0	0	4
F2	53	43.8	0.4	6.2	1.7	100.0	0.0	4	42	1	0	47
F3	7	50.7	1.0	12.7	2.4	100.0	0.0	7	337	0	0	344

Source: FAP17 Village Census

NE4-3 Enaetnagar — Satellite fishing village — Outside

Fish Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H mem-bers	Earn. mem-bers	% Muslim	% Hindu	Home-stead	Culti-vable Land	Ponds	Other	Total
F1	64	38.1	0.0	5.9	1.6	100.0	0.0	4	0	0	0	4
F2	148	42.1	0.0	7.4	1.8	100.0	0.0	5	6	1	0	12
F3	38	45.0	0.0	8.0	1.7	100.0	0.0	7	28	0	0	35

Source: FAP17 Village Census

* Fishing categories are defined as follows:
F1 = Fishing as only source of income
F2 = Fishing as primary source of income but with other subsidiary source of income as well
F3 = Fishing as secondary source of household income.

Reconnaissance Surveys conducted in the 1960s. They are therefore indicative of conditions **prior** to the construction of the principal embankments in the area. The Land Resource Survey uses the distribution of different soil types and areas of different flooding depth and duration to establish the agricultural potential of different land units. These areas are defined as "agro-ecological units" (AEUs). Within a particular AEU, a broadly similar historical distribution of soil types, land height and agricultural capability can be assumed.

These AEUs were used as a basis for the selection of communities for study as they appeared to offer the possibility of identifying areas with similar agricultural potential **and** similar access to waterbodies as defined by land height. In practice, using the agro-ecological units as a basis for identifying paired comparisons of communities did not always prove satisfactory given the immense range of variables influencing fisheries activity in different rural communities.

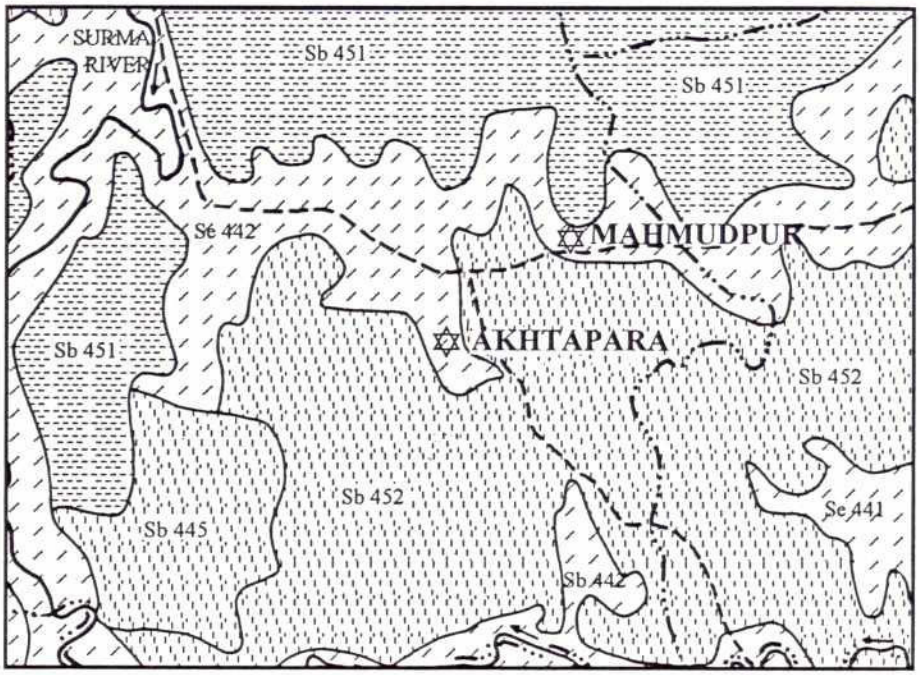
However, the agroecology of areas around study villages does provide a general indication of conditions. In Figure 3, the agro-ecological units immediately surrounding Akhtapara and Mahmudpur are shown. On the maps, AEUs are shaded according to their flood phase while details of the particular AEU where target villages are located are given in the table below the map.

1.4 Floods

The flooding patterns affecting Akhtapara and Mahmudpur prior to the introduction of flood control were essentially the same and shared two principal features: flash floods during during the pre-monsoon and early monsoon period, and deep and sustained flooding of the *haor* during the rainy season.

Flash flooding in the area has two main sources. The Meghalaya Hills in India, which rise steeply out of the *haor* basin about 30 miles to the north of the study area, are subject to some of the heaviest rainfall on earth. The run-off from this rainfall, particularly during violent seasonal storms from *choytra* (March/April) to *joisthya* (May/June) can cause rivers like the Surma to rise several metres overnight. These floodwaters feed through the network of *khal* linking the river to the *haor* areas, resulting in sudden fluctuations in the level of the *haor*. The same seasonal storms frequently affect the *haor* area directly and intense local

Figure 3
Akhtapara & Mahmudpur
Flood phases and agro-ecological units



LEGEND

>50% F0	District boundary
>50% F0 and F1	Upazila boundary
>50% F2, F3, F4	Main road
>50% F3 and F4	Railway
>50% F4	River
Target villages	Tidal river
Town	0 1 2 Km. SCALE

AEU	LANDTYPE DISTRIBUTION (% of land of different flooding depth)					LAND CAPABILITY (%)			
	H	MH	ML	L	VL	Land Capability I		Land Capability II	
SE 442	15	15	65	5	0	IIIWd (65%)	One moderate wetland crop per year & one moderate to poor dryland rabi crop.	IVW (15%)	Either one very poor to moderate rice crop in the monsoon season or remain follow under grassland.

Source : FAO Land Resource Survey

rainfall can give rise to similar flash flooding. These early floods in the *haor* region play an important role in local fisheries.

The monsoon rains set in seriously during late *joisthya*, somewhat earlier than in other regions. The line between the pre-monsoon and monsoon period is frequently blurred in the *haor*. Sometimes there is a lull between the period of violent *kalbaishaki* storms and the arrival of the steady rainfall of the monsoon; sometimes one follows immediately after another. As a result, the water levels in the *haor* may rise and fall several times before finally beginning their rise to full flood levels.

The principal connection for Bara *haor* with the Mahasingh River is the Shaldigha *khara* at its southern end. The *haor* slopes towards the south, with most of the deepest *beel* clustered at that end. The general direction of flooding is north to south suggesting that the Shaldigha *khara* is primarily a drain for these *beel*, but it obviously also acts as an inlet during the early flood season, along with the Launi River on the north side of the *haor* and a few other *khal* running through the road embankment on the east side.

The area immediately around Mahmudpur is affected in similar ways by the level of the Mahasingh River which feeds the Putia *nadi* running past the village. The Mahasingh is the major drain for Dekker *haor* and receives most of its water from the *haor*. It is also connected to the Old Surma River at Jaykalas and the Asanmara ferry *ghat* through the Nainda *gang*. When the Surma rises, there is considerable in-flow through these channels into the *haor* and indirectly into the Mahasingh. This connection is important for the flooding patterns in the *haor* as a whole and plays a key role for fish resources. Flows into and out of the *haor* might change direction several times during the course of the flooding season in response to changes in water levels inside and outside the *haor* and the frequent episodes of heavy rainfall which are typical of the region.

Flood control interventions have had important impacts on flooding patterns in both villages. Flooding from the Mahasingh into Bara *haor* has been restricted to a few channels, limiting the impact of the pre-monsoon floods. In Dekker *haor*, the most important source of flooding used to be a series of *khal* on the northern side of the *haor* which connected with the main channel of the Surma. These brought in floodwaters directly from the river and would have allowed flash flood flows into the *haor* during the pre- and early monsoon period. All these *khal* have now been cut off by the river embankment along the left bank of the Surma.

1.5 Waterbodies and access

The *haor* region is reknowned for its' abundant fisheries resources. Deep seasonal flooding, extensive areas of permanent wetland and run-off from surrounding hills all contribute to this. The extremely tight control of fisheries access which also characterises the region is a reflection of the value of the resources at stake.

Table 3 shows the access arrangements, leaseholders and institutions responsible for waterbodies in the area around Akhtapara and Mahmudpur.

The level of control and enforcement of restrictions on fishing throughout the *haor* region is far greater than in any other part of the country. Whereas elsewhere, the effective limitation of fishing effort on leased *jalmahal* has become the exception rather than the rule, in the North-East the opposite is true. Most permanent waterbodies, of which there are a large number, are leased out and strictly controlled by the leaseholders.

In the area around Akhtapara and Mahmudpur, many of the important *beel* located in both Bara *haor* and Dekker *haor* are either leased out individually or as part of larger "group fisheries" made up of clusters of interconnected *beel* and their linking channels. In Bara *haor*, the *beel* located at its southern end, Pakhimura, Shaldigha, Magurkhasi, Goalpoi and several others are all leased out as individual *jalmahal* by the Land Revenue Office. In addition, many smaller *beel* and sections of *khal* are controlled by local landowners or covenanted to local religious institutions for their upkeep.

In Dekker *haor* there are many *jalmahal*; particularly important are two group fisheries, the Bordoi and Boroghor, located in the heart of the *haor*. Around the edges of these *jalmahal* and over the broad floodplains surrounding them are many other *beel* and *khal*. Most of these waterbodies are also subject to formal leasing arrangements, either through District or *thana* level authorities or local union councils, depending on their size and importance.

The leaseholding system will be discussed in greater detail later, but its' importance in determining patterns and degrees of fisheries dependence in the area needs to be emphasised. Practically all features of the fisheries, whether for subsistence, seasonal or traditional fishing communities, are determined by the strong hold of the leaseholding system in the *haor*.

Table 3

Akhtapara & Mahmudpur

Principal waterbodies and access arrangements

Waterbodies covered (location)	Official leaseholders/ actual controller	Leasing system	Institution responsible	Period
Mahasingh River (Ashapura - Sholagram)	**Official** - fisheries samity **Actual** - local *maimul* leaseholder (member of *thana* fisheries committee)	New Fisheries Management Policy (NFMP - *nitimala*)	*Thana* Fisheries Committee	1 year
river areas > 20 acres i.e.Old Surma River at Jaykalas	**Official** - traditional *maimul* leaseholders / fisheries *samity* **Actual** - same	leasing system (auctioned)	District *Jalmahal* Management Committee - Land Revenue Office	1 year
major *beel* areas > 20 acres - Bordoi-Kastunga Group Fishery & Boroghor Group Fishery (Dekker *haor*), - Shaldigha *beel* (Bara *haor* inside Kai Project)	**Official** - fisheries *samity* / traditional *maimul* or other leaseholders **Actual** - traditional *maimul* leaseholders / other leaseholders	leasing system (auctioned)	District *Jalmahal* Management Committee - Land Revenue Office/ (Central Goverment in case of dispute)	3 years
other *beel* areas > 20 acres - Dapha *beel* & Baral *beel* (Dekker *haor)* - Pakhimura *beel* (Bara *haor* inside Kai Project) - Kastochaprar *beel* (Shanghair *haor* inside Shanghair *Haor* Project)	**Official** - fisheries *samity* / traditional *maimul* or otherleaseholders **Actual** - traditional *maimul* or other leaseholders	leasing system (auctioned)	District *Jalmahal* Management Committee - Land Revenue Office (Central Goverment in case of dispute)	1 year
***beel* areas 3-20 acres**	**Official/Actual** - traditional fishermen / local farmers	leasing system (auctioned)	*Upazila Nirbani* Office (*Thana* Executive Office)	1 year
***beel* areas < 3 acres**	**Official/Actual** - traditional fishermen / local farmers	leasing system (auctioned or privately arranged)	Union *Parishad*	1 year
khal -C & B *khal* (next to Sylhet-Sunamganj highway)	**Official/Actual** - traditional fishermen /local farmers	leasing system (auctioned or privately arranged)	Union *parishad* - often given to local mosque or school	1 year

Source : FAP17 Village Appraisals

The Mahasingh River is under the New Fisheries Management Policy (NFMP). This system was instituted on selected waterbodies countrywide in 1986. Under NFMP waterbodies are no longer leased out to individuals or fisheries *samity* by auction but, instead, gear licenses are issued to "genuine fishermen" belonging to local fisheries *samity*. Control of the system, including the identification of license holders, is vested in the *thana*-level fisheries committee. For the purposes of fisheries licensing, the Mahasingh is divided into two sections; one running from just north of Asampura village where the Uttar *khal* turns into the Mahasingh River, down to Meena *bazar* (opposite Doradhar) ; the other from Meena *bazar* to Shologram.

2. FISHERIES IN AKHTAPARA & MAHMUDPUR

2.1 Sources of information

The socio-economic research undertaken by FAP 17 provided four different means of assessing levels of fishing activity and dependence on fisheries in the communities under study :

- During the census survey undertaken in each village, each household reported the principal occupation of the household head and ranked a selection of other sources of income for the household, including fishing.

- During the baseline survey, the sample households listed different income-generating and expenditure-saving activities undertaken at different times of the year by different family members. This included any fishing activities either for income or consumption.

- The one-year monitoring of incomes and activities of sample households recorded the earnings, expenditure and time spent by different household members on all income-generating and expenditure-saving activities including fishing. Special care was taken to check on fishing activities **not** mentioned during the census or baseline surveys.

- Semi-structured appraisals were carried out in all the study communities at different points during the study, focussing on more qualitative issues and historical processes affecting fisheries. These open-ended appraisals allowed available data sets to be cross-checked, distorting factors to be identified and, most importantly, the social, cultural and historical context understood.

The following analysis deals with four basic questions :

- **who** is involved in fishing ?
- **when** and **where** do these different groups fish ?
- **why** do they fish **there**?
- **how important** is fishing for these groups ?

The social stigma attached to fisheries involvement in this area led to some underreporting of fishing in the main villages, especially during the early stages of the study. The use of multiple sources of information for cross-checking and the comparison of data collected during the socio-economic surveys with data from the fish catch monitoring on neighbouring waterbodies was therefore important in obtaining a complete picture of local fisheries.

2.2 Patterns of fishing involvement

In the main villages of Akhtapara and Mahmudpur, practically no households initially reported fishing as a significant source of household income during the course of the census survey. Table 4 shows data collected during the census survey from all households in each of these two villages. The proportion of households reporting different first and second ranked sources of household income in each landholding category is shown.

Table 4
Ranking of sources of household income
by landholding category

NE3-1 Akhtapara **Main village** **Inside**

Land Cat.	No.	First Rank Occupation *					Second Rank Occupation **				
		Farm	Fish	Lab	Trade	Other	Farm	Fish	Lab	Trade	Other
Large	9	88.9	0.0	0.0	0.0	11.1	11.1	0.0	0.0	0.0	33.3
Medium	28	71.4	0.0	0.0	10.7	14.3	28.6	0.0	17.9	3.6	17.9
Small	38	73.7	0.0	7.9	13.2	5.3	18.4	0.0	50.0	10.5	15.8
Landless	130	10.8	0.0	73.8	6.9	7.7	12.3	0.8	12.3	8.5	8.5

Source: FAP17 Village Census

NE4-1 Mahmudpur **Main village** **Outside**

Land Cat.	No.	First Rank Occupation *					Second Rank Occupation **				
		Farm	Fish	Lab	Trade	Other	Farm	Fish	Lab	Trade	Other
Large	12	50.0	0.0	0.0	8.3	41.7	41.7	0.0	0.0	0.0	50.0
Medium	16	68.8	0.0	0.0	6.3	25.0	31.3	0.0	0.0	12.5	37.5
Small	35	77.1	0.0	5.7	8.6	8.6	22.9	0.0	37.1	14.3	17.1
Landless	77	15.6	2.6	68.8	2.6	10.4	9.1	3.9	9.1	28.6	6.5

Source: FAP17 Village Census

* % of households in each landholding category ranking different sources of household income as primary

** % of households in each landholding category ranking different sources of household income as secondary

During the census, five landless households in Mahmudpur reported fishing as a first or second-ranked source of income. Three of these households are low-caste Hindu *namasudra* families. Only one landless household in Akhtapara admitted to obtaining any income from fishing.

The very low numbers of households reporting fishing income during the census contradicted accounts given by some local people, particularly fishermen, and observations by the field team in the area which suggested a considerable level of fisheries involvement among farming and agricultural labouring households. The strong social stigma associated with fishing as a means of livelihood, particularly among *stanio* households, had made people reluctant to admit to income from fishing and even ownership of fishing gear. Widespread tension and violence over issues of access to fisheries resources were also evident in the area.

Subsequent surveys and appraisals in the study communities provided an opportunity to correct these early figures. Undoubtedly, in both villages, an appreciable number of these "subsistence fishing" households do, in fact, earn some income from fishing. Local traditional fishermen were emphatic in claiming extensive involvement of farmers and labourers in both the catching and selling of fish. One *matsya das* fishermen from Doradhar near Akhtapara claimed that at least 40% of the people selling fish on that day at Meena *bazar* were "farmers" from Akhtapara. Enquiries in the market indicated that, while exaggerated, there were certainly a greater number there than the survey data would have led one to expect. Fishermen from all the fishing communities investigated also gave consistent reports of local agriculturists preventing them from fishing on indundated agricultural land in order to reserve the fish resources there for their own exploitation.

Table 5 uses income from fishing with different gears recorded during the income monitoring of sample households to establish a more realistic picture of fishing gear ownership, as well as the average annual income earned from those gears by households using them.

The extent of gear use shown here corresponds more closely with the informal accounts of fishing activity obtained during village appraisals and with observed levels during the flooding season. The greater variety and numbers of gears used in Mahmudpur as opposed to Akhtapara are clear. Also, while more landless households are engaged in fishing in absolute terms, the proportions of landholders involved are significantly higher, particularly small landowners. The high figure for small landowners in Akhtapara reflects the higher

levels of fishing activity by many of the more recent settlers in the village.

For all socio-economic groups in both villages, the simple *thella jal* (push net, locally called *feloon*) is the single most important gear in use. About 46% of households in Akhtapara and 49% in Mahmudpur own this gear. *Jhaki jal* (castnet) is also fairly common. The gears owned reflect the concentration of fishing effort, by non-traditional fishermen, on the floodplains. *Thella jal* are widely used to fish out bunded areas and residual waterbodies in the *haor* and around the village where larger gear cannot be easily operated. The small group

Table 5
Akhtapara & Mahmudpur
Gear ownership and average annual
income from types and landholding category

NE3-1 Akhtapara **Main village** **Inside**

Gear Type	Bengali Name	Medium Farmers			Small Farmers			Landless		
		No.	%	Tk.	No.	%	Tk.	No.	%	Tk.
Cast net	Jhaki jal	0	0.0	0	4	11.2	575	0	0.0	0
Push net	Thella jal	17	59.8	634	34	88.8	209	44	33.8	569

NE4-1 Mahmudpur **Main village** **Outside**

Gear Type	Bengali Name	Medium Farmers			Small Farmers			Landless		
		No.	%	Tk.	No.	%	Tk.	No.	%	Tk.
Seine net	Deol	2	10.9	980	0	0.0	0	0	0.0	0
Scoop net	Ucha	2	10.9	100	3	8.6	130	0	0.0	0
Trap	Doiar	0	0.0	0	0	0.0	0	4	5.2	2011
Cast net	Jhaki jal	5	28.1	510	0	0.0	0	10	13.0	559
Push net	Thella jal	10	64.1	522	24	69.7	737	35	45.8	532
Other	Dewatering	0	0.0	0	4	10.9	300	2	2.6	900
	Hand fishing	0	0.0	0	0	0.0	0	2	2.6	2500

Source : FAP17 Socio-Economic Monitoring

of *namasudra* households in Mahmudpur who depend more on fishing also use traps (*chai* or *doair*) extensively.

2.3 Women and fisheries

The movement of women outside of the household is strictly limited in the North-East, where observance of *purdah*, at least among any household which can afford it, is the norm. The involvement of women in an activity such as fishing, which requires being out in the open for all to see, is therefore frowned upon. Women from poorer households, who might be willing to overlook the issue of social respectability, are frequently prevented by wealthier households from engaging in activities which are likely to bring "disrepute" on the community as a whole.

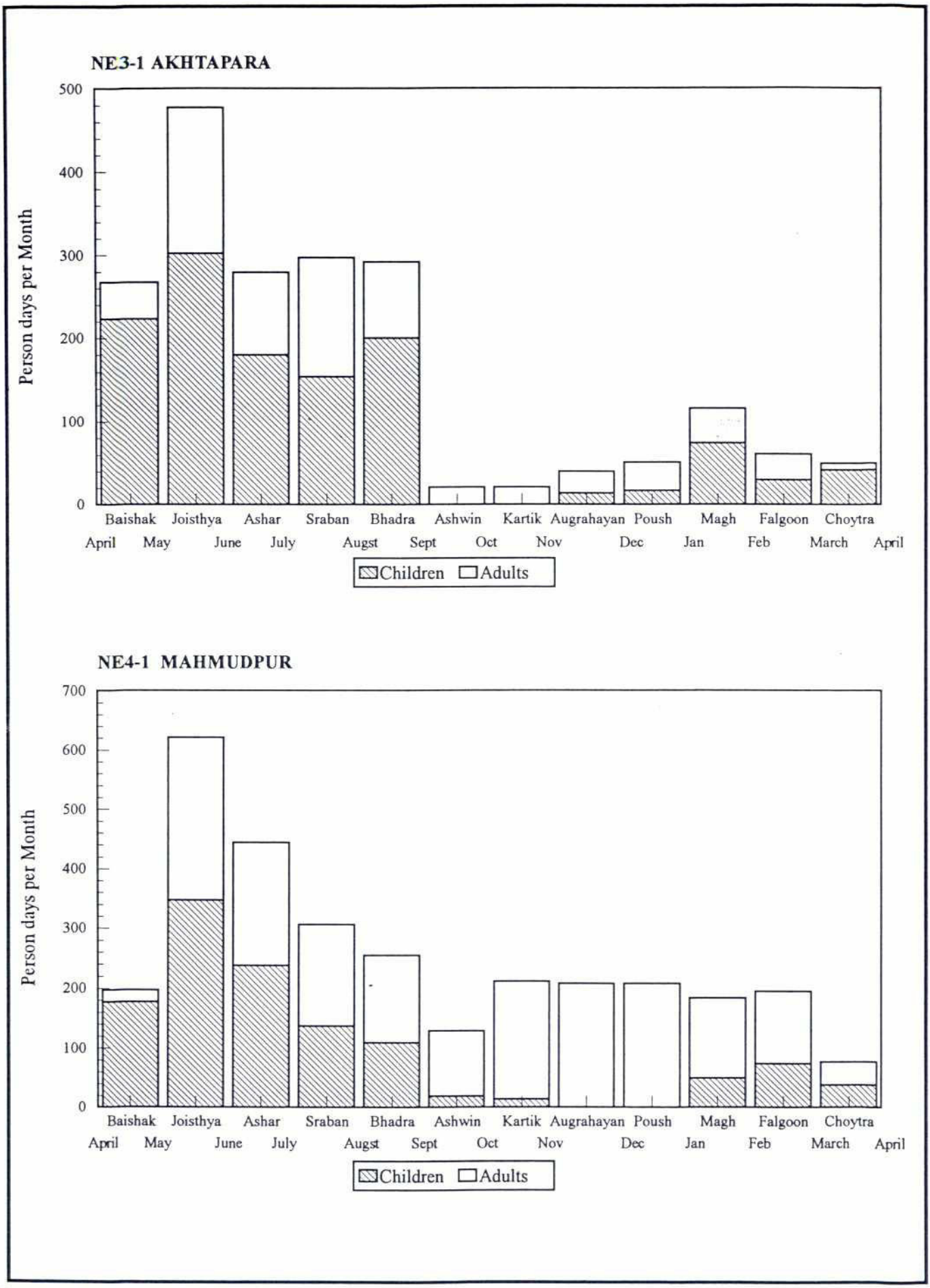
This limits the extent to which women in either Akhtapara or Mahmudpur are directly involved in fishing. Even among the poorest households in both villages, such as female-headed households where the mother has been left a widow with a large family to support, taking to fishing is not considered a viable option. Women who are forced to work tend to find jobs as dependent labourers working for richer households, or as agricultural labourers. A few old widows were seen fishing with rod and line in *maital* and ponds within the village or along the banks of rivers running near to homestead areas. But the acute sense of shame experienced by having to resort to such activities was apparent in people's reluctance to discuss it, even with female researchers.

Even the involvement of pre-adolescent girls is subject to disapproval. Although girls from poorer households are active in fishing during the floods, it is very unusual to see them ever selling fish in the local *hat* where boys from non-fishing communities commonly make up a considerable proportion of fish vendors.

2.4 Children and fisheries

The combination of social stigma attached to fishing activity, strict regulation of fisheries, extending beyond the boundaries of the *jalmahal*, and abundant fisheries resources, helps to explain why children's contribution to fishing effort is high in *haor* communities. Figure 4

Figure 4 Person Days Fishing per Month, Adults and Children



Source: FAP 17 Socio-Economic Monitoring

shows the proportion of person-days fishing in Akhtapara and Mahmudpur which was accounted for by children through the year, children being defined as those under 15.

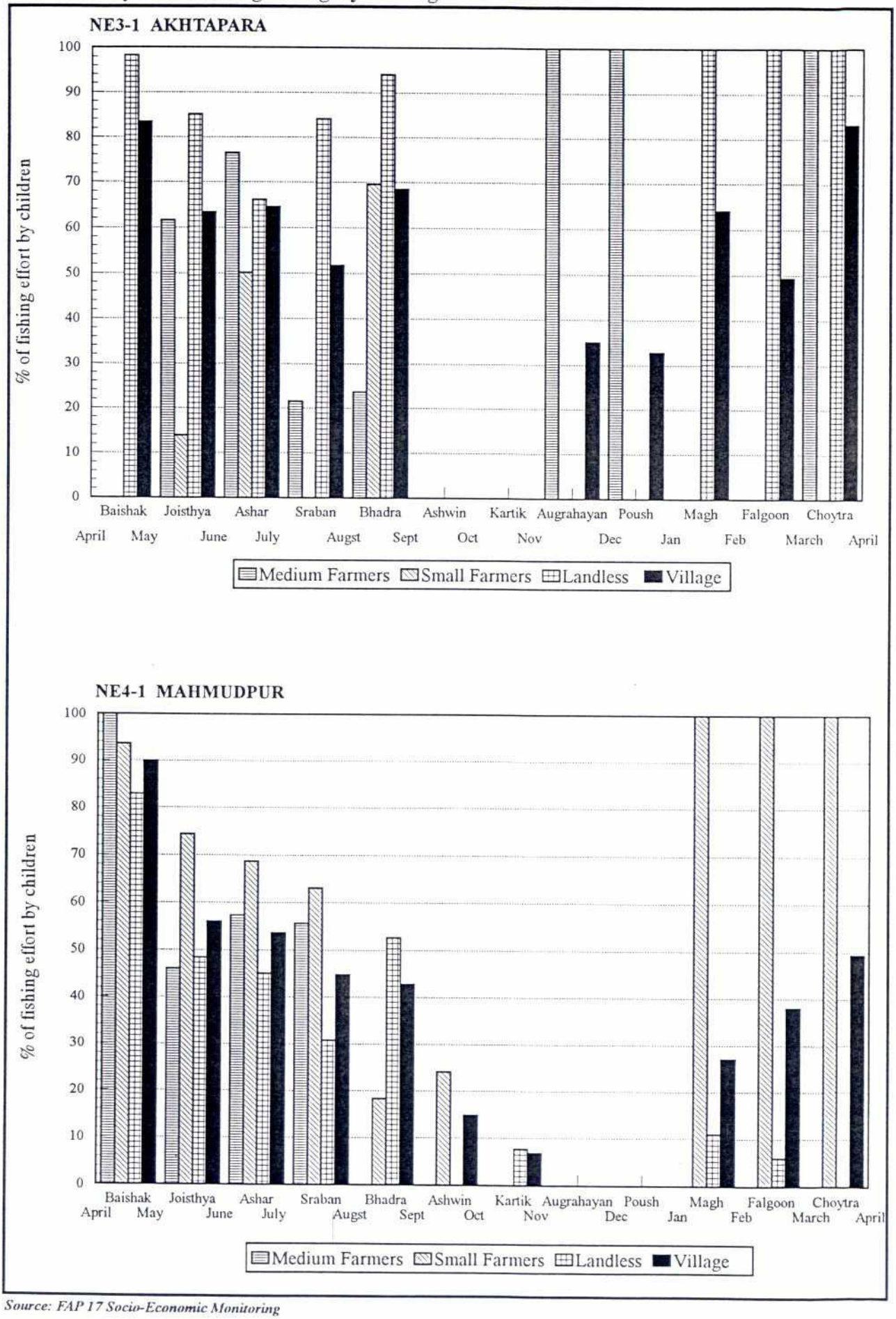
In Figure 5, the data are disaggregated by landholding category **and** weighted, giving a child's day fishing a value of 0.5 compared to an adult male's. (Adult women's fishing effort is valued at 0.75, but is very rare in this particular area.) This aims at providing a better picture of fishing **effort** as opposed to just time out fishing. The justification for this weighting is debatable. The cut-off age for children was probably set too high (12 years old would have been better) and, particularly in non-fishing communities, children may spend more time fishing than adults, making up for any reduced efficiency.

The most distinctive feature of children's contribution is the extent to which it is concentrated during the early part of the year. The *ozaya mach* fishery, generally during the month of *joisthya* (May/June), involves children to a disproportionate extent. This fishery is **very** concentrated (usually a few hours on particular days following particular combinations of weather conditions), encouraging households to mobilise as much man- and child-power as possible to take advantage of the high catch which can be obtained.

Children play an important role in **all** fisheries taking place during the pre-monsoon and early flooding season. These early season fisheries are usually concentrated in relatively shallow waters and are easily exploited by children. The significance of this for households earnings is clearly shown in the income data for both villages in Section 2.7. From *baishak* to *joisthya* (April to June) children are responsible for over 50% of the person-days spent fishing in both communities.

It is also interesting that, inside the Kai Project, fishing activity by children carries on for longer into the flood season. This takes place mostly in the floodplain immediately around Akhtapara village and along the embankment of the Dabor-Jagannathpur road. This area is shielded by the Kai Project embankment from deep flooding. Flooding is mostly indirect at this point, coming from the *haor* rather than directly from the river. This creates an environment which is more readily fished by children and explains the greater proportion of weighted fishing effort (almost 50%) which is applied by children in Akhtapara. Fishing by children is clearly more important for landless households than for other socio-economic groups.

Figure 5 Distribution of Fishing Effort by Children by Landholding Category Through the Year



Source: FAP 17 Socio-Economic Monitoring

In Mahmudpur, the figure is lower. The fact that there are more adults involved in seasonal fishing for income seems to limit the extent to which children are involved. Fishing activity by children is more spread across socio-economic strata, reflecting the greater role overall played by fisheries in the unprotected village.

2.5 Fisheries access

While fishing is clearly important seasonally for households in both of these *haor* communities, more intensive exploitation by villagers might be expected given the richness of the fisheries resources nearby. If villagers in Akhtapara and Mahmudpur do **not** fish as much as expected, it is largely due to a combination of two factors: the social stigma attached to fishing and, most importantly, the tight control of fisheries access exerted by local leaseholders.

The areas officially controlled by leaseholders are relatively limited although the North-East has a far greater extent of *khas* waterbody than any other area of the country. Up until the early 1970s, leaseholders and the traditional fishermen working for them did not need to exert especially strict controls over fishing activity, except during the harvesting phase at the end of the fisheries year from *magh* (January/ February) through to *choytra* (March/April). Fish resources were abundant and exploitation of them was generally left to the traditional fishermen. Pressure from non-traditional fishermen was practically unknown as the original *haor* people, the *stanio*, would never fish except for consumption due to the low social status associated with fishing. Intensive seasonal fishing activities such as the *ozaya mach* fishery and community fisheries in *beel* held after the completion of harvesting would have been an exception. Poorer members of the community were probably involved in some fishing year round if they were willing to accept the loss of face entailed.

As long as fishing pressure was limited, this structure of fisheries access (tightly controlled *beel* surrounded by floodplains where anyone could fish) ensured a degree of balance in the distribution of resources. Access to the most productive fisheries in the *beel* was controlled by the leaseholder and limited to fishermen working for him. But the presence of a managed resource in the centre of the *haor*, which was only harvested fully every three years or more, would have greatly benefitted the surrounding floodplain where local people fished for subsistence. Fish residing in the *beel* could be caught as they moved out onto the floodplain

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at the onset of the floods. The quantities being caught were never sufficient to seriously jeopardise the profitability of either the leaseholder's or the traditional fishermen's operations when they finally came to harvest the *beel*.

Over the last two decades, as the numbers of landless and poor farmers have increased, and the competition for access to any potential source of livelihood has grown, this relatively balanced system has broken down. More non-fishermen, particularly more recent in-migrants to the area, have become involved in fishing in spite of the low status widely associated with the activity. As fishing pressure has risen, important changes have been taking place in the wetland habitat on which the fisheries depend. More and more of the *haor* has come under the plough, less land is left fallow and the numbers of livestock grazing in the *haor* (and fertilising it with their dung) has declined in response. Many of the new settlers occupying newly opened land in the *haor* have themselves seen the potential for exploiting the fisheries resources in floodwaters covering land which they own. These *abadi* or outsiders are generally poorer and have access to more marginal land, located further down the slope of the *haor*. They are less concerned about social norms regarding fishing and have been more willing to move into an occupation previously reserved for the fishermen.

Just outside the road embankment which marks the eastern boundary of the Kai Project, a large landowner from Durgapasha has placed a low, submersible bund around about 12 acres of his land. A deep pit at one end from which earth was excavated provides both a water reservoir for *boro* cultivation during the dry season and a fish shelter which is enhanced by placing a small *katha* inside. This type of bunded structure, locally called a *tuma*, serves a multiple function : it protects the standing *boro* from early floods; it sets clearer boundaries both on the landholding in the floodplain and on the floodwaters which cover it seasonally; and it retains and traps fish as the floods recede. The labourers working and guarding the plot were expressly instructed by the owner to prevent people fishing inside the *tuma* even when it was flooded. The owner, who lives in Sylhet, is the last member of his immediate family left in the country. All the others are *londoni* living in the U.K.

Box 1 : Fencing off fish

On long-settled land, the increasing value of the catch is encouraging landowners, even if they are reluctant to fish themselves, at least to exert more control over fish resources in areas owned by them. A case from Durgapasha, located in the same *mauza* as Akhtapara, is given in Box 1. Where the fisheries resource can be passively captured like this, and harvested by labourers, there is not even any risk of loss of social status on the part of the landowner.

A further factor encouraging farmers to get involved in fishing is their growing need for cash income in order to finance the costly inputs required for new HYV rice varieties. The high cost of this crop is a source of considerable concern for many farmers interviewed. Fisheries income from dewatering of residual waterbodies on private land can help in financing HYV technology.

From the point of view of fisheries leaseholders, these changes threaten one of the basic factors which made the *beel* fishery so productive. When harvesting the *beel* during the dry season, leaseholders were harvesting the concentrated production of the entire *haor* area after flood waters had receded into the residual *beel*. However, if the fish are now being more extensively caught on the floodplain during the floods and aggregated in ditches and fish-pits all over the floodplain during the drawdown, the production from the traditional *beel* fishery is obviously threatened. The leaseholders' reaction has been to attempt to extend their sphere of control over the fisheries resource beyond the area of their official lease to ensure that as large a proportion as possible of the floodplain production "returns" to the *beel* at the end of the season.

The progressive increase in the value of the fish catch, itself a result of the process outlined above, has encouraged the further tightening of controls, whether licit or otherwise, over what leaseholders consider to be "their fish". These attempts clearly bring floodplain farmers into conflict with leaseholders over the fish caught outside of *jalmahal* in areas covering privately owned land. What is certain is that those who have **no** solid claim to the resource (i.e.landless subsistence fishermen and many lease-less professional fishermen) are seeing their options for access to fisheries being progressively squeezed.

One form of public access which is still available on some *beel* is the end of season community fishing event. After the main harvest is complete on *beel* and sections of *khal*, and it is no longer profitable for the leaseholder or fishermen to continue operating, some leaseholders throw open their *jalmahal* for community fishing. This takes place on a specific day set by the leaseholder and announced in nearby villages. Large numbers of children and adults come with simple gears such as *feloon* and *polo* (a kind of trap) to complete the harvest of the *beel*. It is not entirely clear to what extent this long-standing tradition is a form of redistributive mechanism aimed at easing tensions between leaseholder and local communities over access to the fishery or whether it is simply a means for the leaseholder of completing the harvest of his *beel* cheaply and efficiently.

It is now more common for leaseholders to control the event, whereas it used to be completely open. Leaseholders now get local people to fish together with professional fishermen working for them who catch residual fish driven into the nets by the large numbers of people in the water, making the event more like the *nimbais* fisheries, which leaseholders have commonly organised in order to harvest their *beel* as intensively and completely as possible. Sometimes the leaseholders are reported to even exact a catch-share from the "community fishing" groups. What is certain is that the whole process is becoming rarer as the competition for and value of the fisheries resource increases. Many leaseholders are now dewatering *beel* using low-lift pumps to ensure a more complete harvest. It can be assumed that the impacts of this practice on the sustainability of the fisheries are negative.

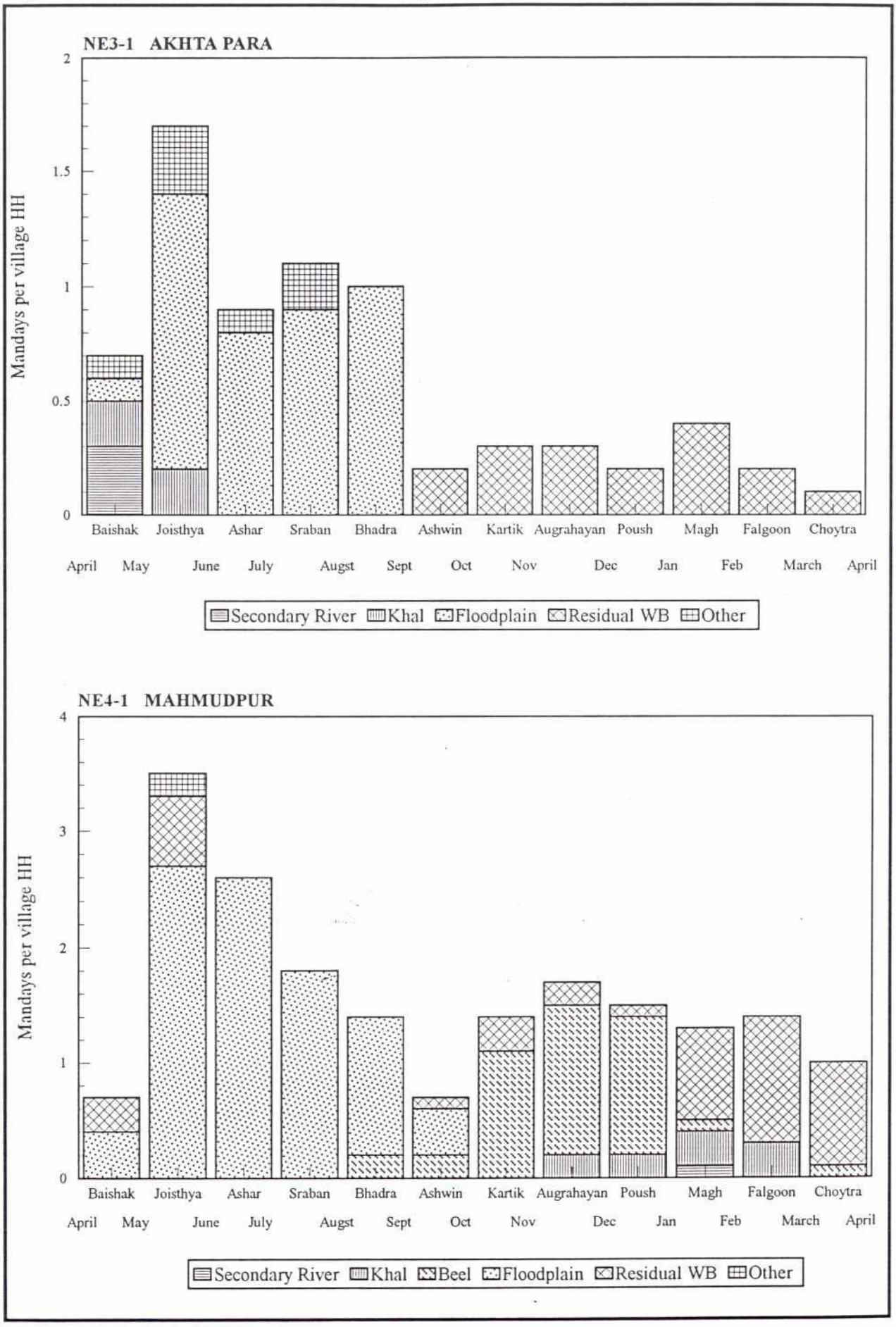
2.6 Seasonality and fisheries

The way in which fishing effort on different types of waterbody is distributed through the year among households in Akhtapara and Mahmudpur is shown in Figure 6, while Table 6 shows the intensity and distribution of fishing through the year for the main gear/waterbody combinations.

The concentration of fishing by people in Akhtapara in the pre-monsoon and peak flooding period is clearly shown. But the relatively low level of overall fishing activity which this represents needs to be remembered. During the **peak** month for Akhtapara households, the average number of fishing days recorded across all households in Akhtapara was only just over 1.5 per month. The other waterbodies fished by the community are mainly borrow-pits and flooded pathways, or *nala*, through the village which are fished above all during the rising flood. From the month of *ashwin* (September/ October) when the flood recession begins, almost all fishing activity outside of the *maital* (ditches) and channels inside the village homestead area ceases as the floodplain and virtually all surrounding water areas come under tight control by local fisheries leaseholders.

Fishing in Mahmudpur shows a similar peak of activity on the floodplains from *joisthya* (May/June) to *bhadra* (August/September). However, in contrast to Akhtapara, the few households in the village engaged in seasonal fishing also work with local leaseholders as guards (*furial*) or harvesting some of the small local *beel* by dewatering or *thella jal* (called *faloon* locally). The nearby C & B *khal* is leased by a Mahmudpur farmer and local people

Figure 6 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 6
Principal Gears, Use by Month and Waterbody

NE3–1 Akhtarpara — Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Jhaki jal	Residual WB						0.1	0.1	0.1	0.2				0.5	6.8
Thella jal	Secondary River	0.3												0.3	4.1
	Khal	0.2	0.2											0.4	5.5
	Floodplain	0.1	1.2	0.8	0.9	1.0								4.0	54.8
	Residual WB						0.1	0.2	0.2		0.4	0.2	0.1	1.3	17.8
	Other	0.1	0.3	0.1	0.2									0.8	11.0

NE4–1 Mahmudpur — Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Leaseholder labour	Beel					0.2	0.2	0.9	0.9	0.9				3.3	16.8
Doiar	Floodplain		0.5	0.4	0.3	0.2	0.1							1.6	8.2
Net/Basket+Dewatering	Khal										0.3	0.3		0.6	3.1
Jhaki jal	Residual WB										0.6	0.7	0.8	2.1	10.7
Thella jal	Khal								0.2	0.2				0.5	2.6
	Floodplain	0.4	2.0	2.0	1.4	1.0	0.3							7.2	36.7
	Residual WB	0.3	0.5				0.1	0.3	0.2	0.1	0.2	0.2		2.0	10.2
Hand fishing	Beel								0.3	0.3				0.6	3.1

Note : Depth of shading indicates relative intensity of use of that gear within the year

also help in its' harvesting later in the year.

This pattern is particularly interesting because, in part, it is directly dictated by the patterns of flooding, but access controls are even more important in shaping local people's fishing involvement.

Pre-monsoon

As described earlier, the pre-monsoon period in the *haor* is marked by violent storms and heavy local rainfall with flash floods. These flooding episodes pose one of the principal threats to agriculture in the area. Under normal circumstances, standing crops of *boro* are frequently washed out by these early floods. One of the principal functions of submersible embankments, such as the one around the Kai Project, is to protect standing *boro* against this threat by holding back early floods until after the harvest of *boro* has been completed.

The pre-monsoon period is generally regarded as covering the time from late *choytra* (March/April) to *joisthya* (May/June) but, during the year of the FAP 17 study, 1992/93, there were heavy storms and fluctuations in the water levels in many *haor* in the North-East practically all through the winter, with some serious flooding in *falgoon* (February/March). These erratic weather patterns can have serious implications for the *beel* fisheries which are being completed at this time. Sudden rises in water-level in *magh* and *falgoon* (January to March) can delay the harvest of *beel* and allow fish to spread out over the floodplain prematurely. Naturally, such occurrances can have very significant positive impacts on floodplain fisheries. Leaseholders do not attempt to limit the ensuing rush of fishing activity.

The storms and flash flooding of the pre-monsoon period lead to sudden fluxes of water down the main rivers, from rivers into *beel*, and from the *beel* out onto the surrounding depressions, but the increases in current and water flow trigger migratory behaviour by fish throughout the system. Migratory species in the rivers start their upstream spawning runs and their eggs and fry begin to drift downstream to be carried laterally onto the floodplains by floods.

In the *haor*, the fluctuations in *beel* levels and the first inundation of the floodplain give rise to the *ozaya mas* fishery. As water from intense rainfall drains into the *beel*, or when the water from sudden rises in *beel* level begins to drain off the flooplain again, *beel* resident fish begin their own migratory movement against the current out of the *beel* onto the

floodplain to breed and spawn. For *haor* residents, especially **non**-fishermen, this is the time of peak fish catch. Nowhere else in the country is a similar pattern found. Fish are easily caught and move in concentrated shoals which can give rise to impressive catches even using simple fishing gears.

Most importantly, this fishery is not subject to control or interference by leaseholders. In part, this is because it **usually** occurs at a time of the year when the main harvest on the *beel* has been completed and controls have been removed, at least until the onset of the floods proper in *ashar* (June/July). The fishery would, in any case, be very difficult to control as it is generated by sudden combinations of weather and hydrological conditions and involves enormous numbers of local people spread all over the floodplain. Children play the lead role in this fishery.

In Akhtapara and Bara *haor*, inside the Kai Project, most of the area south of the village is protected from water intruding from the river during this period. Water rises from the *haor* as a result of rainfall and in-flow through the Shaldigha *khara* to the south. This seems to provide adequate protection for rice crops near the village while not affecting the fishery seriously. The submersible embankment along the southern side of the *haor* generally overtops between mid-*baishak* and early *joisthya*.

Peak flood

The timing of the beginning of the floods proper varies considerably from year to year. In 1993-94, in Chatal *beel*, in the south-western side of Dekker *haor*, water levels rose very rapidly, going from their minimum level to almost peak levels in the space of about 10 days between early and mid *baishak* (late April/early May). They then stabilised, before rising again to their maximum levels in late *ashar* (early July). By the end of *ashar*, flood levels had already begun their long recession which continued until mid-*augrahayan* (early December). The variations in these patterns from year to year are considerable.

Generally, the levels of the rivers begin to rise steadily in mid-*baishak* (late April). Around Akhtapara, water flows from the Mahasingh into Bara *haor* through the Launia *nadi* north of the village and the other *khal* left open on the right bank. These flows are dependent on the out-flow of water from Dekker *haor* into the Mahasingh River. The Shaldigha *khara* on the south side of the *haor* is the single most important inlet. The *haor* begins to fill up until, by mid-*sraban* (July/August) practically the entire area from the Mahasingh across to the Old

Surma on the west side of the Shanghair Haor Project is a continuous sheet of water. The Dabor-Jagannathpur road along the eastern side of the project remains above water.

In Dekker *haor*, the inflow of water from the Surma at Asanmara and Jaykalas increases and, together with rainfall, fills up the *haor* until the divisions between individual *beel* and catchments disappear. In relatively higher areas around the edge of the *haor*, deep-water broadcast *amon* rice can be planted, but violent early floods often wash away the young plants before they are properly established.

Fishing on the floodplain is carried on, with children widely involved. Catch rates are greatly reduced as the fish are widely dispersed. However, with water reaching right up to the homesteads, the area available for fishing is enormous. It is impossible to effectively restrict fishing activity, but, out on the *haor*, the leaseholders of the larger and more important *jalmahal* already have their *paharadar*, or *beel*-guards in place as early as *sraban* (July/August). On the Bordoi *beel* jalmahal at the centre of Dekker *haor*, there are some guards active all year round. However, the intensity of control increases greatly after the water levels begin to fall in *bhadra* (August/ September).

Drawdown

The entire *haor* region is affected by drainage congestion as the enormous volume of water gathered in the Sylhet Basin all drains out through the Meghna River at Bhairab. The ability of the Meghna to cope with this flow is also dependent on flows out of the Padma-Jamuna system. If these are high, water backs up through the entire Meghna system, slowing further the drainage from the *haor* basin.

In the *haor*, the water slowly recedes off the floodplain, running back into the perennial *beel*, or draining out into the surrounding rivers through the *khal*, *gang* and *khara* criss-crossing the *haor*. From Bara *haor*, water drains out of the Shaldigha *khara* into the Mahasingh River. Water, and the fish carried by it, are also concentrated in the *beel* located at the southern end of the *haor*.

Fishing all over the floodplain which drains into these *beel* is discouraged by a mixture of intimidation and influence by the powerful leaseholders. Fishing by non-fishermen reduces radically from *ashwin* (September/October) onwards. Landowners are able to continue by trapping water in bunded sections of the floodplain (*tuma*) as it drains out and harvesting the

fish remaining there. Some landowners are also beginning to excavate fish-pits, locally called *dubi* or *gara*. These terms are also used to refer to small natural depressions in the floodplain which are exploited by their owners in the same way. The excavation of these pits seems to be limited, like subsistence fishing, to the periferal areas of the floodplain where leaseholder's control is weakest. As the water level recedes, these areas of water are isolated and harvested by their owners either late in the drawdown or during the dry season.

In Dekker *haor*, the drainage patterns are more complex. The *haor* is made up of a series of inter-connected catchments. The Mahasingh River drains the principal catchment which consists of the main group fisheries, Bordoi and Boroghor. To the west, there is another series of smaller *beel*, such as Chatal and Dapha which drain out through the Nainda *gang*, which connects with the Mahasingh and into the Surma to the west depending n the relative water levels in the *haor* and in the Surma River. The Nainda *gang* generally dries up in *kartik* (October/November), effectively isolating the two catchment areas.

As in Bara *haor*, fishing during the drawdown is strictly controlled on the *haor*. Local people harvest the waters draining off the agricultural land on the perifery of the *haor* but the powerful local leaseholders, many of whom live in villages around Mahmudpur, do their best to restrict fishing as much as possible. Those Mahmudpur people who depend to some degree on fishing are able to participate in the harvesting of some of the smaller local *beel*, such as Baral *beel*, and the dewatering of *khal* around the village.

As the waters recede, *boro* is planted into the receding line of inundation. The large areas brought under cultivation in the last 10-15 years in the *haor* mean that agricultural labour demand is sustained from *augrahayan* on.

Dry season

More than in any other part of the country, the dry season, from late *augrahayan* (November/December) to *choitra* (March/April) is the period of peak fish production due to the abundance of perennial waterbodies. However, from the point of view of the non-fishing communities living around the *haor*, this affects only the availability of fish on the market. Access to fisheries is generally increasingly limited as the year proceeds.

The physical distance from homestead areas to the remaining bodies of water increases steadily throughout the dry season, as the floodwaters recede. But the most important factor

limiting fishing involvement is the total closure of fisheries by the leaseholders. By the end of *augrahayan*, there is practically no free fishing on the floodplain. In Akhtapara, only ditches and *maital* around the homesteads and *dubi* (fish-pits) on the floodplain are still available to people from the village. In Mahmudpur, the harvesting of some of the *beel* close by the village continues up until *magh* (January/ February), but after that fishing is almost entirely limited to residual *maital* and the C & B *khal* running along the highway by the village.

Some of the *beel* and *khal* in Dekker *haor* are opened up to community fishing once the harvesting by fishermen has finished. These are traditional events which are almost like local festivals. On a day made public by the leaseholder, usually in late *choytra* (March/ April), large numbers of children and adults gather to fish out the *beel* using mostly *thella jal* and *polo* traps.

2.7 Fisheries incomes

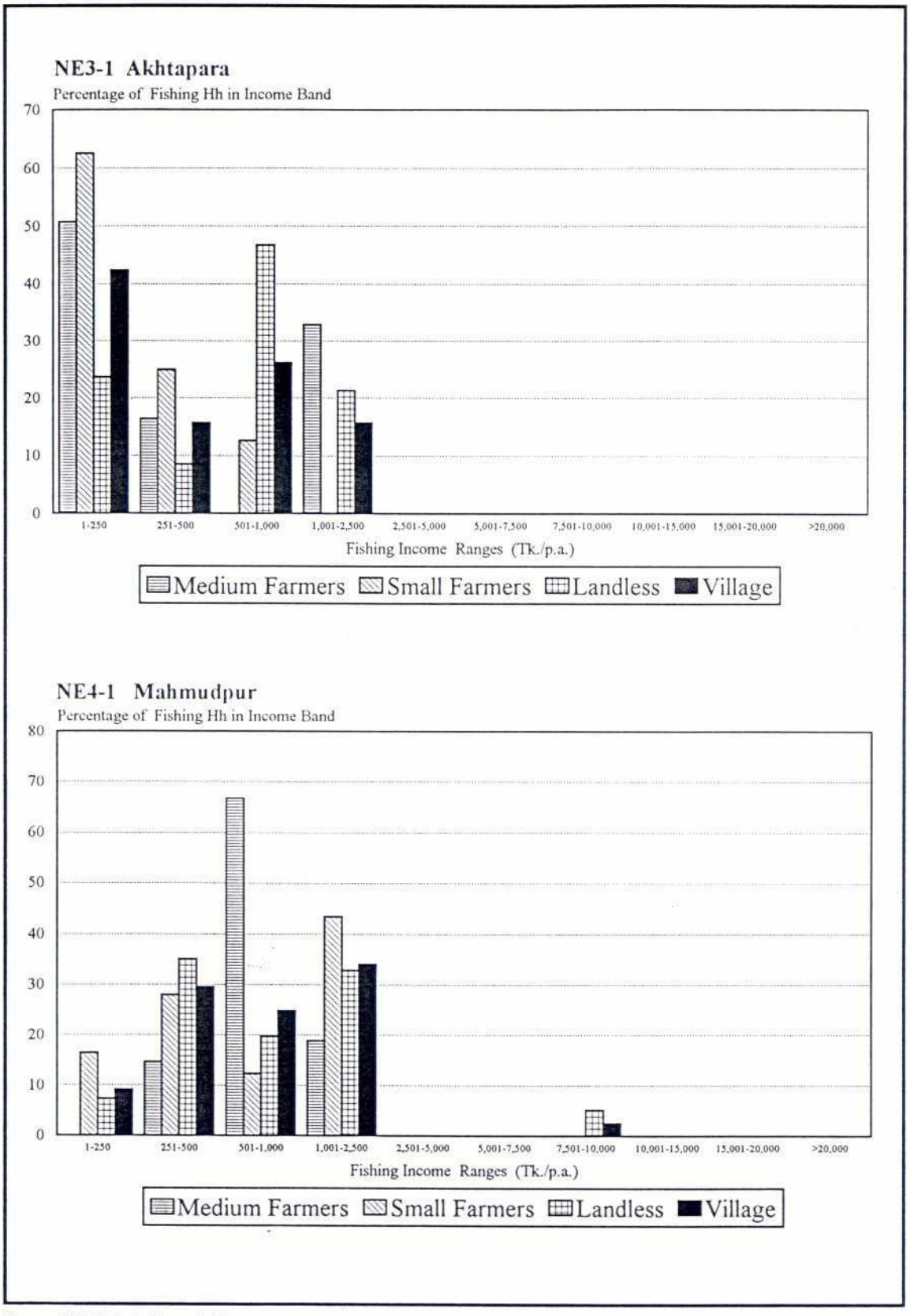
Figure 7 shows the distribution of incomes from fishing within certain ranges in the two villages.

People in Mahmudpur who are involved in fisheries tend to earn higher incomes, whereas fishing in Akhtapara is clearly more consumption oriented. The single family in the Tk.7,500-10,000 range is the leaseholder for the C & B *khal* and his earnings tend to distort the figures for the village as a whole.

Fishing is a good income earner for those households which have taken to fishing seasonally and for households which have either leases for smaller local waterbodies or have *dubi* on the floodplain. However, from the income data for both villages it appears to be of relatively minor importance in comparison with the other sources of income in the community.

The apparently low levels of fishing income need to be seen in the context of the type of other activities carried out in the community. In both villages, high levels of self-employment are recorded and these make the major contributions to village income overall. There are very marked peaks in earnings during the period from *bhadra* to *kartik* (August to October) which would normally be regarded as a lean time of the year.

Figure 7 Distribution of Fishing Incomes for Fishing Houscholds



Source : FAP17 Socio-Economic Survey

Data for Akhtapara showing the balance between household income from different sources through the year, disaggregated by landholding category, is illustrated in Table 7. Figure 8 reviews the figures for the whole village.

In this village, a large proportion of the income from self-employment comes from the involvement of many people in the village in the bamboo trade in neighbouring Meena *bazar*. This is active only during the monsoon period when bamboo can be brought in by river and, over the past few years, it has become a very important seasonal activity for a large proportion of people in the village. People from all strata are involved; landless and small farmers as carriers and others, with greater resources at their disposal, as traders. This bamboo trade is at its peak when there are very few agricultural labouring opportunities and at a time of the year when fishing might otherwise be seen as an important livelihood option. In fact, fishing is very limited in Akhtapara during this period.

In Mahmudpur, as seen in Table 8 and Figure 9, a similar peak in self-employment earnings is seen during the same period. For some medium landholders, the in-flow of income during *bhadra* and *ashwin* (August to October) is extraordinary. There are two principal sources for this income. First of all, particularly for some of the medium and small landowning households, the flow of remittance money from family members living abroad either in the U.K. or the Middle East is extremely high. There is a tendency for people to send remittances at 6-monthly intervals, normally in *bhadra* and *choytra* which explains the two peaks in "self-employment" earnings during those months.

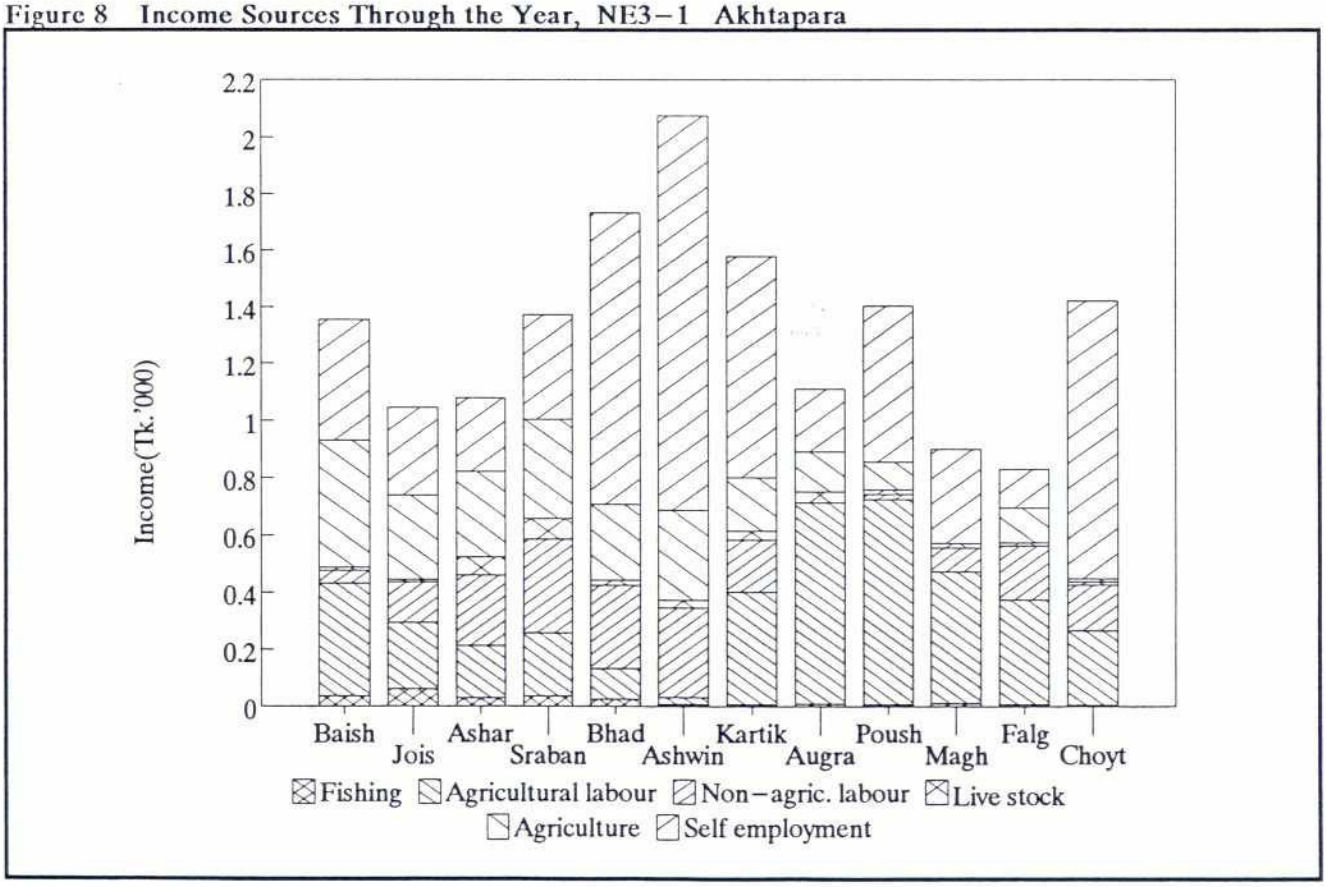
Various types of trading activity are also important during this period when water access to *haor* communities is easiest and alternative sources of income are most difficult to come by. While fishing appears to be a minor component in incomes, small quantities are caught for consumption by a very broad cross-section of the village.

Landless households in Mahmudpur do evidently make more uses of the fisheries resource, which provides almost 7% of household income on average. It is particularly important from *kartik* to *poush* (October to January), accounting for up to 18% of income during the month of *augrahayan* (November/December). In Akhtapara, even the most fisheries dependent households never get more than 7% of their monthly income from fishing.

Table 7 Income Sources Through the Year, by Landholding Category, NE3–1 Akhtapar: UNIT: TK.

LAND CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABA	BHAD	ASHWI	KARTI	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
Medium	Fishing	12	45	20	79	56	22	25	38	12	20	15	15	358	1.2
	Non–agric. labour	–	–	69	161	151	161	123	–	–	–	–	–	666	2.2
	Small stock	12	2	20	43	61	43	15	43	16	–	4	20	278	0.9
	Large stock	24	24	393	–	–	48	50	64	59	62	62	38	824	2.7
	Agriculture	2,248	962	967	1,748	1,195	1,743	1,176	771	451	–	–	–	11,260	37.0
	Self employment	479	252	252	267	1,523	3,844	4,660	134	215	900	146	4,379	17,050	56.0
	Total	2,775	1,285	1,721	2,298	2,986	5,861	6,049	1,050	753	982	227	4,452	30,436	100
Small	Fishing	17	69	17	21	24	14	11	17	22	22	11	6	250	1.2
	Agricultural labour	290	47	67	112	111	124	374	726	601	293	290	243	3,277	15.3
	Non–agric. labour	–	66	161	246	229	288	216	–	–	–	99	–	1,305	6.1
	Small stock	16	16	–	13	17	25	16	56	11	22	2	–	193	0.9
	Large stock	18	–	11	–	–	22	28	34	–	10	18	18	160	0.7
	Agriculture	438	690	832	501	488	349	99	153	28	–	–	–	3,578	16.7
	Self employment	1,213	355	190	663	2,675	2,860	394	720	1,747	540	67	1,256	12,681	59.1
	Total	1,992	1,243	1,278	1,556	3,544	3,682	1,138	1,706	2,409	887	487	1,523	21,444	100
Landless	Fishing	45	59	32	30	17	–	–	–	–	6	3	2	194	1.7
	Agricultural labour	514	341	260	305	130	–	489	853	910	612	470	324	5,208	46.7
	Non–agric. labour	65	196	314	388	343	356	184	–	29	125	254	243	2,496	22.4
	Small stock	1	2	2	96	7	7	19	7	3	–	–	1	144	1.3
	Agriculture	55	37	–	–	–	–	–	–	43	–	183	16	333	3.0
	Self employment	180	304	280	301	436	423	49	91	268	144	153	157	2,786	25.0
	Total	860	939	888	1,120	933	786	741	951	1,253	887	1,063	743	11,161	100
Village	Fishing	35	59	27	35	24	6	6	9	6	11	7	4	228	1.4
	Agricultural labour	397	235	185	224	108	24	397	706	720	463	368	262	4,090	25.7
	Non–agric. labour	43	142	249	328	293	315	182	–	19	83	188	161	2,004	12.6
	Small stock	5	5	4	72	17	16	18	22	6	4	1	3	173	1.1
	Large stock	7	3	58	–	–	11	13	16	8	11	12	9	149	0.9
	Agriculture	443	295	299	347	265	317	187	140	98	–	121	10	2,523	15.9
	Self employment	423	306	258	366	1,025	1,384	775	219	547	329	136	973	6,742	42.4
	Total	1,353	1,045	1,080	1,372	1,732	2,073	1,578	1,112	1,404	901	833	1,422	15,909	100

Figure 8 Income Sources Through the Year, NE3–1 Akhtapara

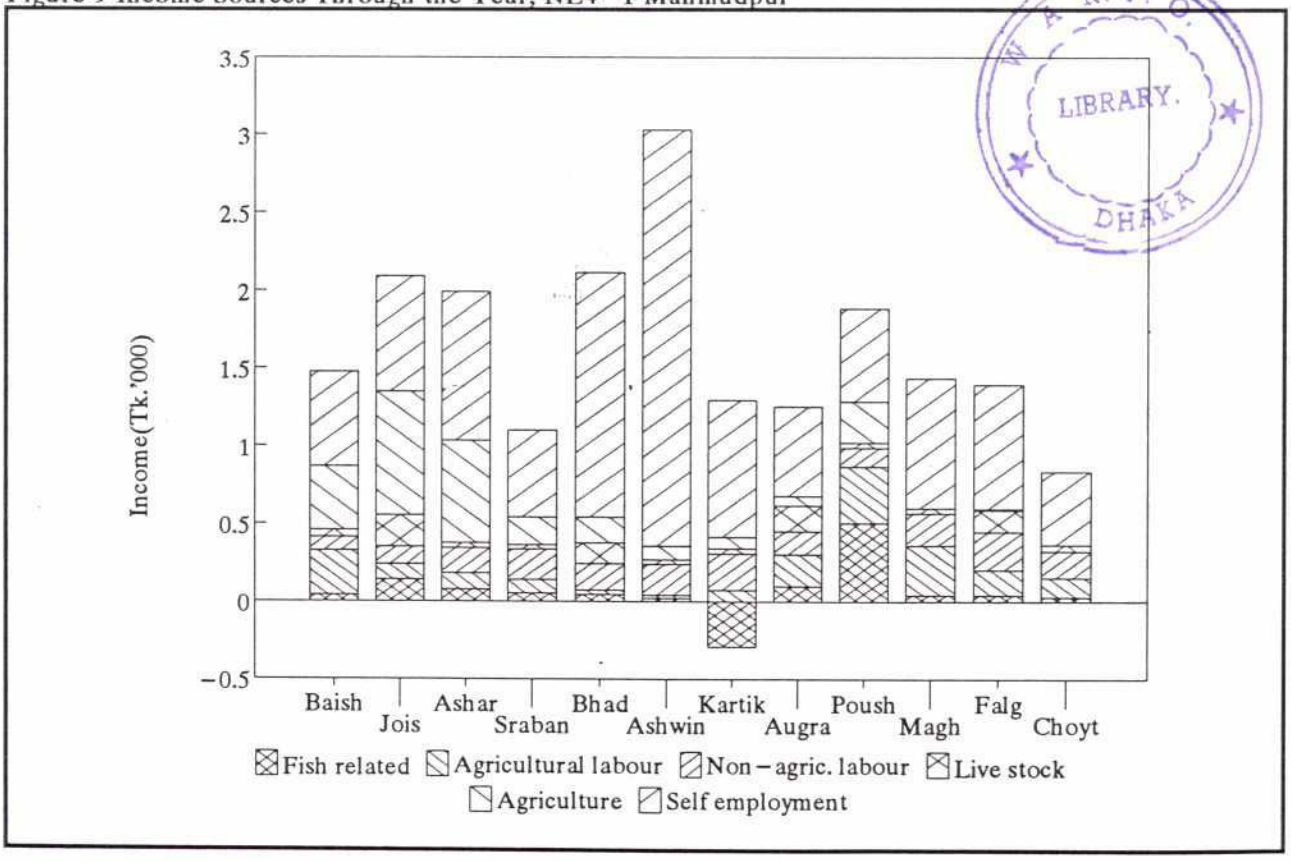


Source : FAP17 Socio–Economic Monitoring

Table 8 Income Sources Through the Year, by Landholding Category, NE4–1 Mahmudpur UNIT: TK.

LAND CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABA	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	PALG	CHOYT	TOTAL	%
Medium	Fishing	42	182	136	75	7	11	–	–	–	55	44	45	596	0.9
	Fish culture	–	–	–	–	–	–	(2,813)	–	3,516	–	–	–	703	1.1
	Small stock	71	33	37	33	–	–	31	16	3	13	77	55	369	0.6
	Large stock	127	127	113	113	108	108	117	130	130	128	853	127	2,179	3.4
	Agriculture	806	1,185	1,539	648	534	506	422	197	917	–	70	–	6,825	10.8
	Self employment	3,312	3,632	3,873	2,178	8,330	11,071	4,463	2,755	2,906	5,153	2,302	2,574	52,549	83.1
	Total	4,358	5,159	5,698	3,047	8,979	11,696	2,220	3,098	7,472	5,349	3,346	2,801	63,221	100
Small	Fishing	69	155	91	63	40	49	8	21	17	21	35	22	592	3.3
	Agricultural labour	227	120	111	125	51	9	88	88	256	436	275	230	2,016	11.4
	Non–agric. labour	–	–	–	–	28	120	191	92	–	93	115	104	743	4.2
	Small stock	28	13	3	4	7	9	15	12	9	2	11	–	111	0.6
	Large stock	33	636	36	36	393	13	28	467	22	21	21	21	1,726	9.7
	Agriculture	793	1,066	627	282	81	81	81	81	263	–	–	–	3,355	18.9
	Self employment	330	291	985	615	330	2,648	809	522	505	256	1,605	273	9,167	51.8
	Total	1,480	2,281	1,853	1,125	930	2,929	1,220	1,283	1,072	829	2,062	650	17,710	100
Landless	Fishing	29	121	63	43	51	9	90	154	99	43	43	26	771	6.8
	Agricultural labour	365	113	118	90	30	30	81	294	491	332	144	104	2,191	19.2
	Non–agric. labour	146	183	270	318	266	280	303	206	197	304	353	234	3,061	26.9
	Small stock	–	5	5	–	15	14	–	16	–	–	4	5	63	0.6
	Large stock	9	9	–	–	–	–	–	11	11	17	17	16	92	0.8
	Agriculture	151	582	486	34	126	–	–	26	130	–	–	–	1,535	13.5
	Self employment	178	352	343	194	740	942	168	146	165	201	119	123	3,672	32.3
	Total	878	1,365	1,285	679	1,228	1,275	642	853	1,093	897	680	508	11,385	100
Village	Fishing	42	138	80	53	43	20	56	99	64	38	41	27	700	3.6
	Fish culture	–	–	–	–	–	–	(352)	–	439	–	–	–	88	0.4
	Agricultural labour	282	101	101	88	32	20	73	201	365	319	162	125	1,869	9.5
	Non–agric. labour	88	110	162	191	168	201	234	149	119	208	244	169	2,044	10.4
	Small stock	16	11	8	5	11	11	8	15	3	2	15	10	115	0.6
	Large stock	30	195	24	24	121	17	22	151	29	32	123	31	800	4.1
	Agriculture	408	790	656	178	165	86	75	63	265	–	9	–	2,694	13.7
	Self employment	611	746	960	558	1,576	2,675	880	575	600	835	798	470	11,284	57.6
	Total	1,477	2,091	1,991	1,097	2,116	3,030	996	1,253	1,884	1,434	1,392	832	19,594	100

Figure 9 Income Sources Through the Year, NE4–1 Mahmudpur



Source : FAP17 Socio–Economic Monitoring

One household in Akhtapara is involved in fish culture and their outlay on fingerlings in the month of *kartik* (October/November) explains the negative figure for fisheries income in the village in that month and the high earnings in *poush* (December/January). This distorts the data for the village as a whole, as levels of fishing income for landless households are relatively high during that month.

Overall income levels for landless households are very similar in both communities, at just over Tk.11,000 per year. The relative contribution of fisheries is higher in Mahmudpur, but the principal difference is in the contribution of agricultural activities (as opposed to labouring) which are far more important in Dekker *haor* outside the flood control scheme. This is because of the greater area of land available in the *haor* for share-cropping. Much of this opportunity has been created by the closure of the Pander *khal* on the north-eastern side of the project, which opened up much of the *haor* to cultivation although it is reported to have seriously affected the fishery resource. It is not clear whether the Kai Project embankment has any role in encouraging owner-cultivation around Akhtapara. The whole area, whether protected or unprotected, experiences in-migration of agricultural labour during the *boro* season so it is unlikely that there would be any major difference between villages a few kilometres apart.

2.8 Conclusions

Two principal points are apparent from the analysis of fisheries dependence in these two communities.

Firstly, fish are a valuable resource in this area and, as a result, they are jealously guarded by anyone who is able to establish a claim over them. This limits the extent to which people from local communities are able to gain free access to fisheries. During the peak flooding period when the floods bring the fish to the people, out of the leaseholders' control, the level of dispersal is so great, given the enormous volume of water of the *haor*, that people are generally limited to subsistence catches. The social stigma attached to fishing as an occupation influences this as well. But it is the control of fishing activity by leaseholders which has the most impact on the levels of fishing activity; and this becomes progressively stricter as the floods recede.

In Akhtapara, the pattern of fishing effort is almost the exact reverse to that found in most floodplain communities in other regions studied by FAP 17; effort declines steadily from its' peak in *joisthya* (May/June) right through the normal peak period of *ashwin* (September/ October) and *kartik* (October/November) as controls are progressively enforced. In Mahmudpur, the involvement of a few villagers in fishing for leaseholders on their *jalmahal* creates a slightly different picture, but the control of access is still the main feature.

The second important point is the peak in fishing activity, and earnings, in *joisthya* at the time of pre-monsoon floods. This is an important event for local communities, providing both a peak in fish consumption and in income from fishing. It does not come at a particularly lean time of year as it corresponds to the period just after the main *boro* harvest, but the involvement of many children means that much of the catch goes directly into household consumption.

Direct impacts of the submersible embankment on the fishing activities carried out by villagers from Akhtapara are minimal. The embankment has usually already overtopped by the time of the *ozaya mas* fishery in *joisthya* and therefore should not affect it. Income levels from the fishery are already far lower than in Mahmudpur. Landless labourers in Akhtapara prefer to harvest *boro*, leaving a higher proportion of the fishing activity to children.

While fisheries plays a role in the livelihoods of both communities, there is no doubt that improvement of agriculture or other income-generating opportunities seems to have a greater impact on these communities than fisheries. The seasonal bamboo trade in Akhtapara and the opening up of much of Dekker *haor* to agriculture make significant contributions to households in both communities. Fisheries remains a viable option for some households in Mahmudpur but progressively tighter restrictions mean that these opportunities may decline in the long-term.

3. FISHING COMMUNITIES AND FLOOD CONTROL

3.1 Means of comparison

The difficulties in identifying fishing communities between which valid socio-economic comparisons can be made are even more marked than with primarily agricultural communities. The variety of strategies employed by different fishing communities for maintaining their livelihood is highly dependent on historical, social and cultural factors which are rarely replicated from one community to the next.

The complexity of the social interactions affecting traditional fishing communities means that, in most cases, direct quantitative comparisons are less informative than more qualitative means of assessment. This is particularly true when dealing with traditional Hindu fishing communities which have obviously been strongly influenced by political and social changes in Bangladesh as a whole. These have often been far more important in terms of their livelihood strategies than changes in the fisheries resource due to flood control.

A few basic indicators can be studied and assessed in order to achieve a better understanding of how flood control measures might have affected the livelihood of "professional" fishing communities. The special indicators taken into consideration when looking at fishing communities are reviewed below.

Social and religious composition of fishing communities

Up to the Partition of India and Pakistan in 1947, fishing as a livelihood was largely limited to specific social and religious groups. Since then, many of the lines dividing fishing and non-fishing communities have steadily broken down. Changes in resources and hydrology due to flood control constitute one of these pressures affecting **who** is fishing.

Migration

In some cases, traditional fishing communities have migrated due to changes in fisheries resources which have been caused, at least in part, by flood control measures. For traditional Hindu fishing communities, migration to India is often a reasonable option in response to problems of a changing resource base or the failure of access arrangements. In the North-East, where there is a large **Muslim** traditional fishing community, migration is a strategy

which is less likely to be adopted by fishing communities in response to such changes.

In any case, some general points need to be made regarding migration of traditional fishing communities as an indicator of flood control impacts.

- By **far** the most important cause of migration by traditional Hindu fishing communities in Bangladesh is communal pressure. Most migration has taken place in clear waves, usually following significant political changes (the Partition of India and Pakistan in 1947, the Independence of Bangladesh in 1971) or episodes of communal tension (anti-Hindu riots in 1965, the backlash after the Babri Mosque incident in 1992). All these events have led to fluxes of migration by Hindu households in general to India.

- The trend has been for Hindu fishing communities to remain in Bangladesh for **longer** than other rural Hindu communities as the capture fisheries resources in the country are far more abundant than in West Bengal. Even in conditions of increased competition and decline, conditions in Bangladesh offer greater opportunities for fishing communities to continue their traditional occupation.

- Changes in patterns of **seasonal** migration for fishing are better indicators of changes in the resource than wholesale out-migration by entire fishing communities. Although these changes are seldom the result of the introduction of flood control *per se*, it is often one of a range of factors influencing changes in the areas exploited by fishermen.

Access issues

Traditional fishing communities have been affected more than any others by the major changes in fisheries access arrangements which have taken place over the last 40 years all over the country. In some situations, flood control can be a contributory factor leading to such changes in the structure of access.

Seasonality & fishing

Study of the seasonal patterns of fishing, and the changes in gears and fishing techniques can also serve as a useful comparative indicator when considering fishing communities. Different types and sizes of fishing gear are designed for use on waterbodies with specific

characteristics in terms of depth, flood duration and species composition. As the waterbodies change, the gears used on them must change also. In the floodplain, **any** change in waterbodies and hydrology also implies changes in **seasonal** patterns of gear use and waterbody exploitation. Comparison of gear use and waterbody exploitation through the year thus becomes a very important indicator of the condition of the fishery.

While fishing communities adapt, like any other community, to changing circumstances and change their technology accordingly, the gears used by specific groups of fishermen also reflect long-standing traditions of exploitation, and management, of fisheries resources. These indicators are not so readily observed among seasonal fishermen or agriculturalists engaged in fishing part-time.

Patterns of waterbody exploitation

Changes in the types and locations of waterbodies exploited by traditional fishing communities have to be carefully placed in their historical context, requiring an understanding of conditions 40 years ago or more. This obviously presents problems in terms of finding reliable sources but such research is essential for understanding the real significance of flood control measures on fisheries resources and the communities dependent on them. Often patterns of waterbody exploitation now and in the past are due to long-term changes in the waterbodies themselves, the communities around them and the social and political context of Bangladesh as a whole.

Incomes and occupational patterns

In spite of social, cultural and religious barriers, traditional fishing communities do diversify out of fishing into other activities in response to changes in the fisheries on which they depend. The extent to which individual communities are able to do this varies greatly from area to area and community to community, but this can also provide an important indicator regarding the ways in which local resources and fishing communities' access to them has altered over time.

3.2 Social and religious composition of fishing communities

Harinagar and Doradhar

The two satellite fishing communities for Akhtapara, Harinagar and Doradhar, represent two

of the major "types" of fishing community in the region. In terms of settlement pattern, they are also representative of most of the professional fishing communities in the *haor*.

Harinagar, a small Muslim *maimul* community, is located quite separate from any of the adjacent farming communities. The hamlet, which is almost entirely landless, lives in intensely overcrowded conditions in a small homestead area at the point where the Halda River meets the Mahasingh. The separateness of the *maimul* community is emphasised constantly in conversation. Local farmers are referred to as *sheikh* or *bangali*. The community, although Muslim, lives and thinks like a caste, set apart from surrounding communities by their occupation and the low social status which it signifies. In contrast to many of the leaseholders, some of whom also call themselves *maimul*, these fishermen seem to occupy the lowest rung in *haor* society, as is illustrated by the story in Box 2.

Some of the leaders of the *maimul* community in Harinagar are aware that the degree of competition for fisheries resources means that fishing cannot support the whole community any more. So they have been encouraging some children from the village to go to school instead of starting fishing at a young age as they normally do. But when *maimul* kids went to the school in the neighbouring *sheikh* community of Soyhara, the villagers turned them away saying they did not want their children mixing with fishermen. Soyhara leaders, who also act a arbiters in disputes within Harinagar and obviously enjoy some influence locally, are also said to be obstructing efforts by the *maimul* to set up their own school. It seems that they feel the place of fishermen's children is not in the classroom. The low wages paid to Harinagar villagers working as agricultural labourers for local farmers during the *boro* season may have something to do with this.

Box 2: Keeping fishermen in their place

Doradhar is located in a similar situation, seperate from other communities in the area, across the river from Meena *bazar*, on the east bank of the Mahasingh. The Doradhar fishermen are all Hindu *matsya das*, one of the most diffuse fishing castes in the country.

Both Harinagar and Doradhar are actually located outside the Kai Project on the east bank of the Mahasingh River. However, they were selected as satellite fishing communities for Akhtapara as they exploit a range of waterbodies around about the village, both within the bounds of the project and outside. Both Harinagar and Doradhar fishermen fish for leaseholders of some of the major *beel* within Bara *haor* and both groups interact with Akhtapara people in the use of the rivers and *khal* round about.

Chandpur and Enaetnagar

The two *maimul* fishing communities in Chandpur and Enaetnagar are, like the other fishing communities, self-contained if less isolated from surrounding communities due to their vicinity to the union centre at Pagla *bazar*. More importantly, several of the most influential *maimul* leaseholders in the entire district live in their midst.

Chandpur and Enaetnagar are just two of a group of five fishing communities located along the upper portion of the Mahasingh River on either side of Pagla *bazar*. Most of these are linked to some degree with the same group of leaseholders, although the fishermen are too numerous to all find employment as leaseholder's men.

Chandpur and Enaetnagar fishermen also exploit many smaller waterbodies in and around Dekker *haor* and are active in fishing on the Mahasingh River.

3.3 Migration

Harinagar and Doradhar

Table 9 shows the numbers of households migrating from Harinagar and Doradhar over the last 40 years, with the timing and causes ascribed by respondents in the communities.

While Harinagar is now a completely Muslim *maimul* community, it had a Hindu majority until the 1940s. From that period onwards, successive waves of out-migration took place, mostly to India but also to other villages in Bangladesh. These moves were evidently a reaction, in part, to the political changes in the country and successive episodes of communal conflict within and around the village.

However, these conflicts were themselves partly the product of changes in the morphology of local *beel* which have brought fishing and farming interests into conflict. Several of the *beel* on which Harinagar fishermen used to rely have silted up, changed from perennial to seasonal waterbodies, and been occupied by farmers and converted to cultivable land. Even when they are inundated fishing activity by fishermen is increasingly restricted by landowners. At the time of the major Hindu out-migration, such conflicts were probably still in their infancy, but the changes which led to them seem to have been already underway and to have influenced the decision by Hindu fishermen to migrate out.

For households in Doradhar, changes in access and levels of competition for fisheries resources are specifically mentioned as having influenced the two households that chose to move from the village in the late 1980s. Both of these households moved to the Chhatak area, where they had relatives in other fishing communities, in the hope that they might be better able to carry on their traditional occupation there. The construction of the nearby embankment of the Kai Project is not, however, directly blamed for any of these changes. The problem of gaining access to local waterbodies in the face of strong competition is seen as having played a more important role.

Table 9

Harinagar & Doradhar :

out-migration of households - 1950s to present

VILLAGE	HARINAGAR		DORADHAR	
Timing	H/H nos.	Reasons for migration	H/H nos.	Reasons for migration
before 1950	35	• Partition (all Hindu H/H moving to India)	17	• communal conflict (all Hindu H/H - 12 moving to India - 5 moving to other area of Bangladesh)
1950-1970	21	• Partition (20 Hindu H/H moving to India) • loss of homestead (1 *maimul* H/H moving to nearby village)	0	-
1970-1980	6	• communal conflict (all Hindu H/H moving to nearby village)	0	-
1980-1990	1	• loss of homestead (*maimul* H/H moving to nearby village)	2	• decline in fishing (Hindu H/H moving to nearby village) • increased competition with seasonal fishermen
1990-present	0		0	-

Source : FAP17 Village Appraisals

Chandpur and Enaetnagar

Table 10 shows the migration data for Chandpur and Enaetnagar. Any migration which has taken place in Chandpur and Enaetnagar has been largely local, with some movement between villages within the same union. This has been almost entirely due to family connections, pressure on the limited homestead area in both villages and, in some cases loss of homestead due to erosion from the Mahasingh River. In addition to these households which have migrated locally, twelve individuals from Chandpur and seven from Enaetnagar are working in the Middle East.

Table 10
Chandpur & Enaetnagar :
out-migration of households - 1950s to present

VILLAGE	CHANDPUR		ENAETNAGAR	
Timing	H/H nos	Reasons for migration	H/H nos.	Reasons for migration
before 1950	0	-	0	-
1950-1970	2	• join relatives in nearby village • seek other employment	20	• join relatives in nearby village • loss of homestead (nearby village)
1970-1980	1	• loss of homestead (nearby village)	0	-
1980-1990	0	-	0	-
1990-present	1	• loss of homestead (nearby village)	0	-

Source : FAP17 Village Appraisals

The migration patterns from the two groups of fishing communities emphasise the general patterns seen countrywide. Most significant migration has taken place among Hindu fishermen who have moved in response to political and social changes. In some more recent episodes, usually confined to individual households, changes in access to fisheries resources played a role. The indirect impacts of flood control measures on changes in access will be discussed at greater length below.

3.4 Fisheries access - leaseholders in the *haor*

Control of access to fisheries resources is the single most important issue in fisheries in the region. Everywhere in Bangladesh formal and informal access arrangements are influential in determining the patterns of distribution of benefits from the fisheries. However, in the *haor* basin, the historical and cultural context have resulted in a far stronger system of access control taking root. Participation or exclusion from this system are decisive for those wishing to exploit the resource.

Leaseholders

The key players in this system are the leaseholders, who control the formal rights for the exploitation of government-owned, or *khas*, waterbodies. Most leases to these fisheries *jalmahal*, as they are known, are controlled by the Land Revenue Department of the Ministry of Lands which auctions out the leases on a competitive basis. The lengths of leases vary from one to three years with some longer leases in special cases. In theory, at least, there can be a change over of leaseholders from one lease period to the next. Preference in the auction process is also supposed to be given to bids by fisheries cooperatives, or *samity*, formed by local fishing communities. The high values of leases for *jalmahal* in the *haor* basin, and the automatic raising of lease values by 25% from one leasing period to the next, means that, in practice, very few fisheries *samity* are able to finance a lease bid without surrendering effective control of the lease to a wealthy financier.

It is therefore these financiers or *mahajan* who make up the leaseholder group which wield such power over fisheries in the region. Even within this group there are distinct divisions. On the one hand there is a group of "traditional" *mahajan* who have acted as arbitors of fisheries access and leaders/patrons of the fishing community in the *haor* area at least since the days of the *mirashdari* system during the colonial period (the *mirasdar* was the term used in the North-East for the local equivalent of the *zamindar*). While there have been equivalent access brokers in other important fisheries areas of the country, nowhere have they been able to establish such a strong and sustained hold on the mechanisms governing the distribution of fishing rights as they have in the *haor*.

The reasons for this lie both in the social history of the *haor* and the nature of the fisheries in the area. Fisheries in the *haor* have always been highly concentrated in *beel* located in the lowest parts of the *haor*. After the drawdown of the floods, all the fisheries production of

the flooded *haor* is steadily concentrated in the perennial *beel* at their heart. It is there, during the dry months from December to March, that fishing effort has always been most intensive as the concentration of fish and their "catchability" increase exponentially.

While this pattern is common to most floodplain fisheries in Bangladesh, the *haor* area has always presented particular problems due to its remoteness. The *haor* is still today a wild environment with relatively limited human settlement and poor communications. The operation of a commercial fishery in *beel* located many miles from the nearest village creates special logistical problems. Greater levels of investment are needed for support of fishermen spending up four months of the year in a temporary community far out in the centre of the *haor*. These *khola*, or seasonal fishing camps, are typical of the *haor* during the dry season. Most fishing crews involved in harvesting operations require advances on prospective earnings or wages in order to prepare gear and hire new members and it is usually the leaseholder who is approached to provide these initial loans. In addition, the efficient harvesting of the *beel* requires a large amount of structural investment in *katha* (brush-piles), *bana* (bamboo barriers) and netting which would probably always have been beyond the means of normal fishermen. Some leaseholders also re-excavate channels which are in danger of silting up and affecting the flows of water to and from the *beel*.

Prior to Partition, these factors probably encouraged the *mirasdar* (landlords) of the *haor* region to appoint influential members of the fishing community as intermediary collectors of revenue from the waterbodies under their control. These figures came to occupy a very similar position to the *dakhaldar* or *pattadar*, the name given to the intermediary tenants/ revenue collecters on the lands of the *mirasdar* landlords in the *haor* basin. The leaseholders acquired a powerful position as fishing operations require particular organisational skills and more capital outlay than most agricultural activities.

In other situations, these influential *maimul*, *kaibarta das* or *matsya das* apparently acted as managers of the "water estates" (*jalmahal*) directly on behalf of the *mirasdar*. In Doradhar, the *matsya das* fishermen describe their relationship with the local *mirasdar* as having been that of *nankar*, practically a form of bonded labour. They worked directly for the *mirasdar*, generally providing the choice of their fish catch to the *mirasdar* in return for maintenance and food.

With the abolition of the *mirasdari* system with the State Acquisition Act of 1950, many of

the intermediary revenue collectors moved into the role of controllers of fisheries access under the new system of *jalmahal* leases. The resources at their disposal and their connections both upwards into government bureaucracies and elite circles and downwards into the fishing communities placed them well to take control of the distribution of access rights and even to influence government policy and its implementation at least at local level.

Many of the Hindu leaseholders have now migrated out of the area and, at least around Akhtapara and Mahmudpur, the traditional leaseholder group is dominated by a few *maimul* families. The use of the term *maimul* is ambiguous. Many leaseholders who are **said** to be *maimul* are simply using the title to indicate that they are involved in fisheries and to establish their credentials as "genuine fishermen" who have a legal right to hold fisheries leases. In other cases, they or their families do originally come from the traditional fishing community although they may not have been involved directly in fishing for generations.

These leaseholders take considerable pains to create an aura around their position as leaseholder on particular waterbodies in order to justify their monopolistic hold on particular fisheries leases. The legends and stories which circulate about particular leaseholders and the fisheries which they control indicate the historical and cultural depth of their social status, a status which they work hard at maintaining (see Box 3). They are also evidence of the loyalty (and fear) which many of the older class of *maimul* leaseholders command among "their" people.

The current leaseholder of the Bordoi-Kastunga Group Fishery in Dekker *haor* comes from a family of *maimul* leaseholders who are extremely influential and have a long history of control of many of the most important *jalmahal* in the area, going back to the colonial period. Local fishermen say that this leaseholder has a special relationship with the *chata* called Khoas Khijir, a spirit said to have power over everything that lives in water. According to *maimul* fishermen, the *chata* will **only** allow the present leaseholder and his descendents to harvest two of the key *beel*, Kastunga and Rangapoti. Any other leaseholder who attempts to take over the fishery would be doomed to failure. The key to the leaseholder's success is said to be his careful show of respect for the *chata*; he holds a yearly *mela* for the villages around the *beel* in her honour (also reinforcing his standing in the villages); at the *mela* a bullock is slaughtered and sweets called *shirni* are distributed; at other times of the year, no women and nobody wearing shoes are allowed in the *beel*.

Box 3 : Leaseholder control and local beliefs

If certain characteristics of the fisheries in the *haor* help to explain the historical development of a powerful and influential group of leaseholders, the nature of changes in the institutional framework of the leaseholding system since Partition and then Independence of Bangladesh

help to explain both its persistance and the pressure which it is now under.

With the transfer of responsibility for *jalmahal*, along with other *khas* land, to the government after the dismantling of the *mirasdari* system in the early 1950s, competitive bidding for fisheries leases was introduced. As long as outside interest in fisheries was limited by the low status associated with it and the remoteness of the *haor*, this had little impact on the existing system. However, with the progressive settlement of the *haor*, the distribution of *khas* land to "landless" households and the growth of demand for fish in urban markets, the auctioning off of *jalmahal* leases has steadily attracted new "investors".

In the *haor*, these investors are often individuals or consortiums of people with limited knowledge of fisheries who have been attracted by the potentially high returns. Many have come from the growing, urban-based middle class, or even from migrant families with family members abroad looking for businesses to invest in "back home". Often these people have the political and institutional contacts necessary to assure that leases are awarded to them or to *samity* they control.

The introduction of competitive auctions for leases has effectively opened up the system to these new leaseholders and has certainly resulted in a dramatic rise in value of leases. There has been considerable competition between the older leaseholding groups and the newer, but much of this "new" investment has probably been absorbed by the considerable increase in the number of waterbodies controlled by the leasing system. Many relatively minor *beel* which were previously left open are now included in the far more comprehensive coverage of the leasing system.

3.5 Fisheries access - changes in the leasing system

The changes in the leasing system introduced after Partition were primarily aimed at improving the coverage and efficiency of the mechanisms for revenue collection from government *jalmahal*. In fact, they clearly led to the increasing marginalisation of the primary producers, fishermen, from the resource on which they depend. The government revenue collection system may have benefitted, but it was also regarded as important that the benefits of state-owned resources should serve to redress inherent inequalities in rural areas. An example is the distribution of *khas* land to landless households. From Independence in

1971, fishing communities, organised into *samity* or cooperative societies, were given the exclusive opportunity to make the first bid at auctions of *jalmahal*. If they were able to offer at least the base price set by the authorities, they were theoretically entitled to the lease. Only if fishermen were unable to reach this base price at the first auction were other prospective lessees to be given the opportunity to make their own bids.

Certain features built into this revised leasing system have made it practically impossible for it to achieve its overt distributional intentions. Notably, the automatic raising of base lease fees by 25% from one lease period to another has quickly led to fishing communities being priced out of the market. Only by borrowing increasingly large sums from local *mahajan*, and, in turn, surrendering effective control to the lender, have fishing communities been able to maintain even a nominal title to access rights. In reality, the leaseholders are usually the active movers in the relationship, approaching fishing communities and acquiring the right to use their names in order to obtain leases in return for rights to fish either as labourers, licence-holders or sub-lessees. The lack of effective sources of institutional credit means that relatively few have been able to genuinely obtain the fishing rights as intended.

The base price system has been subject to widespread abuse. Many important *khas* waterbodies in Sunamganj District, including some in Dekker *haor*, have been unleased for several years. This generally means that they are either occupied and treated like private *jalmahal* by local elites, including leaseholders, or they are left "open" and become the focus for a fishing free-for-all. The explanation for this state of affairs varies according to respondent. According to local officials in the Land Revenue Department, leaseholders are forming cartels and preventing any offers being made at the base price set by the government. This either results in the base price being lowered before finally being leased out to a prearranged beneficiary or no lease being issued at all for that year, in which case the leaseholders simply occupy the *beel* in question and reserve the rights of exploitation by a mixture of force and intimidation. According to local leaseholders, local government officials deliberately delay awarding leases in the hope of inflating the bribes from prospective lessees hoping to sway the decision their way. When leaseholders refuse to satisfy their demands, they refuse to issue a lease at all.

Both situations are obviously occurring on different *jalmahal* in the area. What is certain is that there is a mass of litigation concerning the award of *jalmahal* leases in the *haor* basin clogging the courts both in the North-East and in Dhaka. Matters are complicated by the

involvement of different levels of government administration in the distribution of leases with the result that cases are reported where different leases have been issued to the same waterbody by different level authorities.

New Fisheries Management Policy (NFMP)

The introduction, in 1986, of the New Fisheries Management Policy (NFMP) or *nitimala* as it is commonly called, was intended to address the political and distributional problems inherent in the leasing system. On the limited number of waterbodies where it has been introduced, the replacement of a leasing system with a licensing arrangement for "genuine" fishermen has reportedly had a beneficial impact in redirecting the flow of benefits from the fishery towards the primary producers. However, the situation on the Mahasingh River flowing through the target areas illustrates the problems such a system can encounter when applied in the face of a well-intrenched and politically powerful system of lessee control.

A section of the Mahasingh River stretching from its juncture with the Uttar Gang running out of Dekker *haor*, at Ashampura village, down to Shologram south of Birgaon on the south side of the Kai Project, has been brought under the NFMP. This section is itself divided into two : from Ashampura to Meena Bazar (fished by fishermen from Chandpur, Enaetnagar, Ashampura, Raipur and Kadipur) and from Meena Bazar to Shologram (fished by fishermen from Doradhar, Harinagar, Durgapasha, Naogaon and Birgaon). In theory, a list of "genuine" fishermen from local fishing communities was drawn up by the *Thana* Fisheries Committee, to whom fishing licences were to be directly issued giving them rights to fish with particular types of gear on particular sections of the river.

In reality, a representative of the most powerful local traditional leaseholder sits on the *thana* fisheries committee and effectively controls the distribution of licences through the committee. Local fishermen are told that they should make their submissions and payments for licences directly to this individual who then says that they are licenced to fish but provides no official documentation. These fishermen are, effectively, allowed to fish and it is somewhat ironic that the undermining of the intended system may actually provide better guarantees of access to local fishermen than if they really were managing it themselves. The local leaseholder is at least able to genuinely limit fishing effort by strict (and often violent) policing. However, some fishing sites, such as for *bel jal* (liftnet), on the river are reportedly auctioned off to the highest bidder. The destination of the proceeds of this auction are unclear and some of the rates paid seem to far higher than would be normal under the regulations.

The NFMP section of the Mahasingh continues to be managed like a privately-held leaseholding by the former leaseholder.

3.6 Fisheries access - changes in the *haor*

The increase in the area under cultivation in the *haor* has caused a sharp rise in the levels of conflict and confrontation surrounding the fisheries. Table 11 shows the correspondance between changes in the *haor* and changes in fisheries access for different groups.

The main actors in these conflicts are the leaseholders attempting to maintain and extend their control over an increasingly valuable resource and new landowners in the *haor* trying to establish their claims to a portion of that resource as an extension of their claim over their land. Even within the leaseholding group, there is intense competition for the control of *jalmahal*. "Traditional" leaseholders, with close links to the fishing community, are facing competition from new "businessmen", for whom control of an important fisheries lease is an investment. Often, leaseholders are associating themselves with groups of these investors as these are able to mobilise the bureaucratic connections and the considerable sums of money required for lease fees and bribes.

Members of this older generation of leaseholders maintain that they take (or at least **used** to take) an active role in managing and maintaining the *beel* which they had leased. The levels of expenditure which they quote are almost certainly exaggerated but fishermen informants, including some **not** linked to a particular leaseholder, distinguish between these experienced leaseholders and the newer lessees. A local fisherman commented about a traditional leaseholder, that "at least he knows how to look after a *beel*".

Under conditions of limited fishing effort and longer leasing periods, leaseholders would have had some incentive to manage their *beel* carefully. Failure to harvest some fish of specific species (particularly the migratory major carps) in a particular year, either through inefficient harvesting methods or foregoing catch by choice, did not necessarily mean **loss** of that catch. The high-value migratory carps (*ruhi*, *mrigal*, *katla* and *kalibaus*) migrate longditudinally up river to spawn and then onto the floodplain to feed and grow. These carp are reported by fishermen to return to the same *beel* and even the same *katha* year-after-year and, as long as there was a good chance of those fish being **able** to return, leaseholders could afford to

Table 11

Akhtapara & Mahmudpur :

changes in fisheries access for different social groups - 1960s to present

		SOCIAL GROUPS	FISHERIES	INVOLVEMENT	OTHER
Time	**Leaseholders**	**Trad. fishermen**	**Land-owners**	**Landless labourers**	**ACTIVITIES & CHANGES**
1960s	open auctions for *jalmahal* : little competition for traditional leaseholders ⇓	**Flood season** - open fishing in *haor* : subleases on Mahasingh River **Dry season** - fishing on *beel* for leaseholders ⇓	**Flood season** - subsistence fishing in *haor* **Dry season** - community fishing on *beel* after harvest ⇓	**Flood season** - subsistence fishing in *haor*: **Dry season** - community fishing on some *beel* after harvest ⇓	**Flood season** - DWR **Dry season** - *boro* & cattle grazing in *haor* ⇓
1970s	preference in auctions to fisheries *samity* : increased competition for leases : more non-traditional leaseholders ⇓	**Flood season** - open fishing in *haor* : subleases on Mahasingh River **Dry season** - *beel*-fishing for leaseholders: more competition for leaseholder work ⇓	**Flood season** - subsistence fishing in *haor*: **Dry season** - community fishing on some *beel* after harvest: more land on *boro* in *haor* ⇓	**Flood season** - more fishing in *haor*: **Dry season** - community fishing on some *beel* after harvest: more labour on *boro* during winter: in-migration ⇓	Land in *haor* settled: increase in *boro* area: some flood control ⇓
1980s	value of leases rising: stiff competition for leases : more non-traditional leaseholders ⇓	**Flood season** - fishing in *haor* restricted: NFMP on Mahasingh River: leases on *khal* **Dry season** - *beel*-fishing for leaseholders: pond & river fishing ⇓	**Flood season** - more fishing in *haor* **Dry season** - most of *haor* converted to *boro* ⇓	**Flood season** - more fishing in *haor*: some restrictions from landowners & leaseholders **Dry season** - more labour during winter: in-migration ⇓	Most of *haor* cultivated: HYV *boro* introduced: more flood control ⇓
1990s	high lease values : heavy additional costs : increasingly stiff competition for leases : many non-traditional leaseholders	**Flood season** - fishing in *haor* restricted: Mahasingh River controlled by leaseholder: catch-share on *khal* **Dry season** - *beel*-fishing for leaseholders for some : pond & river fishing for others: agricultural labour	**Flood season** - more fishing in *haor* : excavation of fish-pits on land **Dry season** - local & HYV *boro* cultivation in *haor*	**Flood season** - more fishing in *haor*: restrictions & conflicts with landowners & leaseholders **Dry season** - more labour during winter: in-migration	widespread HYV *boro* cultivation

Source : FAP17 Village Appraisals

wait until they reached their third or fourth year of growth before harvesting them. This ensured better sustainability, as fish would be given time to breed at least once before being caught, and it optimised the value of the fish as the price per kilogram increases with size.

This functioned well as a sustainable management system as long as fishing effort being applied **outside** leaseholders' *jalmahal* was relatively limited and leaseholders could be assured of at least three years of control of the *jalmahal*. Under these conditions fish which moved out of the *beel* during the floods to graze on the floodplain stood a reasonably good chance of making it back to the *beel* to be harvested by the leaseholder. Likewise, broodstock returning to rivers to overwinter in the deep scour-pits (*doar*) in the Surma, Mahasingh and Kalni Rivers would have a reasonable probability of not being caught and returning to the *beel* with the subsequent year's flood.

The extent to which this "system" was intentional should not be exaggerated. Failure to catch fish from one year to the next has far more to do with inefficiency of gear than with the intentions of the leaseholders to sustain the resource. However, longer lease periods, such as those which predominated prior to the Independence of Bangladesh in 1971, certainly encourage a level of management which is rare at present. With no guarantees of continuing control of the resource from one year to the next, leaseholders' only concern is to extract the maximum benefit in the shortest possible period. Any type of investment in maintaining the *beel* by re-excavation of channels and installation of brush-piles is steadily discouraged. Bureaucratic delays in issuing new leases until the last possible moment, whatever their motivation, has also contributed to a marked decline in *beel* management practices over the last few years.

Better management in the *beel* in the past would have also ensured that there were more fish on the floodplain for those subsistence fishermen catching fish there during the floods. Unfortunately, this argument cuts both ways, depending on the levels of effort being applied on the floodplain. When the effort is contained and resources are not under pressure, the leaseholding system would actually ensure a distribution of benefits from the fisheries by maintaining fisheries resources without threatening the benefits accruing to the leaseholder. However, in the context of the explosion in seasonal fishing activity outside the *beel*, management incentives are reduced and a process of more and more indescriminate "mining" of the resource is initiated.

Under present conditions, with landowners in the *haor* becoming more and more involved in the exploitation of fisheries resources during the drawdown, it is not clear that even the reintroduction of longer leasing periods would, by itself, have an important impact on management practices among leaseholders.

3.7 Fisheries access - fishing communities

Harinagar and Doradhar - access issues

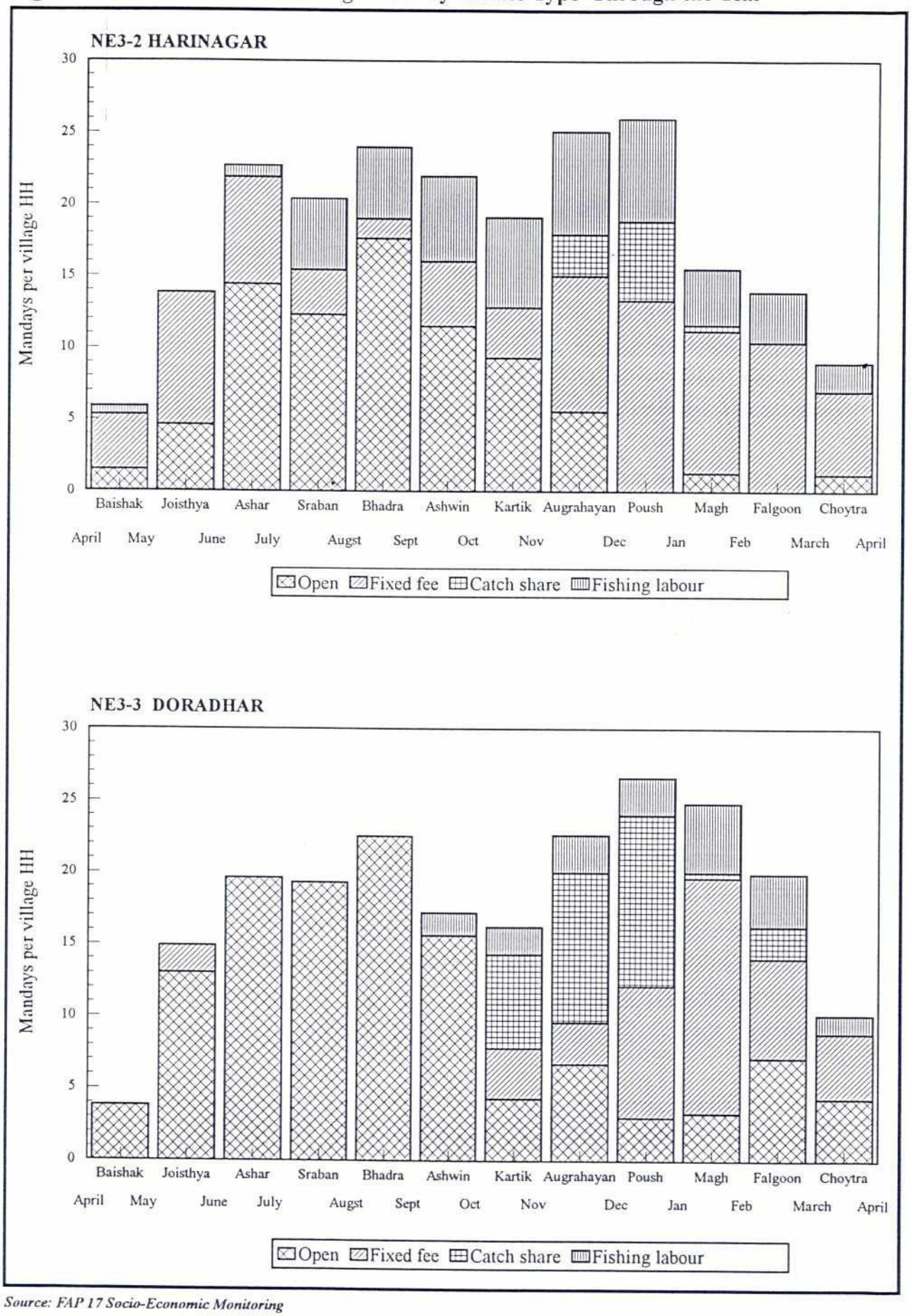
Access for both Harinagar and Doradhar fishermen has been negatively affected by changes in the physical characteristics of many of the *beel* which they have traditionally exploited. Like many traditional fishermen, they have lost out as leaseholders and landowners try to establish new frontiers of control, particularly on the floodplains in the *haor*.

Figure 10 shows the way in which fishing activity in Harinagar and Doradhar is distributed across waterbodies under different types of access arrangement through the year. The relatively higher proportion of fishing **labour** among Harinagar people suggests that *maimul* leaseholders prefer to hire *maimul* fishermen. Most of this labour is in the form of *parahadar*, or *beel*-guards taken on by leaseholders on Shaldigha, Goalpoi and Pakhimara *beel* inside the Kai Project.

For Harinagar fishermen, many of their old *beel*-fishing grounds that used to be perennial *jalmahal* in the past have been turned completely over to crop land. Even when they are flooded, fishermen report that their right to fish is more and more frequently contested by farmers. The *beel* of Basakhair *haor* have, over the last 20 years, changed from a rich network of perennial *beel* into an expanse of seasonally flooded cultivable land. Rights to fish in this area are now being claimed by the Muslim farmers. While open-access fishing in the area remains crucial to the *maimul* of Harinagar, the pressure on them to find other fishing grounds is extreme. Although the open-access floodplain fishery still accounts for the bulk of their fishing effort during the flooding season from *ashar* (May/June) to *kartik* (October/ November) access to this fishery is increasingly contested and insecure.

A similar process has taken place on the Halda River, running along the south side of Basakhair *haor*, where Harinagar fishermen used to fish with *veshal*. As the river has gradually silted up and become seasonal, farmers and landless living along its banks have

Figure 10 Distribution of Fishing Effort by Access Type Through the Year



Source: FAP 17 Socio-Economic Monitoring

begun to lay claim to its fish, first of all dewatering sections of it as it drains out in *kartik* (October/November) and then preventing traditional fishermen from fishing there at all. *Bel jal* (liftnets) now located on the river are all owned by farmers. No formal leasing system exists on this river, but it has become a waterbody closed to local fishermen.

The *beel* inside the Kai Project account for the bulk of the catch-share arrangements seen in Figure 10. It is interesting that Harinagar fishermen are working as fishing labourers on the same *beel* where the *matsya das* of Doradhar are operating on a catch-share basis. The catch-share arrangements vary from 65:35 when the catch is high to 50:50 (leaseholder:fishermen) when the catch is lower. It is noticeable that much of the harvesting of these *beel* takes place relatively early, between *kartik* (October/November) and *poush* (December/January). Smaller numbers of fishermen are engaged in the final harvest in *falgoon* (February/March). No more than half of the fishing effort applied in either Harinagar or Doradhar is on the most productive *beel* such as Shaldigha or Pakhimura.

Working as wage-labour for big leaseholders directly is, by now, a "privilege" reserved for relatively few fishermen from Harinagar. Such jobs are much sought after as they offer steady work for at least four months of the year, even though the wage rates seem low (Tk.20-30 per day plus meals) compared to average agricultural wage rates (Tk.30-40 per day plus meals). Fishermen often take home even less as various "adjustments" are made to their wages to account for lean-season loans and services provided by the leaseholder. On the other hand, access to these loans also constitute one of the main attractions for fishermen of working for a leaseholder.

Doradhar fishermen seem to operate on a more independent basis. The effects of this on their patterns of income will be seen in section 3.10.

Where local people, particularly traditional *maimul* leaseholders, have taken the leases to waterbodies, they seem to be more likely to hire **local** fishermen as *paharadar* or *beel*-guards. Outsiders bidding for *jalmahal* leases prefer to hire fishermen from distant communities to work as guards, labour and catch-share harvesters. There is a general perception that the fishermen are easier to control if they have no ties or obligations to people living around the particular *beel* which they are harvesting. As the hold of traditional leaseholders on local waterbodies slips, the "job security" of local fishermen suffers. Many *beel* in the area in and around the Kai Project and Dekker *haor* are being harvested by

fishermen from other *thana* such as Chhatak or Habiganj.

The institution of the NFMP licensing system on the Mahasingh River should, theoretically, have remedied some of these problems for local fishermen. As described above, however, the system is not functioning as it should, with real control remaining with the previous leaseholders. It is difficult to assess just how much benefit the leaseholder is extracting from his *de facto* control of the river. Fishermen are allowed to fish on the river, although none of them have actually seen their "licences" : (the self-appointed local controller of the Mahasingh *jalmahal* who collected their licence fees is said to have explained to fishermen who asked about their licence documents: "**I** am your licence").

The river is certainly the most important single fishing ground for Harinagar fishermen. The the rights of access are sufficiently sought after for there to be a flourishing market in "fishing licences". In Doradhar, out of 12 *katha* (brush-pile)"licence"-holders, 6 regularly sell out their rights to the other 6. Gear **locations** are auctioned to the highest bidder. This applies primarily to sites along the river for *bel jal* (liftnet) for which the fee varies depending on the position. Sites located on one of the *doar* or *gobi* (scour pits), which are considered the richest fishing locations, can cost as much as Tk.2,000 per year. Other poorer sites go for around Tk.200.

The numbers of traditional fishermen now exceed the demand for fishing labour on the leased areas, even taking into account the increased area under lease. For those fishermen **not** working for leaseholders or obtaining the leaseholder's "licences" to fish on the river, the open-access options are increasingly limited. Not surprisingly, many fishermen are resorting to "stealing" fish (by their own admission). *Current jal* (monofilament gillnet) and various types of *daun borshi* (longline), both passive gears which can be made almost invisible from a distance, are commonly set in the floodplains and even on the leased out *beel* whenever the opportunity presents itself. Violent confrontations as a result of such episodes have become a frequent feature of life in the *haor*.

For Doradhar fishermen, the C & B *khal*, formed by the borrow pit created when the Sylhet Sunamganj highway was constructed, has become important for one group within the village. The leaseholder, a local man from Mahmudpur, hires mainly agricultural labour from his own village to maintain the *khal* but relies on the professional fishermen, working on a catch-share basis, to set up *katha* (brush-piles), locally called *jang*, and do most of the fish

harvesting at the end of the year.

Chandpur and Enaetnagar - access issues

Access arrangements for the two communities of Chandpur and Enaetnagar show an even starker difference, although the two communities are adjacent.

Figure 11, showing distribution of fishing effort through the year by access type, clearly highlights the closer links of the Chandpur fishermen with local leaseholders (who live in their village) compared with Enaetnagar.

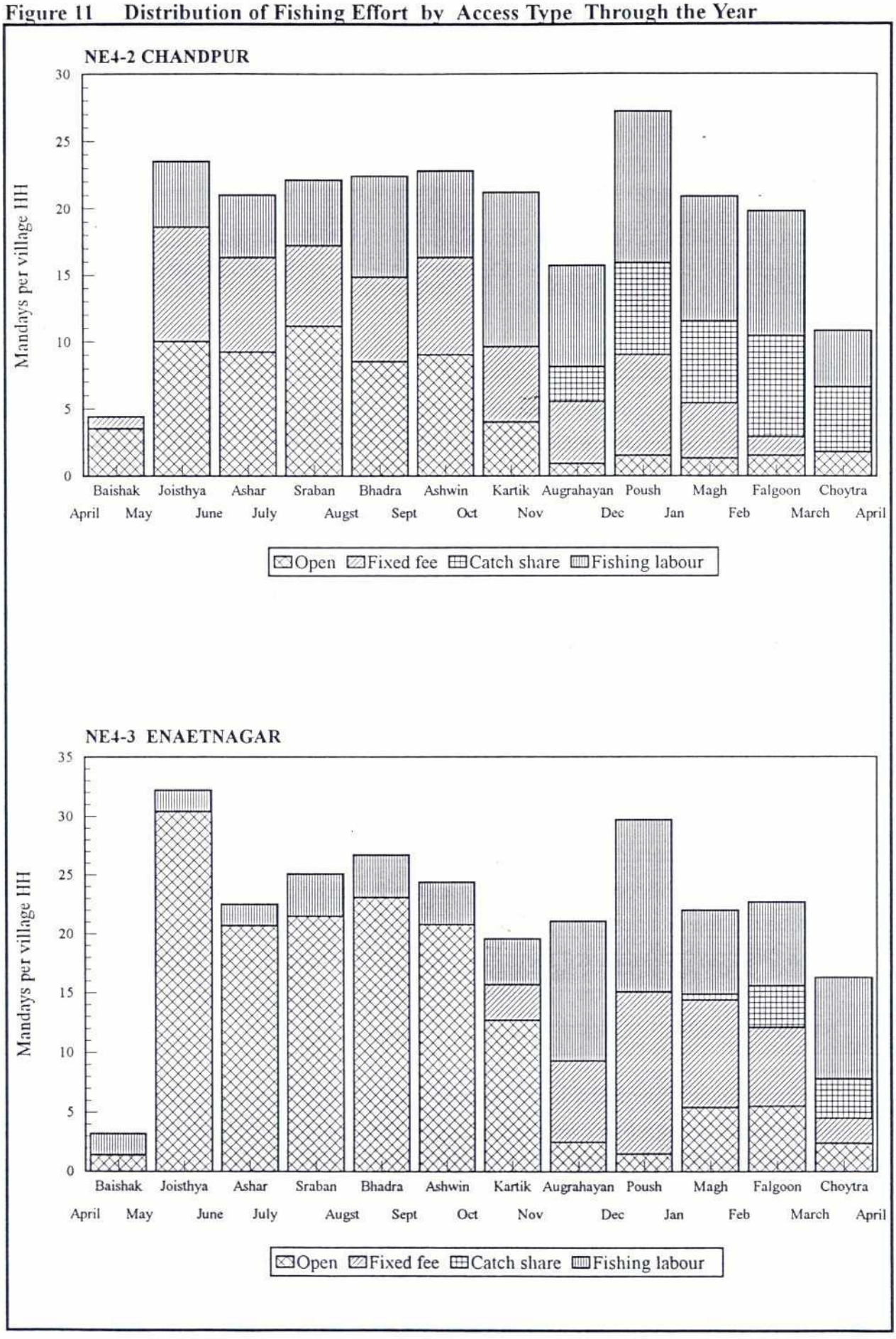
Some Chandpur fishermen are working as fishing labour for the leaseholders right through the year, except for the month of *baishak* (April/ May). Both fishing labour and catch-share fishing peaks during the winter months when they are working for the main leaseholder on his leased *beel*. Fishing on a fixed-fee basis on the river, under the same terms as for fishermen from Harinagar and Doradhar is also an option for a considerable proportion of the community through the rest of the year.

By contrast, Enaetnagar fishermen are mainly dependent on the open-access, and therefore more precarious, floodplain fishery all through the summer months from *joisthya* to *kartik*. Labour for the leaseholder only becomes important at the time of peak catches in *poush* and fishing spots on the river seem to become available only when Chandpur fishermen have moved off the river onto the leased *beel*.

There is also a clear division within the communities themselves. On the one hand, a considerable number of the fishermen are consistently hired directly by the leaseholder for the harvesting of the several major *jalmahal* in the area which he has under his control. For just one of these, a three-year lease, the major fish harvest after three years was carried out by no less than 260 **salaried** fishermen, most of whom came from Chandpur, with periodic involvement of people from the other neighbouring *maimul* communities in Enaetnagar, Asanpura, Kadipur or Raipur.

The dynamics of the relationship between leaseholder/patron and fishermen/client in these two villages is clearer here than in Harinagar. For these "leaseholder's men", the leaseholder is more than just an employer; he acts as moneylender during the lean season, helping out the fishermen's families with fast and flexible loans; indebtedness obliges the fishermen to

Figure 11 Distribution of Fishing Effort by Access Type Through the Year



Source: FAP 17 Socio-Economic Monitoring

work for the leaseholder the following season; the repayment of the debt is then "adjusted" against the fishermen's wages. Interest rates are either unknown or reserved but the mechanism is clearly used to create a web of dependence.

This web of dependence is also a web of security. Given the fragility of fishermen's hold on the fisheries resources they depend on, the importance of the security offered by association with a powerful and influential leaseholder should not be underestimated. The relationship between leaseholder and fishermen is undoubtedly exploitative, but the competition for the fishery resource in the *haor* is such that anyone wishing to control any part of it needs to be willing to use force. On the most valuable *beel*, leaseholders are frequently protecting "their *beel*" with what amounts to a private army. Episodes of violence, gun battles and deaths are not uncommon in disputes over fishing and it is very doubtful whether fishermen, as a low-status minority, could hold their ground in the face of such competition.

At least some Enaetnagar fishermen almost never work for leaseholders, apparently by choice. About 40 fishing households in Enaetnagar think of themselves as "independent". As one of them explained, he prefers "not to have to do what another man says". However, perhaps as a result of that preference, this particular respondent was working seasonally as a boatman as his "independent" fisheries access could no longer assure him a livelihood. For many of these "independent" fishermen, the tendency for landowners to get involved in fishing on their flooded lands is threatening what has normally been one of their most important available fishing areas. At present, areas in Dekker and Jolsi *haor* are still accessible during the floods, but the options are narrowing and an increasing number are seeking alternative areas of employment such as fish trading, water transport or non-agricultural labour.

3.8 Seasonality and fisheries

Harinagar and Doradhar

Table 12 shows the numbers of different fishing gears owned in Harinagar, the percentage of households owning them and the average total income earned by households from that type of gear. The role of Harinagar fishermen as harvesters for local leaseholders, illustrated by the analysis of effort and access type in Figure 10, is also reflected in the gear which they own. While *veshal* (liftnet, locally called *bel jal*) is the most commonly owned gear, different

types of seine net (*berjal* and *konaberjal*) and *kathi jal* (a type of *berjal* often used for harvesting *katha* or brushpiles) are owned by about half the fishermen. *Daun* (longline) is also common for use on the floodplain during the summer months when fishing on the *beel* is restricted.

Table 12 Distribution of Gears, Harinagar

Gear Type	Bengali Name	No.	%	Tk.
Gill nets	Current jal	12	13.3	5117
	Koi/Fashi jal	6	6.6	2900
Seine nets	Ber jal	21	23.4	4668
	Kathi jal	23	25.0	10682
	Konaber jal	11	11.7	5981
	Dora jal	10	5.1	1100
Lift net	Veshal jal	33	36.7	4158
Katha	Katha	6	6.6	17650
Hook	Daun	23	25.0	1960
Cast net	Jhaki jal	15	16.8	1084
Push net	Thella jal	12	13.3	152

Source : FAP17 Socio-Economic Monitoring

In Doradhar, shown in Table 13, *jhaki jal* (castnet) is the most popular gear. Given the community's apparent lack of close connections with any particular leaseholder, this gear gives the *matsya das* greater flexibility in terms of where they can fish. Smaller gears like *current jal* (monofilament gillnet), *dora jal* (small seine net) and *thella jal* (pushnet) are more widespread as they can be used practically anywhere. The *berjal* (larger seine net) operated in the village are the major earners.

In particular, the *kathi jal* (a sort of semi-fixed seine net with vertical stakes usually placed around a *katha* while it is being harvested) is used by teams of fishermen to harvest *beel* and sections of *khal* during the traditional drawdown fishery. The use of this gear seems to be something of a speciality for Doradhar fishermen.

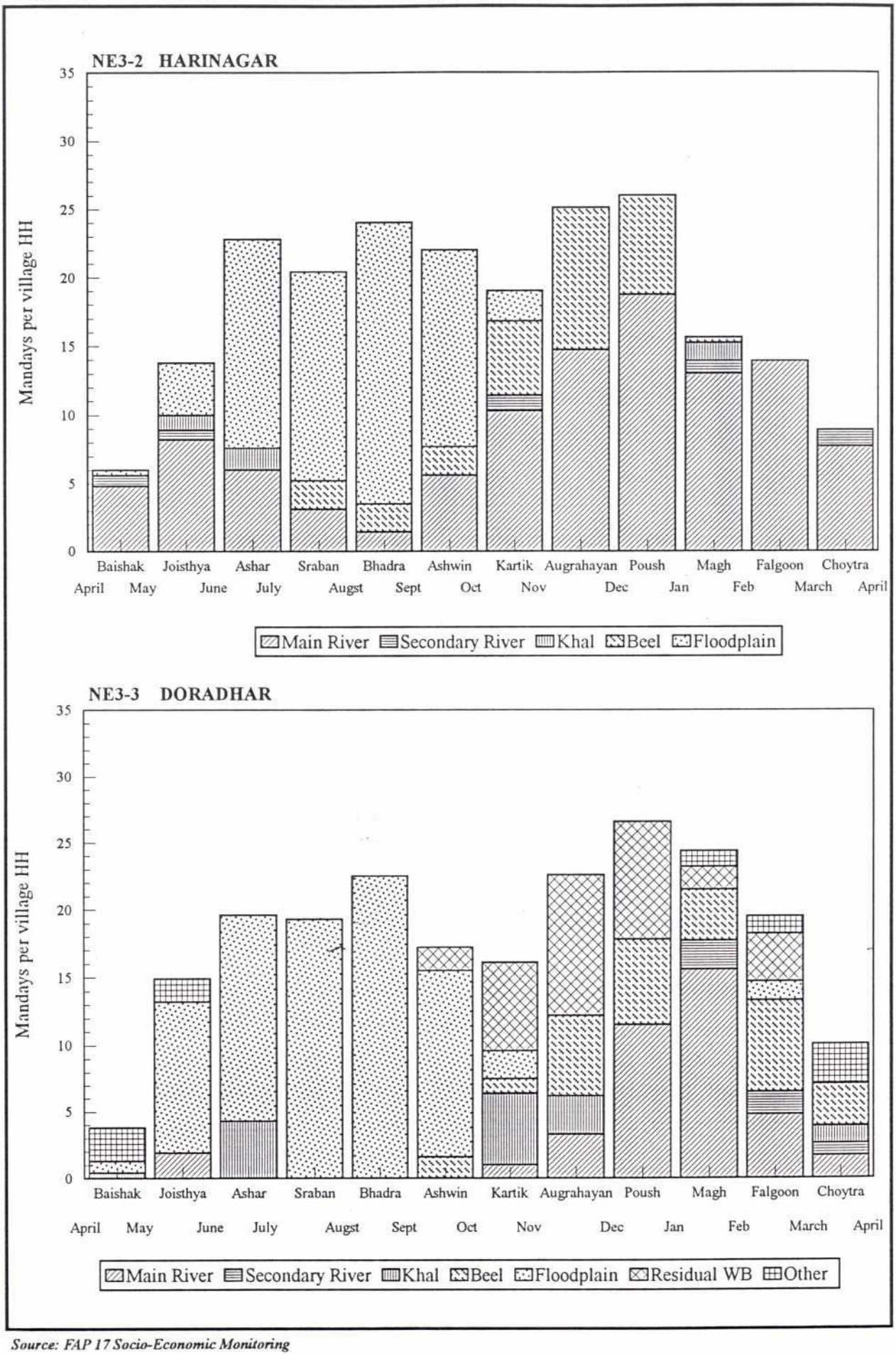
Table 13 Distribution of Gears, Doradhar

Gear Type	Bengali Name	No.	%	Tk.
Gill net	Current jal	8	33.3	6880
Seine nets	Ber jal	5	20.8	42606
	Ferra jal	4	16.7	1405
	Kathi jal	2	8.3	925
	Dora jal	8	33.3	5651
Hook	Daun	8	33.3	2365
Cast net	Jhaki jal	17	70.8	1726
Push net	Thella jal	9	37.5	2637

Source : FAP17 Socio-Economic Monitoring

The distribution of fishing effort by waterbody type, shown in Figure 12, demonstrates the reasons behind the gear choices in the two communities while Table 14 takes the principal gear/waterbody combinations and

Figure 12 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 14
Principal Gears, Use by Month and Waterbody

NW3–2 Harinagar — Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Leaseholder labour	Beel				2.1	2.1	2.1	3.8	3.8	3.8				17.7	8.1
Kathi jal	Main River	3.0					2.1	3.8	6.1	9.3	4.0	4.4	0.9	33.6	15.4
	Floodplain			6.3	5.7	8.6	6.1	1.8						28.5	13.1
Veshal jal	Main River	0.6	6.4	4.9	3.1	1.4	2.4	4.0	4.8					27.5	12.6

NW3–3 Doradhar — Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Ber jal	Residual WB							6.5	6.1	6.7				19.3	8.9
Current jal	Floodplain			3.7	5.8	6.1	5.5	2.1						23.1	10.7
Thella jal	Floodplain		2.4	3.1	2.2	3.1	2.3							13.2	6.1
Daun	Floodplain	0.9	5.0	5.6	4.4	5.3	1.1							22.3	10.3
Dora jal	Main River									4.0	5.7	1.8		11.5	5.3
	Floodplain				3.5	5.2	3.8							12.5	5.8

Note : Depth of shading indicates relative intensity of use of that gear within the year

illustrates their seasonal patterns and intensity of use.

In Harinagar, the movement from the floodplain during the flooding season, with some *veshal* fishing on the Mahasingh River, onto the *beel* as labour and into the harvesting of *katha* in the river is clearly shown. The more sustained dependence on riverine fisheries is also symptomatic of these *maimul*'s ties to local leaseholders who also control access to the river fishery.

Doradhar fishermen work more on the open floodplain during the summer months using small, flexible gear. Although they generally describe the floodplain fishery as open, they admit to frequently having to hide from leaseholders' men attempting to limit fishing even outside their *jalmahal*. The gears used; *daun*, *current jal* and *thella jal*, are suitable for this type of fishing which requires mobility and low visibility. The *berjal* in the community are mostly used now for harvesting the *dubi* and *gara* (fish-pits) excavated by local farmers on their land on the floodplain. From *kartik* (October/November) to *poush* (December/January) this fishery on residual waterbodies is the most important single fishery.

Chandpur and Enaetnagar

Table 15 shows the gear ownership in Chandpur. *Veshal*, operated by 33% of fishermen, and *kathi jal*, used by just under 30%, are the most important gears in the village. The numbers of other types of gear operated are relatively small, indicating the extent to which Chandpur fishermen are dependent on labouring jobs with the leaseholder. Fishing operations besides *veshal* fishing on the Mahasingh River and *katha* harvesting (with *kathi jal*) on both the river and the *beel*, are quite limited.

Table 15 Distribution of Gears, Chandpur

Gear Type	Bengali Name	No.	%	Tk.
Gill net	Current jal	13	17.2	8837
Seine nets	Ber jal	4	5.7	1745
	Kathi jal	28	36.0	6892
	Konaber jal	9	11.5	4057
	Dora jal	4	5.7	2880
Lift net	Veshal jal	33	43.4	6362
Scoop net	Hat Tana jal	4	5.7	3520
Hook	Sip	6	7.4	2330
	Daun	9	11.5	3602
Cast net	Jhaki jal	4	5.7	1100
Push net	Thella jal	18	22.9	544

Source : FAP17 Socio-Economic Monitoring

Table 16 shows the distribution of fishing gears in Enaetnagar and the average total incomes earned by households from these gears. The more widespread ownership of *daun*, *current jal*, *thella jal* and *jhaki jal* in Enaetnagar illustrates the more insecure access to fishing grounds for these fishermen. This, in turn, means adoption of more flexible fishing strategies. Over 45% of fishermen in Enaetnagar use some type of gillnet, either *current jal* or *koi jal* while large numbers of *daun* and *thella jal* are also operated. These are all gears typically used on the floodplain rather than the main *beel* although the *current jal* are often called in by leaseholders to complete the harvesting of *beel* after the main *katha* harvest is over.

Figure 13 and Table 17, showing the distribution of fishing effort through the year and the gear/ waterbody combinations which contribute most to village fishing effort, show this more clearly still. Chandpur fishermen count on their access to the Mahasingh River and some of the *khal* in Dekker *haor* controlled by *maimul* leaseholders and fished there, during the flooding season, with *veshal*. This accounts for about 20% of their fishing effort through the year. Fishing on the main river is considerably less important for Enaetnagar fishermen and their access to *veshal* is limited.

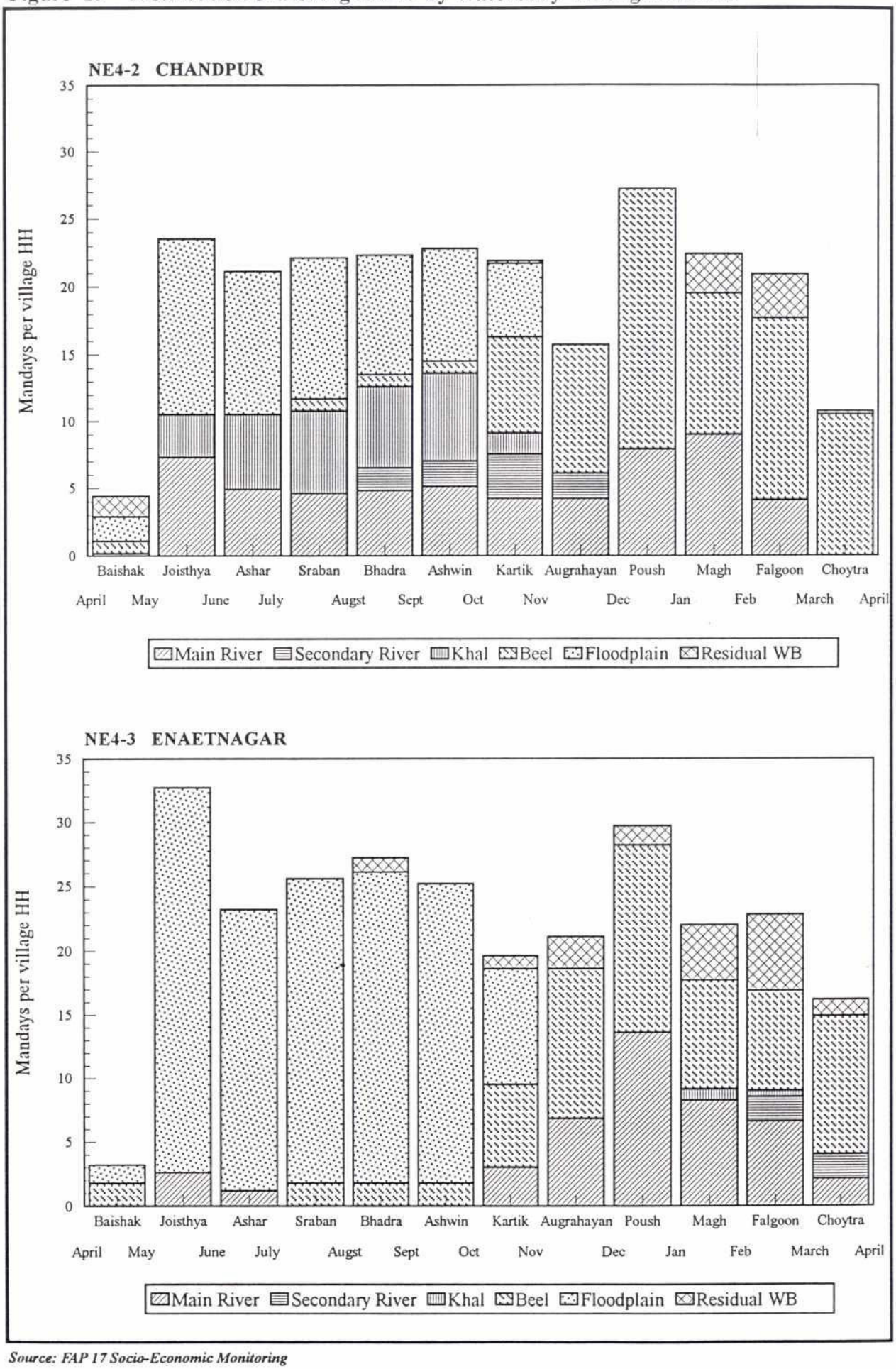
Table 16 Distribution of Gears, Enaetnagar

Gear Type	Bengali Name	No.	%	Tk.
Gill nets	Current jal	51	39.8	8260
	Koi/Fashi jal	7	5.9	7990
Seine nets	Ber jal	18	14.5	1849
	Kathi jal	36	28.0	3342
	Konaber jal	15	11.8	4300
	Dora jal	28	23.0	4803
Lift net	Veshal jal	15	11.8	5686
Hooks	Sip	11	8.5	2690
	Daun	51	40.7	5122
Cast net	Jhaki jal	32	25.4	1384
Push net	Thella jal	38	30.6	778
Other	Dewatering	11	8.5	290
	Net/Basket +	7	5.9	1750
	Dewa	11	8.5	1420
	Akra			

Source: FAP17 Socio-Economic Monitoring

Labour for the leaseholder accounts for a marginally greater proportion of effort for Enaetnagar fishermen than for *maimul* from Chandpur - 19% as opposed to 16% - but Chandpur fishermen also put in a significant proportion of their effort on the *beel* in catch-share arrangements. Enaetnagar fishermen are brought in by the leaseholder later in the season, with *current jal*, to complete the *beel* harvest, but the floodplain catch is far more important. *Daun* and *current jal* fishing on open-access floodplain areas account for about

Figure 13 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 17
Principal Gears, Use by Month and Waterbody

NE4–2 Chandpur — Units: Man Days per Village Household

Gear	Habitat	Baishak	Joisthya	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Leaseholder labour	Beel				0.9	0.9	0.9	5.9	6.2	9.6	6.1	6.1	0.9	37.7	16.0
Current jal	Floodplain	1.3	6.1	5.7	5.9	3.2	3.0	2.8						28.0	11.9
Kathi jal	Beel	0.9							1.9	5.4	4.5	5.8	4.8	23.2	9.9
Veshal jal	Main River		2.7	3.6	4.6	3.1	3.7	2.9	2.1					22.8	9.7
	Khal		3.2	4.1	5.0	4.7	5.5	1.6						24.1	10.2

NE4–3 Enaetnagar — Units: Man Days per Village Household

Gear	Habitat	Baishak	Joisthya	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Leaseholder labour	Beel	1.8			1.8	1.8	1.8	3.9	9.8	12.3	5.3	5.3	6.7	50.5	18.8
Current jal	Floodplain		10.0	9.6	7.7	7.4	6.9	3.2						44.8	16.7
Daun	Floodplain	1.4	7.5	6.8	8.8	9.2	8.9	3.7						46.2	17.2
Dora jal	Main River									3.4	5.5	5.4	1.0	15.2	5.7

Note : Depth of shading indicates relative intensity of use of that gear within the year

34% of their yearly fishing effort and much of their *thella jal* and even *berjal* fishery is carried out in the same place.

Enaetnagar fishermen have a peak in their fishing effort during the *ozaya mas* period in *joisthya* (May/June) while for Chandpur fishermen the busiest period is during the early dry season catches on the *beel* and river in *poush* (December/January).

Chandpur fishermen also make use of *current jal* on the floodplain, particularly from *joisthya* (May/June) through to *kartik* (October/ November), but it is not nearly as important for them overall.

3.9 Patterns of waterbody exploitation

Harinagar & Doradhar

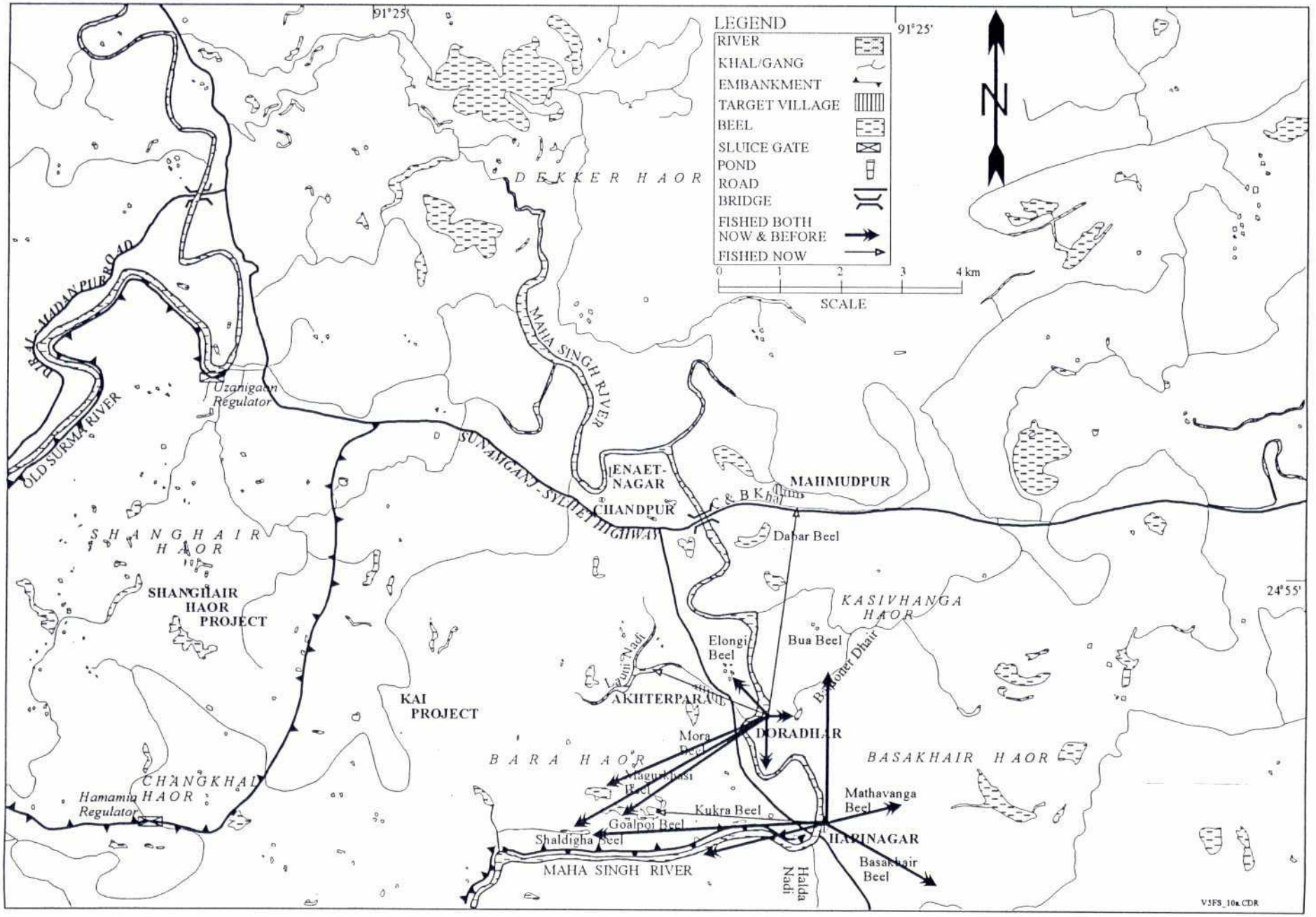
There has not been any radical change in the location of the waterbodies most commonly exploited or the distance which fishermen have to travel. In some cases, there has been an increase in the number of fishermen from outside the area coming in to work on the *beel*-harvest particularly those leased by newer, non-traditional fishermen.

Figure 14 shows the range of waterbodies currently exploited by fishermen from Harinagar and Doradhar, as well as those historically fished by the two communities.

For both communities, the Mahasingh River has always been one of the most important waterbodies but, for Harinagar fishermen in particular, it has increased in importance as opportunities on surrounding *beel* and floodplains have declined. The administrative status of this river, and the official mechanisms governing fisheries access, have changed frequently since the end of the colonial era. However, the underlying system of political and social patronage controlling who exploits it has survived remarkably intact. Although this system, dominated by the local leaseholding elite, limits the proportion of benefits which accrue to fishermen from the fishery, it does ensure some degree of fisheries access to local fishing communities, including Harinagar and Doradhar.

Not many changes have occurred in the *beel* and floodplain areas fished, but the **quality** of the fishery in many of them seems to have changed radically. The five *beel* located in

Figure 14
Harinagar and Doradhar
Map showing waterbodies fished - past & present



Bashakair *haor* (Bashakair, Mathavanga, Bara, Joilla, and Pagna) reportedly supported a rich fishery and constituted the most important single fishing ground for Harinagar fishermen. However, the Boter *khal* connecting the *haor* with the Surma River to the north-east, while probably providing an important migration route for fish from the river to the *haor*, also carried a silt load which has progressively raised the bed of the *haor*. None of the *beel* are now perennial, fisheries resources have been greatly reduced and, most importantly, the area is now cultivated by farmers who, more and more, tend to claim rights of exploitation over fisheries resources that remain. None of the *beel* in Bashakair *haor* are now leased as *jalmahal*, reflecting the decline of their fisheries importance. For Doradhar fishermen, a very similar process is reported to have taken place in Elongi *beel* which is now a seasonal floodplain.

The completion of the planned sluice-gate at Birgaon, controlling water access to Bara *haor* can be expected to have an important impact on the value of the fishery in Shaldigha *beel*, unless it is managed to allow the passage of fish fry migrating into the *haor* during early floods. Changes in the fishery for high-value migratory species in this *beel* could be expected to cause similar problems for both Harinagar and Doradhar fishermen to those they have already experienced in other *beel* in the past. This would push them into further dependence on the riverine fishery and more flexible fishing strategies using smaller gears.

Chandpur and Enaetnagar

The patterns of waterbody exploitation for the two *maimul* communities in Chandpur and Enaetnagar are quite different from both Harinagar and Doradhar. Figures 15 and 16 show the waterbodies fished at present and in the past.

For fishermen from Chandpur, fishing activity has traditionally been dominated by their involvement in the management and harvesting of a series of important *beel* in Dekker *haor*. The Bordoi and Boroghor *beel* fisheries, located in the heart of Dekker *haor* to the north, are the most critical *jalmahal* for both these communities.

Although the fisheries in both these *beel* have reportedly been negatively impacted by the blocking of the principal connection with the Surma River through Pander *khal*, they are still the most important and productive fisheries in the *haor*. Chandpur, and to a lesser extent, Enaetnagar fishermen have always played an important role in the exploitation of this resource. Their close patron-client links with the traditional leaseholder of this fishery, who

Figure 15
Chandpur
Map showing waterbodies fished - past & present

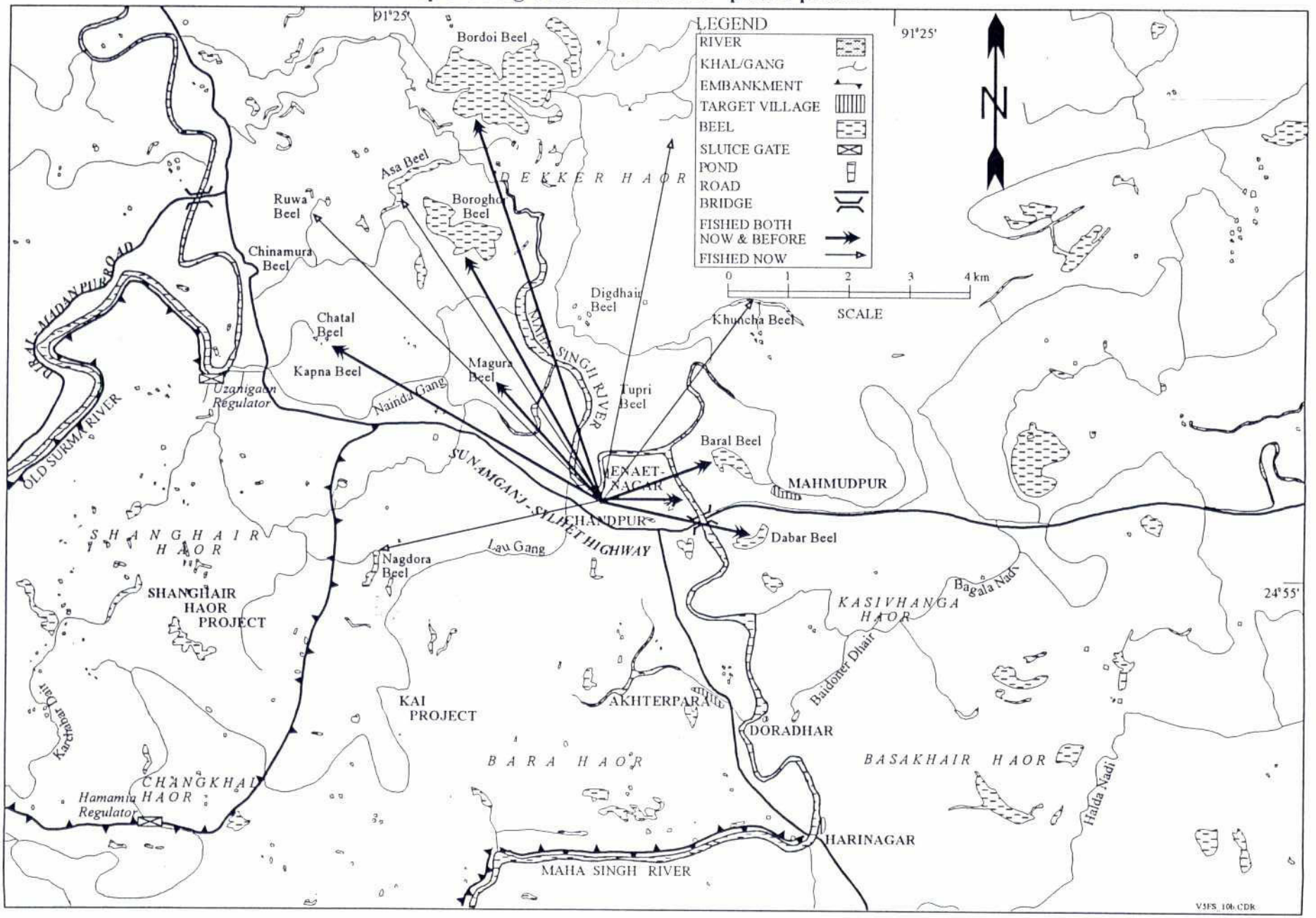
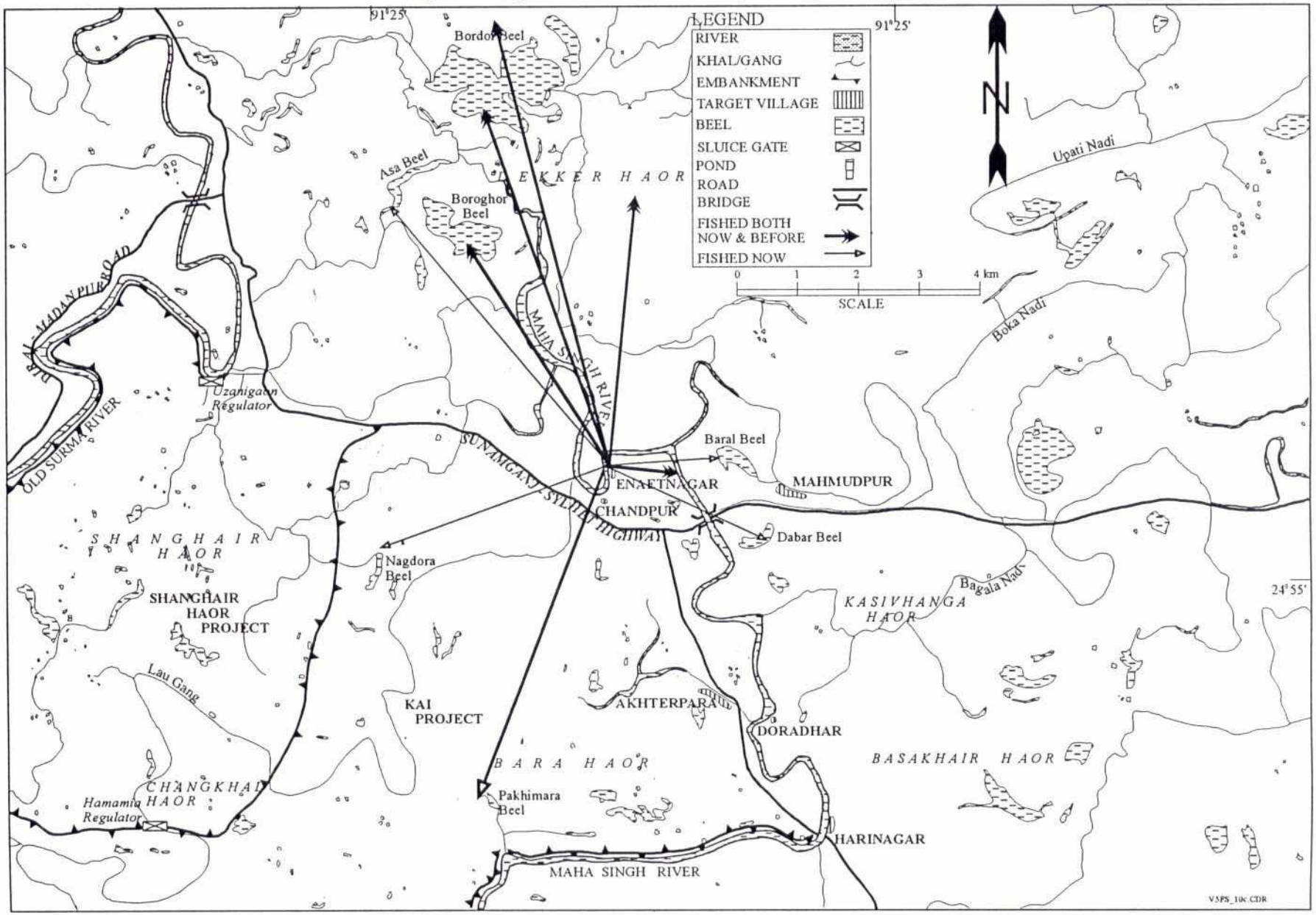


Figure 16
Enaetnagar
Map showing waterbodies fished - past & present



lives in Chandpur, have already been discussed.

The overall numbers hired by leaseholders to work on their *beel* have increased considerably over the last 10 years. Most of this increase has been in the form of guards (*paharadar* or *pariol*) as the need for security on the *beel* has risen. This is indicative of the growing competition and ruthlessness surrounding access to the fisheries resource. It is not clear, however, whether this growth in labour demand has kept pace with the growth of the work force in the fishing community.

Links between fishermen and leaseholder were probably more flexible in the past. Fishermen would have had a range of choices over where to fish and could probably have decided more easily **not** to work for a leaseholder as several alternative fishing strategies were available. These alternatives are now greatly narrowed as more and more waterbodies have come under leasing arrangements, the fishing population has grown, farmers have limited fishing on some areas of floodplain and there is more competition from non-traditional fishermen.

Besides the two principal fisheries where the Chandpur and Enaetnagar fishermen work for their "local" leaseholder, the wide range of other *beel* in the *haor* have always provided alternatives for local fishermen. Many of these *beel* are now leased by "outsiders", businessmen from Sunamganj, Syhlet or even further afield, rather than by the local leaseholders with whom the *maimul* fishermen have well-established links. For access to the fisheries on these *beel*, Chandpur and Enaetnagar fishermen find themselves in competition with fishermen from fishing communities outside the immediate locality. Many of these leaseholders prefer to hire non-local fishermen who are easier to control and less bound by obligations or contacts with local communities. Local fishermen are more likely to be subject to conflicts of interest between their contractual obligations to protect the fishery for their employer and their social obligations to their neighbours, anxious to supplement their incomes through (illicit) fishing.

A significant element in fishermen's livelihoods during the winter season, from *poush* (December/January) to *baishak*(April/May) is provided by the harvesting of bunded areas of floodplain (*tumi*) and *dubi*(fish-pits) excavated in the floodplain by local farmers. Fishing on the many natural and man-made ditches and borrow-pits both in the *haor* and in the surrounding villages is also important. This is particularly important in Enaetnagar.

3.10 Occupations and incomes

Harinagar and Doradhar

Tables 18 and 19 and Figures 17 and 18 show the income flows from different sources for fishermen from Harinagar and Doradhar.

In Harinagar, the single very high peak in the month of *bhadra* (August/September) is explained by a single large remittance payment to one household in the community. Given the smaller size of the samples in fishing communities, this distorts the data and, in terms of the community in general, this large peak can be ignored. Remittances for this same household account for most of the "self-employment" income through the year.Fishing incomes follow the patterns of access and waterbody exploitation closely.

Fishing income is most important and comes mainly from open-access fishing on the floodplains during the monsoon and from fixed-fee fishing on the Mahasingh River during the winter. Fishing labour accounts for only 10% of income in the village while it absorbs a higher proportion of effort. This reflects the relatively low returns of the activity.

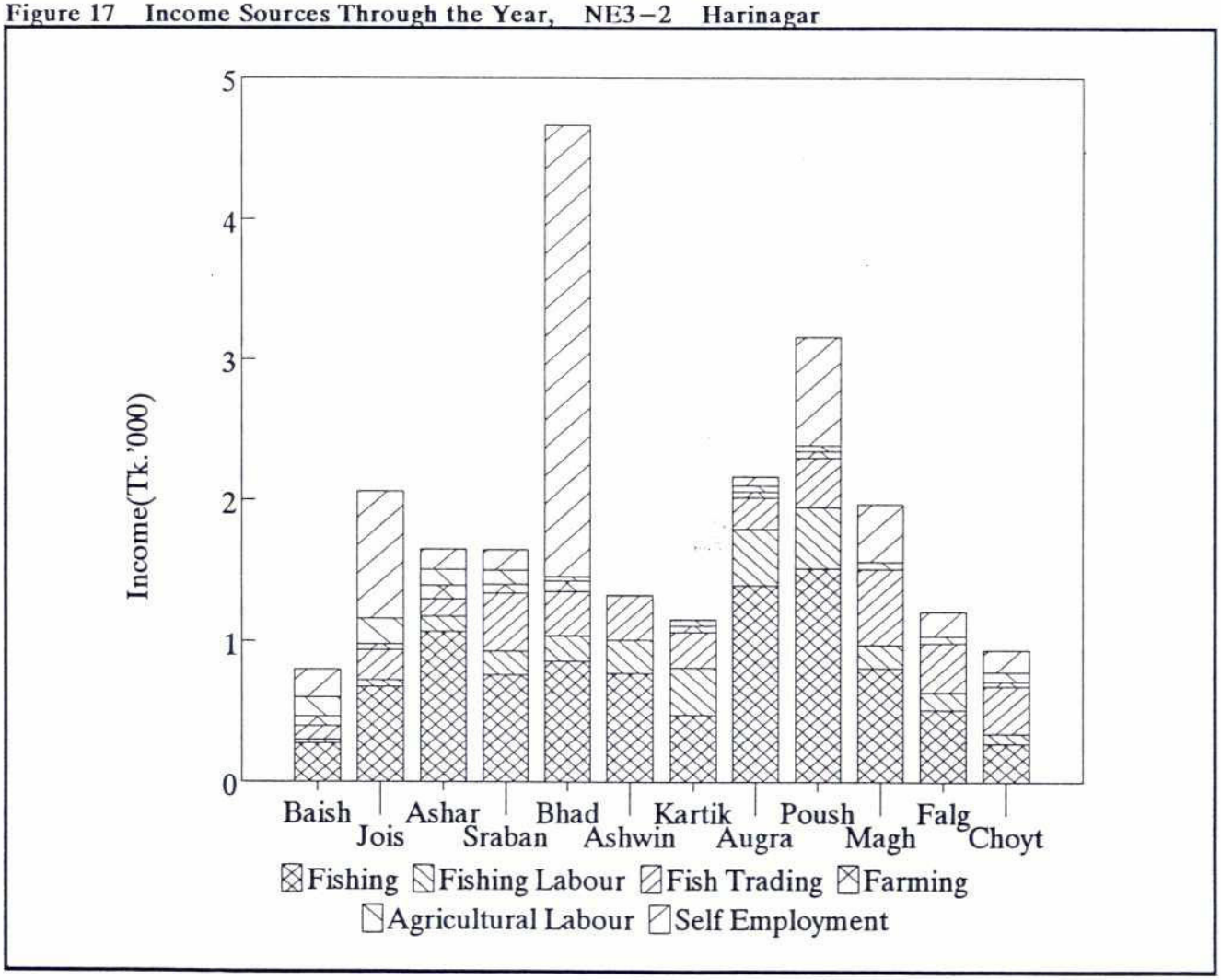
The data for Doradhar also show a dramatic peak, but in *falgoon* (February/March), the period when the principal *beel* are usually being harvested. Again, the data is exaggerated by the exceptionally high earnings of one particular household which took the lease for a small local *beel* and harvested it during that month. However, even discounting this, Doradhar fishermen generally have a higher level of dependence on fisheries. Fisheries labour is even less important and, as shown in the fisheries access analysis, more of the village fishing income comes from catch-share fishing. The specialisation of Doradhar fishermen in *beel* and *katha* harvesting with *kathi jal* is shown in the generally higher incomes earned later in the year when these areas are being harvested.

The contrast in the pattern of fisheries earnings indicates the different fisheries strategies adopted by the two villages. The Doradhar fishermen are still highly specialised in winter season harvesting which offers high returns from *poush* to *falgoon* (December to March). Access to the deeper *beel* in Bara *haor* encourages this. Harinagar fishermen's fisheries earnings drop off as those in Doradhar increase, mainly because the principal *beel* which they used to harvest on a catch-share basis have dried up by then. Their work for leaseholders and other sources of income such a fish trading are therefore relatively more important.

Table 18 Income Sources Through the Year, by Fishing Category, NE3–2 Harinagar UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABA	BHAD	ASHWI	KARTI	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HDC1	Fishing	183	963	1,380	919	1,240	663	213	375	675	910	665	568	8,751	50.7
	Fishing Labour	–	–	165	345	408	418	930	910	675	100	94	38	4,081	23.6
	Fish Trading	6	113	75	283	–	345	175	200	225	175	190	61	1,848	10.7
	Farming	–	–	25	20	63	13	–	–	–	–	–	113	233	1.3
	Agricultural Labour	305	453	400	–	–	–	188	188	188	225	225	113	2,283	13.2
	Self Employment	–	41	–	–	–	–	–	–	–	9	10	9	69	0.4
	Total	494	1,570	2,045	1,567	1,711	1,439	1,506	1,673	1,763	1,419	1,184	902	17,265	100
HFC2	Fishing	298	597	984	719	753	805	552	1,680	1,755	785	472	194	9,591	39.5
	Fishing Labour	33	59	92	118	118	186	167	255	364	179	136	82	1,789	7.4
	Fish Trading	121	245	136	446	402	308	274	228	382	637	392	410	3,980	16.4
	Farming	88	55	113	77	80	–	58	55	59	5	–	15	604	2.5
	Agricultural Labour	93	105	36	127	36	–	–	–	–	–	–	55	453	1.9
	Self Employment	249	1,136	182	182	4,091	–	9	82	991	515	220	195	7,852	32.4
	Total	882	2,197	1,543	1,669	5,480	1,299	1,060	2,300	3,551	2,121	1,220	951	24,269	100
COM–	Fishing	273	676	1,070	762	858	774	478	1,397	1,520	812	514	275	9,409	41.4
munity	Fishing Labour	26	46	108	167	181	236	333	397	431	162	127	72	2,286	10.0
	Fish Trading	96	216	123	411	315	316	252	222	348	537	348	334	3,517	15.5
	Farming	69	43	94	65	76	3	46	43	46	4	–	36	523	2.3
	Agricultural Labour	139	181	115	100	28	–	41	41	41	49	49	67	850	3.7
	Self Employment	195	899	142	142	3,204	–	7	64	776	405	175	155	6,164	27.1
	Total	798	2,061	1,652	1,647	4,662	1,329	1,157	2,164	3,162	1,969	1,213	939	22,749	100

Figure 17 Income Sources Through the Year, NE3–2 Harinagar

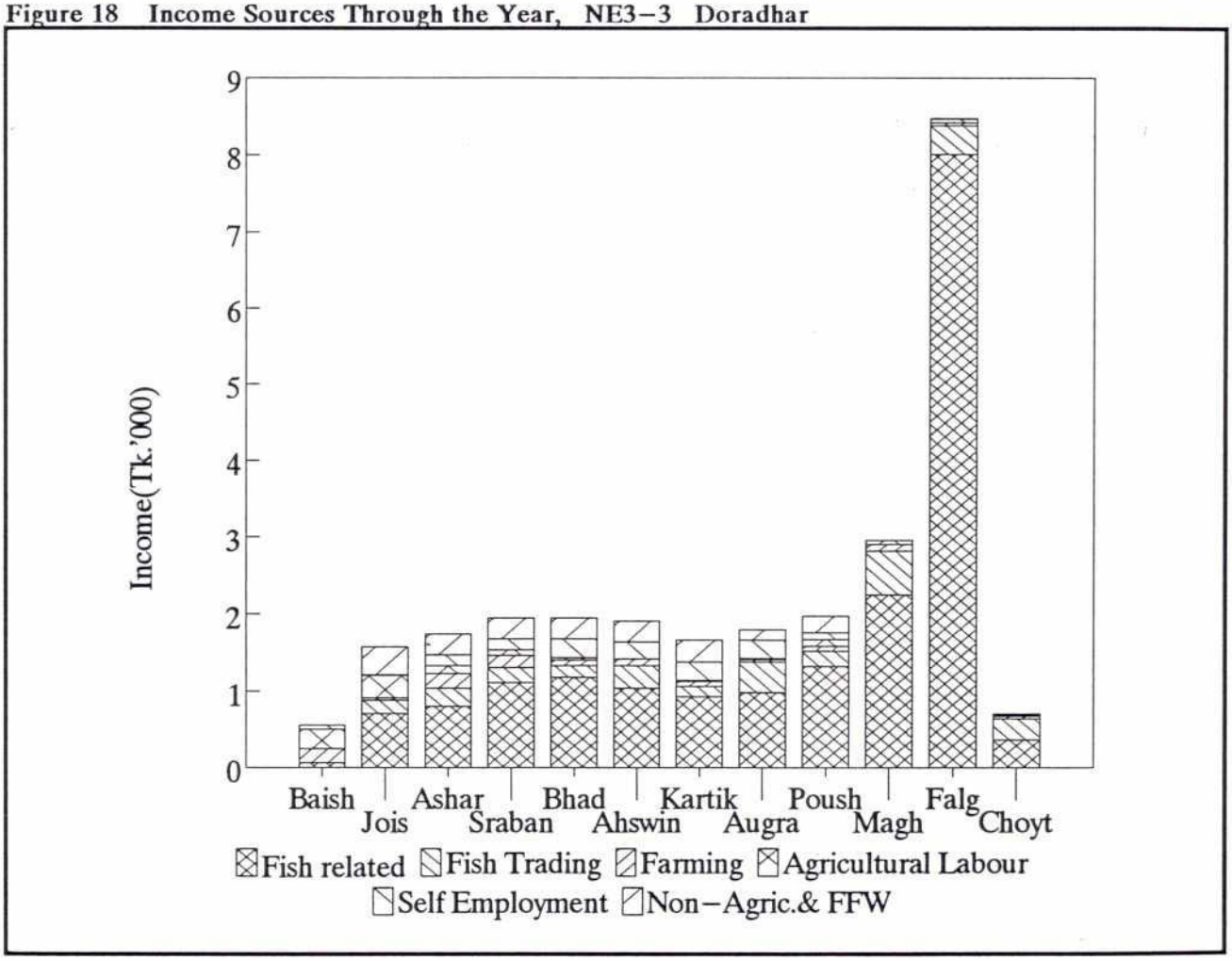


Source : FAP17 Socio–Economic Monitoring

Table 19 Income Sources Through the Year, by Fishing Category, NE3–3 Doradhar UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABA	BHAD	ASHWI	KARTI	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	–	926	1,035	1,090	1,240	1,140	200	200	825	1,382	1,530	1,010	10,578	85.4
	Farming	–	60	–	–	–	–	–	–	–	–	–	10	70	0.6
	Agricultural Labour	450	300	–	–	–	–	240	300	450	–	–	–	1,740	14.0
	Total	450	1,286	1,035	1,090	1,240	1,140	440	500	1,275	1,382	1,530	1,020	12,388	100
HFC2	Fishing	69	695	790	1,109	1,179	969	877	754	1,064	2,079	8,129	264	17,979	64.5
	Fishing Labour	–	–	–	–	–	65	80	264	280	200	175	74	1,137	4.1
	Fish Trading	–	176	243	205	155	304	143	411	204	602	389	290	3,122	11.2
	Farming	189	33	200	163	70	89	68	37	67	91	40	32	1,079	3.9
	Agricultural Labour	245	291	109	73	36	–	–	–	68	53	–	–	875	3.1
	Self Employment	61	12	145	149	255	229	250	245	95	–	45	15	1,503	5.4
	Non–Agric.& FFW	–	382	282	282	282	282	300	141	218	–	7	18	2,194	7.9
	Total	564	1,589	1,769	1,981	1,977	1,938	1,718	1,852	1,996	3,025	8,785	693	27,889	100
Com–	Fishing	66	705	801	1,108	1,182	977	847	730	1,054	2,049	7,842	296	17,657	64.9
munity	Fishing Labour	–	–	–	–	–	63	77	252	268	191	167	70	1,088	4.0
	Fish Trading	–	169	232	197	149	290	137	393	195	576	372	277	2,987	11.0
	Farming	180	34	191	156	67	85	65	36	64	87	38	31	1,035	3.8
	Agricultural Labour	253	291	104	70	35	–	10	13	85	51	–	–	912	3.4
	Self Employment	58	11	139	143	243	219	239	235	91	–	43	15	1,437	5.3
	Non–Agric.& FFW	–	365	270	270	270	270	287	135	209	–	7	17	2,098	7.7
	Total	557	1,575	1,737	1,944	1,946	1,904	1,662	1,794	1,966	2,954	8,469	706	27,214	100

Figure 18 Income Sources Through the Year, NE3–3 Doradhar



Source : FAP17 Socio–Economic Monitoring

Chandpur and Enaetnagar

The **lowest** level of overall incomes in all four villages is reported in Chandpur, the community most dependent on links with leaseholders. This is shown in Table 20 and Figure 19. While more people in the community have relatively stable income through the year through their work as *paharadar*, the incomes earned are very low. The figure for actual household earning from fisheries labour in the two communities is similar : between Tk.3,300-3,500 per year. A single leaseholder in Enaetnagar, who is also a major local fish trader, results in a distorted picture of fishing incomes for that village. This leaseholder would normally have recorded high earnings for *falgoon* (February/March) but flash flooding in Dekker *haor* caused a major reduction in fishing during that month.

Apart from this leaseholder, the patterns and levels of **fishing** income for the two villages are actually very similar. Chandpur fishermen are far more reliant on jobs with their local leaseholder. Fishermen generally seem to be competing to get these jobs as leaseholder's labourers even though they appear to be offering lower earnings than work as "independent" fishermen. This apparent contradiction highlights two points : from the fishermen's point of view, the premium placed on the security found under a leaseholder's patronage; from the leaseholder's point of view, the power he has to dictate terms to the fishermen who work for him.

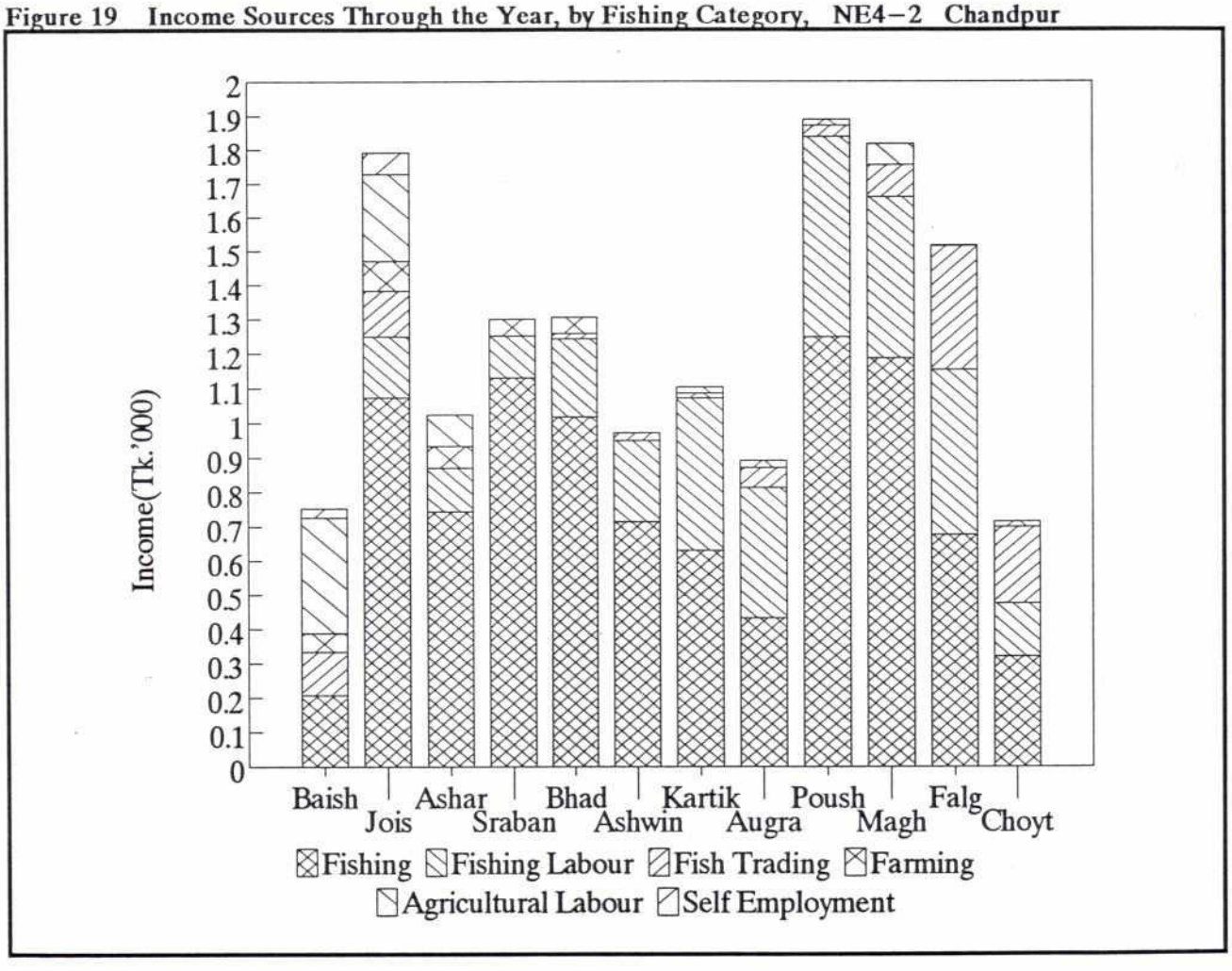
In Enaetnagar, illustrated in Table 21 and Figure 20, fish trading is a key component. The relatively high earnings from fish trading are evident, as is the fact that they are relatively stable through the year. Fish marketing is an important component of the livelihood strategy of a considerable number of fishermen from all the fishing communities studied, whether inside or outside the Kai Project, and whether composed of Muslim *maimul* or Hindu *matsya das* fishermen. The remoteness of the *haor* and particularly of the rich *beel* found in their centres, as well as the seasonal patterns of production, with a large concentration of fish being harvested very intensively during the winter period, all require an extremely intensive marketing effort to ensure that fish produced reaches the distant centres of consumption. As the harvesting takes place during the winter, fish has to be transported from the *beel*-side to the nearest road by foot as the water routes are generally impassable.

Fishermen from Harinagar, Doradhar and, to a lesser extent, Chandpur are primarily involved in acting as *nikari*, purchasing fish from other fishermen or from the *beel*-side as it is being harvested, and carrying it directly to retail markets in Pagla Bazar, Jaykalas and

Table 20 Income Sources Through the Year, by Fishing Category, NE4–2 Chandpur UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOIS	ASHAR	SRABA	BHAD	ASHWI	KARTI	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	–	400	423	983	1,177	1,010	473	333	433	467	367	83	6,150	52.8
	Fishing Labour	–	–	–	–	–	–	433	533	1,067	583	913	308	3,839	33.0
	Farming	153	250	150	10	90	–	50	–	67	–	10	20	800	6.9
	Agricultural Labour	300	300	–	–	–	–	–	–	–	250	–	–	850	7.3
	Total	453	950	573	993	1,267	1,010	956	866	1,567	1,300	1,290	411	11,639	100
HFC2	Fishing	272	1,289	849	1,179	968	620	680	463	1,509	1,416	775	394	10,413	64.3
	Fishing Labour	–	233	166	160	298	311	444	333	438	438	338	105	3,262	20.2
	Fish Trading	168	178	–	–	21	29	–	75	42	127	478	297	1,414	8.7
	Farming	23	37	35	60	33	–	4	29	3	–	–	15	239	1.5
	Agricultural Labour	352	245	120	–	–	–	23	–	–	–	–	–	739	4.6
	Self Employment	34	83	–	–	–	–	–	–	–	–	–	–	118	0.7
	Total	849	2,065	1,170	1,399	1,320	960	1,151	900	1,992	1,981	1,591	811	16,185	100
Com–	Fishing	206	1,073	745	1,131	1,018	715	630	431	1,248	1,186	676	319	9,378	62.2
munity	Fishing Labour	–	176	126	121	225	235	442	382	590	474	477	154	3,402	22.6
	Fish Trading	127	134	–	–	16	22	–	57	32	96	362	225	1,070	7.1
	Farming	55	88	63	48	47	–	15	22	18	–	2	16	375	2.5
	Agricultural Labour	339	258	91	–	–	–	17	–	–	61	–	–	766	5.1
	Self Employment	26	63	–	–	–	–	–	–	–	–	–	–	89	0.6
	Total	753	1,792	1,025	1,300	1,306	972	1,104	892	1,888	1,817	1,517	714	15,080	100

Figure 19 Income Sources Through the Year, by Fishing Category, NE4–2 Chandpur

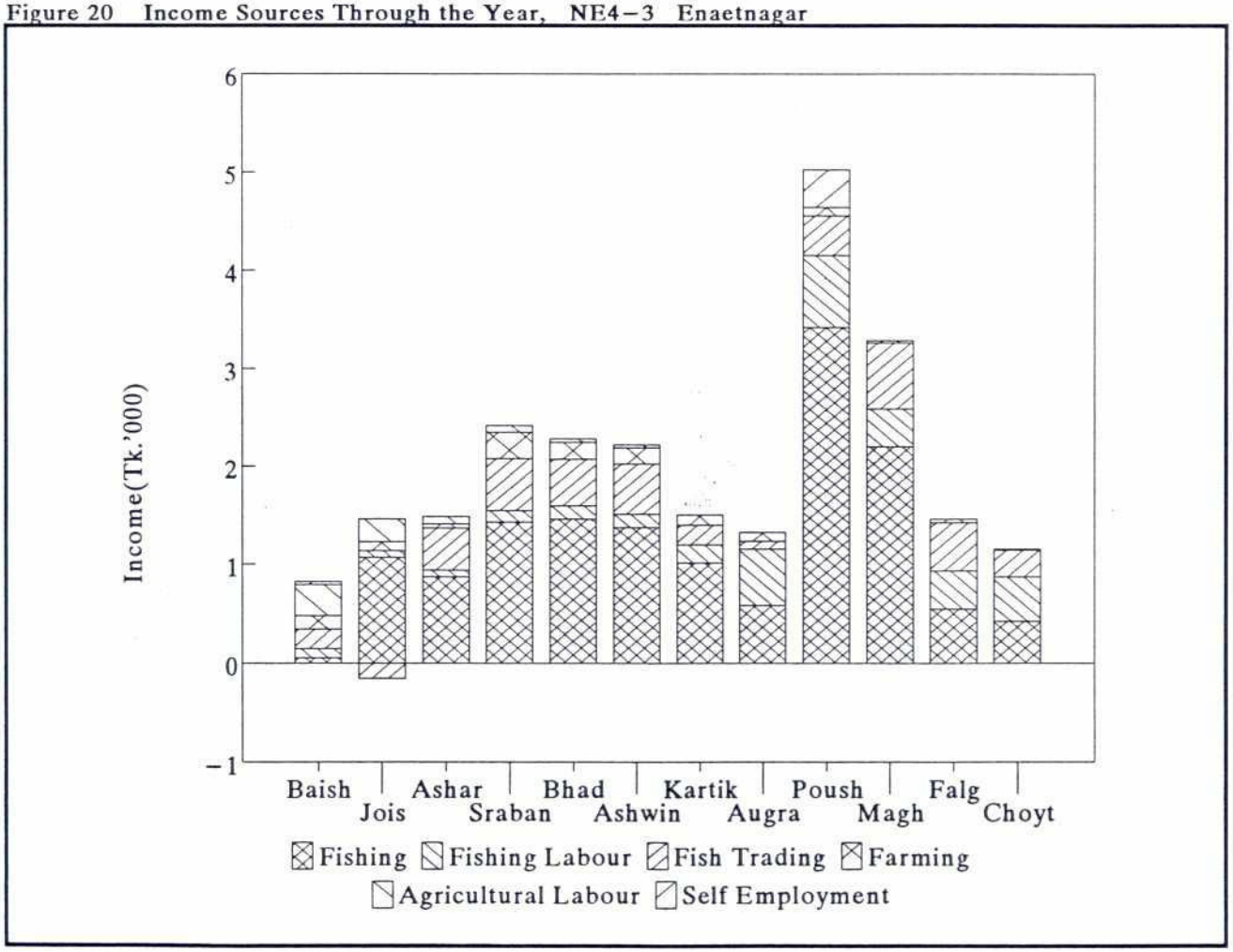


Source : FAP17 Socio–Economic Monitoring

Table 21 Income Sources Through the Year, by Fishing Category, NE4–3 Enaetnagar UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABA	BHAD	ASHWI	KARTI	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	–	1,585	742	1,842	1,623	1,370	1,717	273	1,620	1,238	1,098	563	13,672	81.6
	Fishing Labour	–	–	–	–	–	–	217	–	533	–	–	433	1,183	7.1
	Farming	20	15	–	7	100	50	107	–	–	–	13	27	338	2.0
	Agricultural Labour	417	470	150	267	133	133	–	–	–	–	–	–	1,570	9.4
	Total	437	2,070	892	2,116	1,856	1,553	2,041	273	2,153	1,238	1,111	1,023	16,763	100
HFC2	Fishing	94	975	916	1,404	1,531	1,596	911	585	1,180	303	239	279	10,010	43.7
	Fishing Labour	155	115	115	200	230	230	218	970	995	650	650	563	5,091	22.2
	Fish Trading	329	(427)	487	644	550	669	348	644	448	1,139	839	462	6,131	26.8
	Farming	67	68	80	349	120	144	23	48	38	48	48	–	1,031	4.5
	Agricultural Labour	345	190	51	–	–	–	–	–	–	–	–	–	586	2.6
	Self Employment	53	–	–	–	–	–	–	–	–	–	–	–	53	0.2
	Total	1,043	921	1,649	2,597	2,431	2,639	1,500	2,247	2,661	2,140	1,776	1,304	22,902	100
HFC3	Fishing	–	533	925	833	918	533	208	1,100	15,200	11,218	807	770	33,043	74.9
	Fish Trading	–	650	900	1,000	1,000	750	–	300	375	–	–	–	4,975	11.3
	Farming	600	330	–	415	480	465	415	450	425	–	–	–	3,580	8.1
	Self Employment	–	–	–	–	–	–	–	–	2,500	–	–	–	2,500	5.7
	Total	600	1,513	1,825	2,248	2,398	1,748	623	1,850	18,500	11,218	807	770	44,098	100
Com–	Fishing	55	1,064	873	1,429	1,461	1,376	1,010	583	3,424	2,201	545	426	14,448	59.5
munity	Fishing Labour	92	68	68	118	136	136	185	574	726	385	385	444	3,317	13.7
	Fish Trading	195	(154)	425	533	478	510	206	74	408	674	496	274	4,119	17.0
	Farming	136	94	47	271	170	168	104	97	87	28	32	7	1,241	5.1
	Agricultural Labour	311	233	69	68	34	34	–	–	–	–	–	–	749	3.1
	Self Employment	31	–	–	–	–	–	–	–	380	–	–	–	411	1.7
	Total	820	1,305	1,482	2,419	2,279	2,224	1,505	1,328	5,025	3,288	1,458	1,151	24,285	100

Figure 20 Income Sources Through the Year, NE4–3 Enaetnagar



Source : FAP17 Socio–Economic Monitoring

other local *hat*. Some *maimul* from Enaetnagar, however, are also occupied as *chalani*, taking fish on to higher level markets in Sunamganj, Sylhet or even Dhaka, for sale generally to *arotdar* (wholesalers).

Fishermen frequently shift their occupation, at least seasonally, in reaction to changes in their access to fisheries or the decline of the resource. Seasonal involvement in fish marketing is a logical first choice as an alternative and is widely adopted. The demand for fish traders is capable of absorbing considerable amounts of excess fishing labour.

Changes in agriculture have had a generally detrimental effect on fisheries in the *haor*, but there has certainly been some compensation through the creation of extra labour demand in agriculture. The majority of households in all the fishing communities, both inside and outside, carry out some work as agricultural labour during the year, although this is highly concentrated in the latter half of *choytra* (March/April) and *baishak* (April/May) during the local *boro* harvest.

4. CONCLUSIONS AND IMPLICATIONS FOR FUTURE FLOOD CONTROL SCHEMES

Fisheries in the *haor* region of the North-East are now atypical in Bangladesh. The richness of the fisheries resource in the area and the social and cultural phenomena associated with it are unique to the region, although it is probable that 20-30 years ago other areas (such as the Chalan Beel area of the North-West) would have been similar. At present, however, the levels of fish production, the value of the fishery and the degree of competition for control of the resource are far higher in this area than anywhere else in the country.

Trends in the socio-economics of fisheries exploitation

On most of the floodplains of Bangladesh there is a clear trend towards members of the farming and labouring community replacing traditional fishermen as the primary exploiters of the fisheries resource. This is in response to a combination of changes in the physical condition of the floodplain and *beel*, shifts in agricultural and labour patterns and population pressure. Some of these changes are either the direct or indirect result of flood control measures, many of them are quite independent.

Traditional fishermen are forced to adapt to these changes either by switching occupation, migrating or concentrating their fishing effort on those waterbodies where competition for the resource is less acute. Hindu fishermen, in particular, have to find niches in the fisheries system where, either because of their experience and skills or the official preference given to them in lease allocation, they are able to maintain some hold on the fisheries resource.

Similar changes are occurring in the *haor* region; the area under cultivation is expanding, wetland forests have been largely cleared, land levelled and ploughed, vegetation removed and previously "open" or *khas* land has come under private ownership. However, because of the physical characteristics of the *haor* and the peculiar social structure of communities there, the socio-economic patterns of fisheries exploitation are developing in a different way from the rest of the country.

Haor society is characterised by complex hierarchies of credit, patronage and political influence, usually centred on powerful and influential landowners and *mahajan*. The remoteness of the *haor*, historical patterns of depopulation and resettlement, and the susceptability of the area to disastrous flooding seem to have encouraged the development

of this social structure.

Nowhere does this system wield more influence than in the fisheries of the *haor*. Control of fisheries resources has always been highly concentrated in the hands of leaseholders. The investment levels required for effective harvesting of remote *beel*, with the maintainance of isolated fishing groups and the costs of the *katha* fishery, have, together with the high returns to be made, ensured that the leaseholder plays a more critical role in the *haor* than elsewhere.

These networks of credit provision and influence peddling are often exploitative and self-perpetuating, but they have also served, at least in the past, as an informal means of providing social security in an area where there was little in the way of an alternative.
But this system is under threat. Families and lineages with long traditions of leaseholding and close links with the fishing communities who fish the *jalmahal*, are being replaced by groups of investors bidding competitively for fisheries leases. While such competition should increase government revenue, the system is highly subject to manipulation and much of the benefit accrues to members of the bureaucracy.

The power wielded by leaseholders has, to some extent, ensured that the encroachment of agriculture into the *haor* has not resulted in the marginalisation of fisheries as has often occurred in other parts of the country. However, the levels of conflict are high and are liable to increase steadily as the agricultural frontier pushes deeper into the *haor*. In response leaseholders are spending growing amounts on policing and have expanded the area in which they attempt to control all fishing effort.

Social status of groups affected and their dependence on fisheries.

Fishing continues to be regarded as a very low-status activity, which limits the extent to which non-fishermen are willing to openly take up fishing as an occupation. But for many of the newer settlers in the *haor*, the *abadi* who tend to be those farming lower land further out in the *haor*, questions of status are of secondary importance. Fishing can provide good earnings during the flooding season when other livelihood options are scarce. The settler community in Akhtapara has not reflected this conflict very clearly because the local bamboo trade absorbs much of the labour which might otherwise have become involved in fishing. Mahmudpur has fewer *abadi* households. So fishing activity in both Akhtapara and Mahmudpur are relatively limited but studies elsewhere in the *haor* region by FAP 6 suggest

that the further down the slope of the *haor* a community lies, the more likely it is to be inhabited by settlers and their fisheries involvement is liable to be higher.

Even this may be changing. The first signs of efforts to enclose sections of *haor* to enable the fishing out of receding floodwaters are already apparent. Submersible ponds are not yet as widespread as in many other parts of the country but are on the increase. Any weakening of the hold over fisheries exerted by leaseholders would probably lead to a even faster spread of fishing activity.

Within the fishing community, there are clearly important divisions between groups depending on their ties to leaseholders. When tied closely, their interests to some extent correspond to those of the leaseholders who provide them with continued access to the most productive fisheries. But, as seen in the study, many traditional *maimul* fishermen pay a high price in terms of poverty and powerlessness for the minimum security offered. The interests of more independent fishermen are divided; while they still fish for leaseholders during the peak *beel* harvest they may also rely on open-access fisheries in the floodplain which the very same leaseholders are trying to restrict.

Implications of the Flood Action Plan

Submersible embankments, designed to delay rather than stop flooding, by themselves seem to have limited impacts on the fish resource but the regulation of water flows on key *khal* and rivers can have more far-reaching effects and significantly reduce the production of migratory species. As these are generally the higher value fish, such as carp and large catfish, this would be expected to negatively impact the value of catches on the *jalmahal* where these species are aggregated by leaseholders in their *katha*. Careful management of water regulators and fish passes could mitigate against these negative impacts, but they would do little to mitigate against the steadily increasing levels of conflict which are seen in the fisheries sector in the *haor*.

Flood control measures can be expected to **increase** these levels of conflict; they will accelerate the movement of farmers into the *beel*, encourage more fishing and fish-pit excavation by lowland farmers and create a new focus of competition over water control. Ideally mechanisms which allow water to be managed **should** provide opportunities to **overcome** conflicts over use of the water resource, but the social realities of *haor* society make such management-by-consensus difficult. Particularly where bureaucracies are involved,

management mechanisms tend to end up being manipulated by sets of local interests. Ironically, the *haor* region has a long tradition of local-level mobilisation for water control; small submersible embankments to protect crops from early flooding are frequently erected by local people in the *haor* and local leaders seem to be able to create enough consensus to mobilise a broad cross-section of people when common objectives are clear. But the adaption of such indigenous mechanisms for the management of larger and more permanent structures poses many problems that need to be better investigated and understood. Flexible, locally-led initiatives for water management certainly stand a better chance of success than rigid externally-imposed plans.

Given the acute competition for all floodplain resources, the fisheries resource will become increasingly attractive. The "open-access" fishery is likely to grow, making it less worthwhile for leaseholders to manage the *beel* properly. The expansion of fish-pits and the bunding of floodplain areas during the drawdown would threaten the interests of leaseholders on adjacent *beel*. Increased levels of conflict are to be expected.

In the context of a flood control scheme, fisheries management measures aimed at controlling fishing effort and ensuring the sustainability of the fish resource are a technically attractive option. But the scale of the problems which fisheries management programmes in the *haor* face need to be fully appreciated: extremely powerful and well-entrenched leaseholders protecting a **very** valuable resource, professional and non-professional fishermen with very different interests in access control and a remote environment where enforcement of fishing regulations is extremely difficult. Mitigation measures aimed at maintaining the value of the fisheries by re-stocking with high-value carp species tend to greatly increase the level of competition for the resource and generate more conflict. **Existing** competition for the fisheries resource is encouraging fisheries leaseholders to resort to armed guards to protect their fisheries interests. There is no reason to suppose that any other management regime is likely to **stop** generating conflict simply because it is officially sanctioned.

GLOSSARY

The following are Bangla terms found in this report.

Our main intention with this glossary is **not** to do a definitive taxonomy of Bangla terms concerned with fisheries and aquatic resources. This would in any case be impossible as terminologies and usages change radically from region to region and even from village to village. Our concern is to throw light on the different **meanings** some of the most commonly encountered words and terminologies may have in different parts of the country. Clearly, the meanings of particular words should not be taken for granted. The same word can signify very different things in different areas of the country.

The words are written in the Roman alphabet which is rather poor as a vehicle for communicating the Bangla terms. The versions given here make no pretence at being definitive. There is no standard procedure for transliterating Bangla and marked differences in the regional pronunciation of words mean that different renderings of the spelling of the same word may be equally "correct" in terms of the sound of the word. We hope that our versions will be generally understood.

Terms used for fishing castes/groups

		Regions where term used		
jele/jaola/ jeola	-	NC/NW/ NE/SW	-	Generic terms for fishermen used in different parts of the country.
kaibarta das	-	NC/NW/ NE/SW	-	Hindu caste fishermen, apparently found all over the country & possibly one of the biggest groups of traditional fishermen.
maimul	-	NE	-	A caste-like group of Muslim traditional fishermen & traditional leaseholders.Term sometimes extended, for bureaucratic convenience, to anyone involved in fisheries.

matsya das	-	NE	-	Hindu caste fishermen, encountered in *haor* region. Possibly the same as *kaibarta das*.
namasudra	-	NE/SW	-	Hindu caste group, most commonly referred to in the North-East Region, particularly the Sylhet Basin, but also referred to in SW. Often, but not necessarily, involved in fishing. A generic term for a large group of *sudra* sub-castes.
patni	-	NE	-	Hindu caste boatmen. Sometimes involved in fishing as well and often found living with caste fishing communities such as *matshya das*.

Terms used for actors in the fish trading & fisheries leaseholding system

		Regions where term used		
aratdar	-	NC/NW/ NE/SW	-	Fish wholesaler. A key figure in the marketing chain. Generally the source of credit inputs into the marketing system, advancing money to other actors in the system to ensure fish supply. Usually based in district level wholsesale markets.
chalani	-	NC/NW/ NE/SW	-	People who transport fish from district wholesale markets to higher level markets. Limited to the carriers.
furial	-	NE	-	Beel guard working for leaseholder, usually on a contract basis

mahajan	-	NC/NW/ NE/SW	-	A very generic but very important term. Commonly used for moneylenders, but effectively means almost any rich, influential person in rural areas i.e.closer to its' literal meaning "great man". These people usually lend money as well. In fisheries, it is commonly used to refer to the leaseholder of a particular waterbody, the owner of or major share-holder in a particular fishing operation. Also used for many *arotdar* who are generally money-lenders in their own right.
nikari	-	NC/NW/ NE/SW	-	A generic term for fish traders. Occasionally used for Muslims involved in fisheries activities of any kind; trading, fish culture and fishing.
paikar	-	NC/NW/	-	Fish trader.
parahadar	-	NE		Guards hired by leaseholders to prevent fishing and theft of fish from *jalmahal*. Normally hired for the period from the flood recession (October/November) until the completion of harvesting in February or March, but increasingly hired for the whole year to prevent all fishing on leased areas. Usually hired from fishing community, but not necessarily. Can become a position of considerable influence as they can broker fisheries access for local people behind the leaseholders' backs.

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Terms used for different types of waterbody

		Regions where term used		
beel	-	NC/NW/ NE/SW	-	Officially, a "backswamp" or depression. Can be either perennial or seasonal. In reality used for a wide variety of fresh waterbodies of various types (ox-bow lakes, old riverbeds, *khal*, even manmade channels). Often refers to flooded areas with no obvious deeper section or depression which **used** to have perennial areas of water in them.
bandh	-	NC/NE	-	Floodplain (same as *chak*). Used in *haor* region near Sunamganj & around Tangail in North Central.
chak	-	NC/NW/ NE/SW	-	Floodplain. Often used for a **portion** of floodplain or for floodplains with fairly clearly defined boundaries.
dubi/doba	-	NE	-	Man-made ditch in the floodplain or *haor*. Relatively shallow. Used very commonly in *haor* region around Sunamganj.
gang	-	NC/NW/ NE/SW	-	River. Colloquial word for *nadi*.
gara	-	NE	-	Man-made pit or ditch in the floodplain or *haor*. Deeper than a *dubi*. Specific to *haor* area. Sometimes used as a fish-pit but usually originating from a borrow-pit or section of land where earth has been excavated.

gopat	-	NW/SW NE	-	Grazing land within homestead area of village generally under community ownership.
jalmahal/ jalkor	-	NC/NW/ NE/SW	-	A "water estate", now referring to any area of *khas* waterbody controlled by the government and normally leased out for fisheries.
khal	-	NC/NW/ NE/SW	-	Man-made or natural channel, small river or canal.
khandi	-	NE	-	Ridge, often covered with low bushes, in the floodplain or *haor*. Sometime used as pathway during dry season. Specific to the *haor* region.
khara	-	NE	-	Man-made or natural channel, usually connecting two *beel* in the *haor*. Specific to the *haor* region around Sunamganj.
maital	-	NC/NW/SW NE	-	Small natural or man-made ditch. In NC, NE & NW, usually used for ditches and borrow-pits near homesteads. In SW, also used for ditches and fish-pits in *beel* and floodplain.
nadi	-	NC/NW/ NE/SW	-	River.
nala	-	NE	-	A drain usually near a homestead.
pukur	-	NC/NW/ NE/SW	-	Man-made pond, usually of fairly regular shape and usually near homestead. However, in SW, also widely used for man-made, submersible ponds (*kua*) excavated in *beel* or floodplain.

Terms used for administrative divisions & human settlements

		Regions where term used	
mauza	-	NC/NW/ NE/SW	The lowest recognised administrative unit. It **not** the same as a village. Some *mauza* in the *haor* area have **no** villages in them at all although a *mauza* can cover anything from a single village or hamlet to twelve or more seperate villages.
para	-	NC/NW NE/SW	Usually a sub-division of a village or *gram*. Sometimes constitutes a village or hamlet in its own right. Fishing communities frequently live in their own *para*, often referred to as the *jele para*.
thana	-	NC/NW/	Equivalent of a sub-district or county. Groups together between 10 and 20 unions. Seat of the *thana nirbahi* committee which plays important role in allocating fisheries leases and, under the NFMP, in the identification and licensing of "genuine fishermen".
union	-	NC/NW/ NE/SW	The lowest level of government. Usually groups together anything between five and thirty *mauza*. Important for fisheries as it is the lowest level at which *khas* land and waterbodies can be administered.