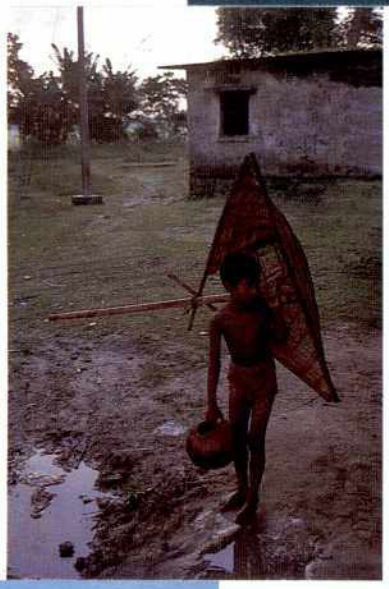
FAP 17

Fisheries Studies and Pilot Project

FINAL REPORT

(Draft)

JUNE 1994



Supporting Volume No. 15

VILLAGE STUDY

CHATLA - FUKURHATI SCHEME

Prepared for the Government of Bangladesh

FAP 17

FINAL REPORT

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Chatla - Fukurhati Scheme

FAP 17
FISHERIES STUDIES
AND PILOT PROJECT

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The field work which formed the basis for the following report was carried out by the FAP 17 socio-economic research team in the South-West 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 PRINCIPAL FINDINGS

1. Impacts of FCD/I on fisheries resources

At least from the comparison carried out by FAP 17, it is practically impossible to assess the impacts of the Chatla-Fukurhati Beel Drainage Scheme. Most of the designed interruptions of floodwater flows in the scheme are not functioning, while the unprotected area chosen for comparison is, in many ways, as protected as the area inside the scheme. In addition, the fisheries in the outside area have **never** been as productive as those in the principal *beel* located within the scheme boundaries. There has almost certainly been a reduction in some of the fish resources within the scheme since the time of its construction, but this has affected mainly the migratory carp species which are in decline throughout the region both inside and outside FCD/I schemes. But fisheries in Chatal *beel*, inside the Chatla-Fukurhati Scheme, are still rich and support a large and heterogeneous fishing population.

2. Impacts on agriculture

Although the Chatla-Fukurhati Scheme is not fully functional; only one of the water regulators on the main *khal* is functioning and the main embankment along the Arial Khan River was breached in two places for the 1993 flood season, most of the changes in timing and depth of flood which the scheme was intended to bring about have taken effect. The *beel* area is now almost completely drained during the winter and planted to HYV *boro* rice and broadcast *amon* crops are protected against early flooding. Irrigation facilities have been introduced resulting in a considerable diversification in *rabi* crops.

Many of the same changes in agricultural patterns are also seen in the unprotected area around Pathankandi.

3. Local involvement in fishing

Involvement in fishing is seasonally intense in the main study village inside the scheme. About 75% of landless households take up fishing for income during the flooding season and earn relatively high incomes from it. Besides the ubiquitous *current jal* (monofilament gillnet) which is the most common single gear in the area, many of the landless are using small *berjal* on the floodplains and *beel*. Gillnets of some kind are owned by practically all

landowners. The excavation of submersible ponds in the *beel* has come to play an important role for these households and for local fisheries in general.

Activity in Pathankandi is more limited, reflecting a poorer resource, but seasonal *current jal* use involves at least 60% of households in the village. Many landowners here have also excavated submersible ponds in the surrounding *beel* and these are progressively acquiring greater importance.

4. Fishing in livelihood strategies

Fisheries plays a key role in the livelihoods of large numbers of rural households, particularly around Chatal *beel*. The number of people there involved in fishing in both locations is rising and fishing is the most important single component in the livelihood strategies of landless households who obtain an average of 44.8% of their annual income (both cash and consumption) from fishing. For small landowners the figure is 18.4%.

For households in Pathankandi, the importance is more limited, but it is most important for landowners, with small and medium farmers obtaining 5.8% and 6.5% respectively of their annual income from fishing. Most of this comes from the harvesting of submersible ponds. For landless households, fishing is a more marginal activity as seasonal migration is a more widely adopted option.

5. Changes in fishing patterns

In both areas, shifts in cropping pattern and in the state of local waterbodies have led to changes in the nature of the fishery. The open-water fisheries in floodplain areas during the flooding period from May to October have come to be dominated by Muslim agriculturists involved in seasonal fishing. Agricultural employment opportunities during the flood season have been negatively affected by shifts from cropping patterns based on *aus* and *amon* rice to winter *boro* rice. This shift, coupled to increasing population pressure, has led people to seek alternative occupations during this period.

Where rich, open-access fisheries resources are available, as in Chatal *beel*, fishing has been actively pursued as an income-generating strategy. However, in Pathankandi, alternative sources of income have generally been preferred. For landowners, the excavation of

submersible ponds has become increasingly attractive as it offers returns at least comparable and often exceeding those for *boro* rice during the winter season.

The lack of access regulation on the mostly seasonal *beel* in the area has played an important role in encouraging non-fishermen to move into fishing as an occupation.

6. Impacts on traditional fishing communities

Traditional fishing communities have generally suffered as a result of changes in their degree of control over access to fisheries resources. In conditions of rising competition for fishing grounds, the traditional fishermen have generally been forced to seek alternatives. The widespread development of pond aquaculture and submersible ponds in the area has provided some mitigation for traditional fishermen. There are, however, clear limits on the extent to which fishing communities can benefit from these changes as pond-owners tend to take a progressively greater role in fish culture activities.

Saraibari fishermen have apparently succeeded in developing a strategy of extremely intensive fishing during the flood season, coupled with fishing labour on large submersible ponds excavated by local landowners in Chatal *beel* during the early part of the dry season to make up for the lack of access to perennial waterbodies. Kutibari fishermen fish steadily thoughout the year on rivers and *khal* moving to the *beel* only during the traditional peak harvesting period in January and February.

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 a considerable proportion of 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, in some areas, 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 to understand how these have been affected by flood control measures. To do this, communities inside and outside existing flood control schemes with comparable, pre-FCD agro-ecological characteristics have been selected for detailed study in 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 one agricultural main village and nearby fishing communities is referred to as a "village cluster". In each of these clusters, a quantitative survey of a stratified sample of households has been applied, looking at labour, income and consumption over a one-year period. This has been supported by a village appraisal which has studied 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 Studies published by FAP 17 as Supporting Volumes for the project's Final Report.

VILLAGE STUDY
The Chatla-Fukurhati Scheme

1 DESCRIPTION OF AREA

1.1 Location

Two main villages in the South-West Region located on the floodplain on the west bank of the Arial Khan River were selected for comparison. One village, Kafurpur, is located inside the Chatla-Fukurhati Beel Drainage Scheme. A small group of Hindu *rajbangshi* fishermen living in the neighbouring village of Saraibari was selected as a satellite fishing community.

The village to which Kafurpur is compared, Pathankandi, is located about 20 kilometres to the south, in an area unprotected by formal flood control works, though not entirely subject to free flooding. Its satellite fishing community is in Kutibari, near the *thana* headquarters at Rajoir and consists of a small group of Hindu *malo* fishermen.

Both village clusters are in areas normally flooded by waters from the Arial Khan and its various tributaries and distributaries, such as the Bhubaneswar and the Kumar. They are also both close enough to the Arial Khan and the Padma to receive direct overbank flooding during years of higher flood.

Figure 1 shows the location of the two village clusters.

Chatla-Fukurhati scheme

The Chatla-Fukurhati Beel Drainage Scheme is situated in Bhanga *thana* near the main Faridpur-Barisal highway. The scheme, the location of the main village of Kafurpur and the satellite fishing community of Saraibari and the principal waterbodies in the area are shown in Figure 2.

The Chatla-Fukurhati Scheme consists of a series of flood control and drainage works which have been constructed around the Chatal *beel* area. The original works date from the late 1960s and consist of a series of sluice gates located on natural and artificial *khal* flowing into the *beel* area from the Bhubaneswar River and out into the Kumar River to the south. The

Figure 1
Location of Kafurpur and Pathankandi in Bangladesh

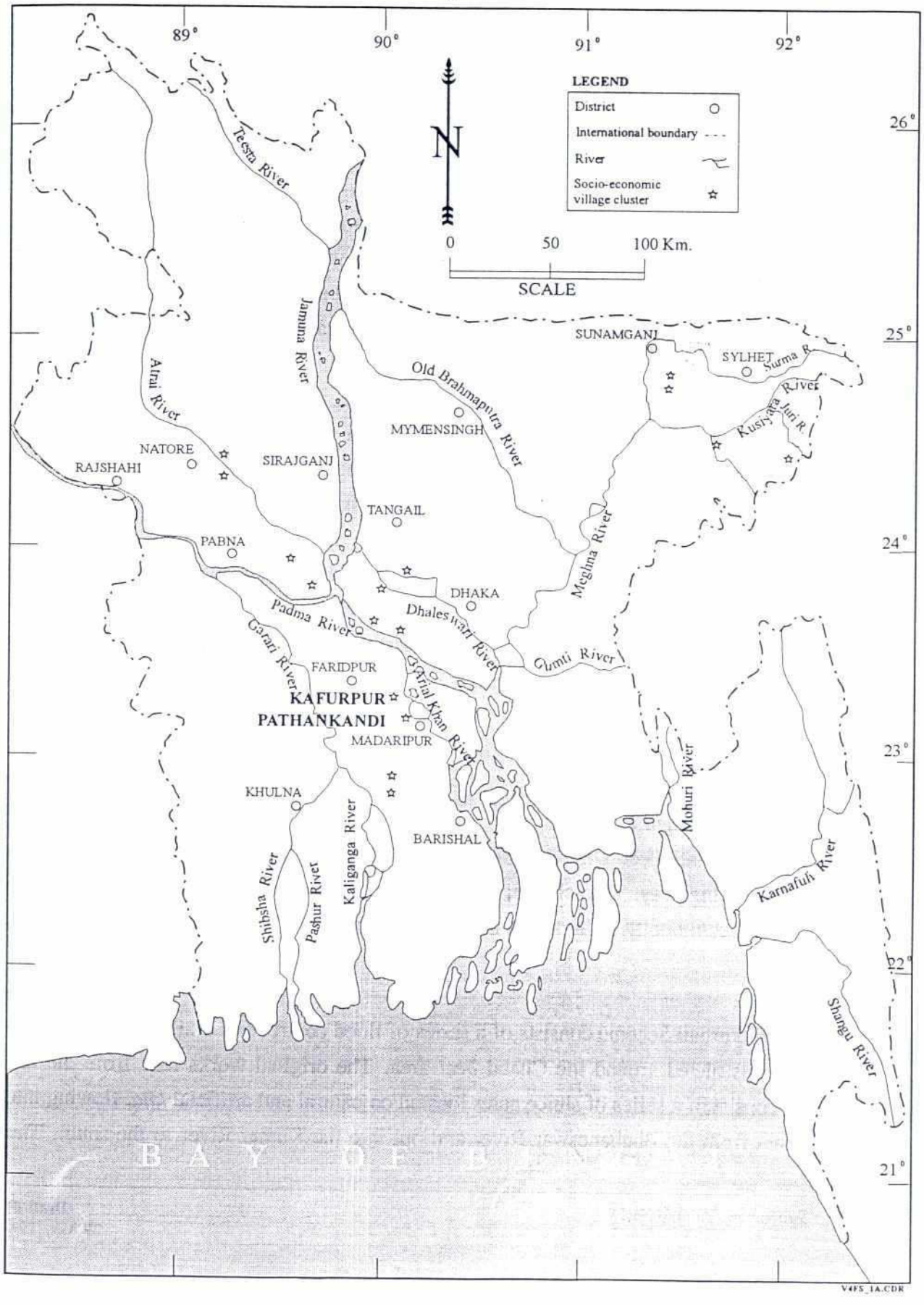
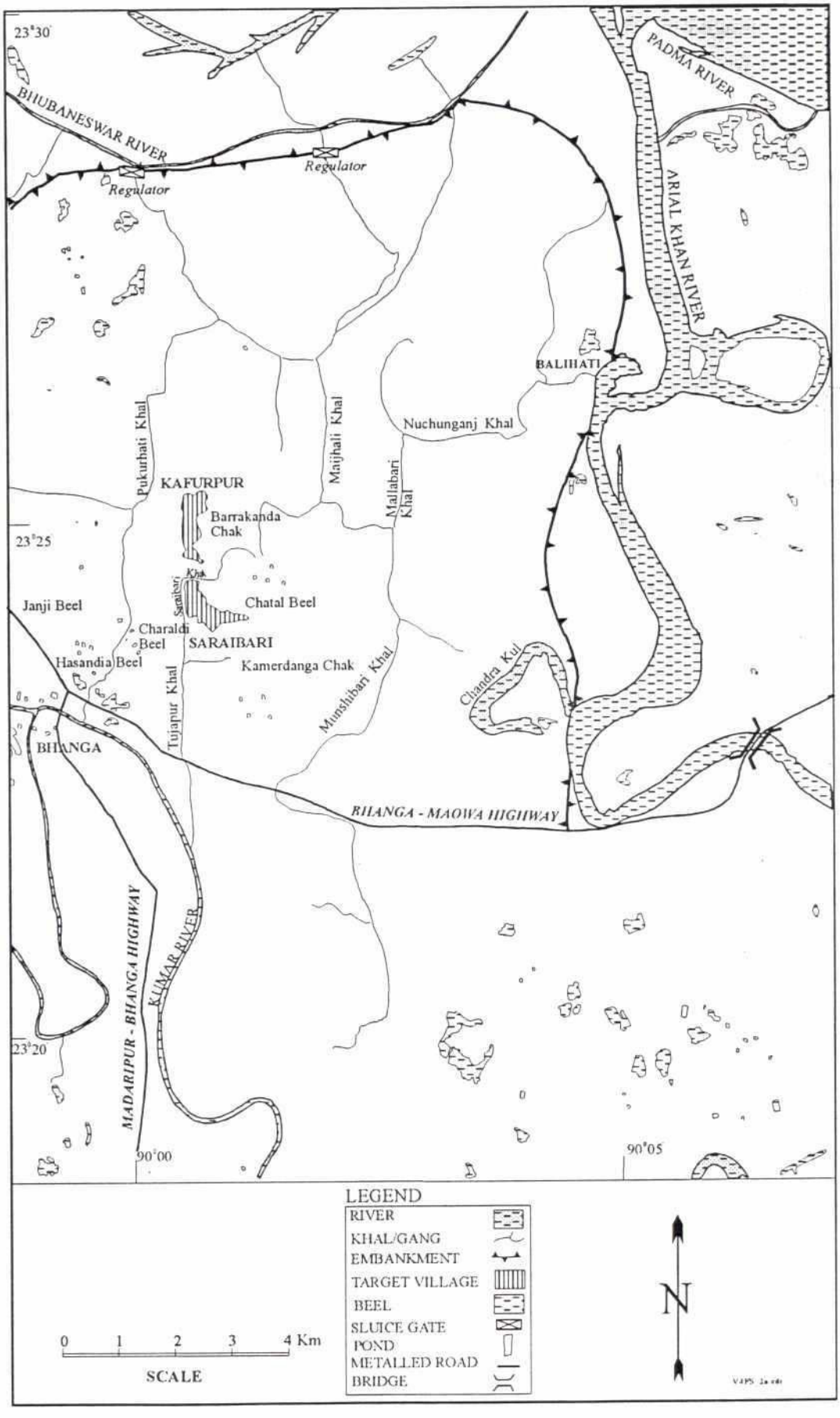


Figure 2
Chatla-Fukurhati Scheme, location of study villages & local waterbodies



aim was to control in-flow early in the flooding season to protect standing *boro* crops and newly planted mixed *aus* and *amon*. Better drainage of the *beel* during the drawdown was also encouraged to extend the area under *boro* into the lower parts of the *beel*. The area of perennial water has been much reduced as a result of these interventions.

These works apparently gave little protection against overbank flooding from the Padma and Arial Khan Rivers, in the years when it occurred. As a result, a full flood-control embankment was constructed starting in the late 1980s, along the east side of the project. Completed in 1992, it was almost immediately breached by erosion. Work on repairing these breaches was in progress during the time of the study (1992-94).

Rajoir *thana*

The area not covered by flood control studied for comparison with this scheme is located just south of the southern branch of the Kumar River and east of Rajoir *thana* headquarters. Pathankandi is located in an area of lowland bordered by the Arial Khan River on the east, and two separate branches of the Kumar River on the north and west. A network of *khal* connects the *beel* around Pathankandi with the main rivers outside. Some of these are now cut by pathways and road embankments with the result that flooding in the area is restricted.

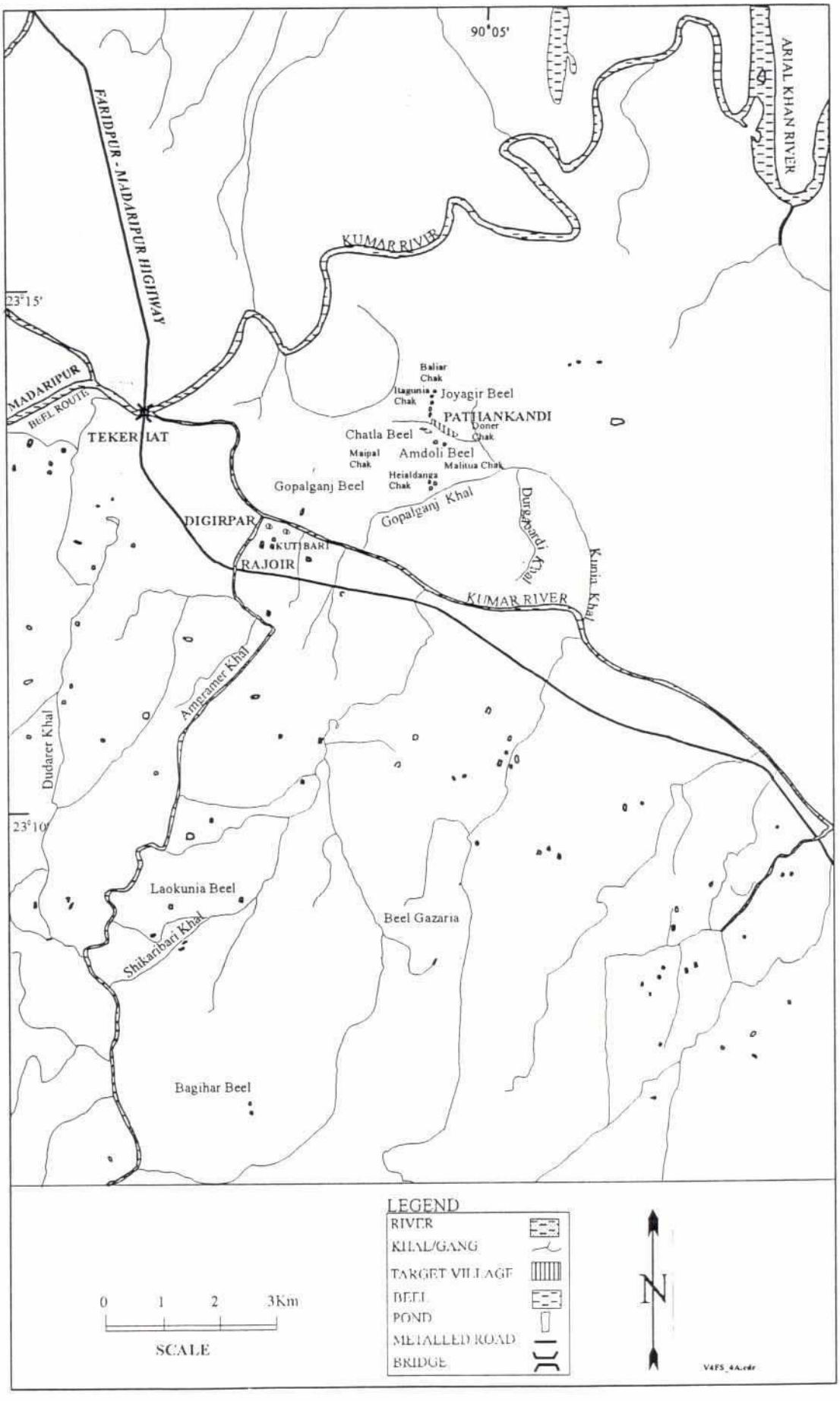
The area around Pathankandi and the principal waterbodies are shown in Figure 3.

1.2 Community profiles

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.

Both villages inside the Chatla-Fukurhati scheme, Kafurpur and Saraibari, constitute individual *mauza* in their own right. Saraibari is almost twice as big as Kafurpur although the fishing community consists of just over 20 households. As can be seen from Table 1, there is a sizeable Hindu community in Kafurpur also. The 26 Hindu households in "*das para*" are the remainder of a far larger and more diverse Hindu community, most of which migrated out to India after the Independence of Bangladesh in 1971.

Figure 3
Rajoir Thana Area, the location of study village & principal local waterbodies



Pathankandi is a relatively small village which forms part of a larger *mauza*, Gandharbbadi. The fishing community, Kutibari, is located four kilometres away adjacent to the *thana* headquarters in Rajoir *mauza*.

Table 1
Kafurpur & Saraibari
Community Profile

SW3-1 Kafurpur **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 Mem-bers	Earn mem-bers	% Muslim	% Hindu	Home-stead	Culti-vable Land	Ponds	Other	Total
Large	3	60.7	3.3	5.0	1.3	100.0	0.0	61	1050	183	30	1324
Medium	17	50.2	4.7	7.3	1.6	94.1	5.9	22	286	38	1	347
Small	45	44.8	1.9	5.6	1.5	82.2	17.8	18	91	10	1	120
Landless	115	36.6	1.3	4.8	1.3	76.5	23.5	5	5	1	0	11

Source: FAP17 Village Census

* Landholding categories are defined in relation to total land owned as followsas:
Large >7.5 acres total; Medium 2.5-7.49 acres; Small 0.5-2.49 acres; Landless <0.49 acres.

SW3-2 Saraibari **Satellite fishing village** **Inside**

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	1	27.0	0.0	3.0	1.0	0.0	100.0	2	0	1	0	3
F2	22	38.6	0.2	5.0	1.3	0.0	100.0	6	14	1	0	21
F3	1	40.0	0.0	6.0	1.0	0.0	100.0	6	0	1	0	7

Source: FAP17 Village Census

* Fishing categories are defined as folloes:
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
Pathankandi & Kutibari
Community Profile

SW4-1 Pathankandi — 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	3	65.0	1.7	6.3	1.7	100.0	0.0	41	1300	126	26	1493
Medium	17	47.8	5.7	6.9	1.7	100.0	0.0	17	414	18	6	455
Small	35	44.6	3.5	5.9	1.4	100.0	0.0	6	109	13	0	128
Landless	15	37.1	3.2	5.1	1.2	100.0	0.0	3	9	3	0	15

Source: FAP17 Village Census

* Landholding categories are defined in terms of 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

SW4-2 Kutibari — 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	6	35.2	0.0	4.7	1.3	0.0	100.0	11	0	0	0	11
F2	10	39.5	1.3	5.3	1.1	0.0	100.0	10	0	0	0	10
F3	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0

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.

1.3 Agroecology

The two main villages occupy similar agro-ecological units within the same agro-ecological regions. These agricultural units have been defined by the Bangladesh Land Resource Survey (FAO, 1988) which is based on Soil Reconnaissance Surveys conducted in the 1960s. They therefore are 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 land flooded to different depths.

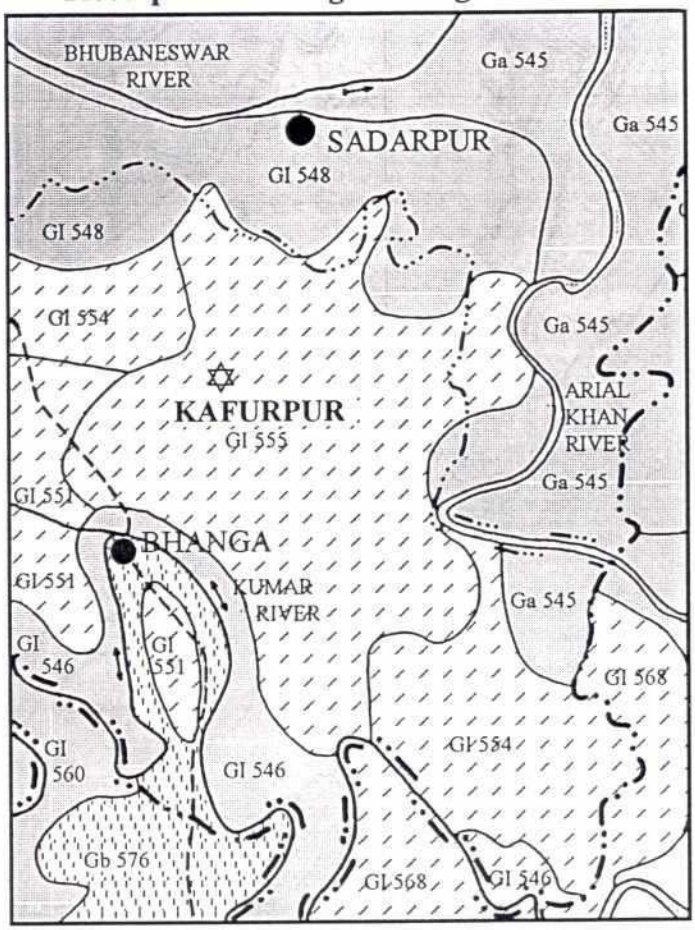
In practice, using agro-ecological units as a basis for identifying communities did not always provide sufficient basis for inferring impacts from paired comparisons, given the wide range of variables influencing fisheries activity.

However, the agroecology of areas around study villages does provide a general indication of conditions. In Figures 3 and 4, the agro-ecological units immediately surrounding Kafurpur and Pathankandi 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

Flooding patterns in both areas have always been dominated by the nearby Arial Khan River. The principal flow of flood waters tends to be from the north and east towards the south and west. This general pattern is complicated by the extremely shallow slopes which characterise the entire region. Tidal effects also occur although both villages are at the very edge of the tidally influenced area. The Bhubaneswar and the Kumar are all normally distributaries of the Padma and the Arial Khan but flows through the Gorai system, itself a distributary of the

Figure 4
Kafurpur
Flood phases and agro-ecological units



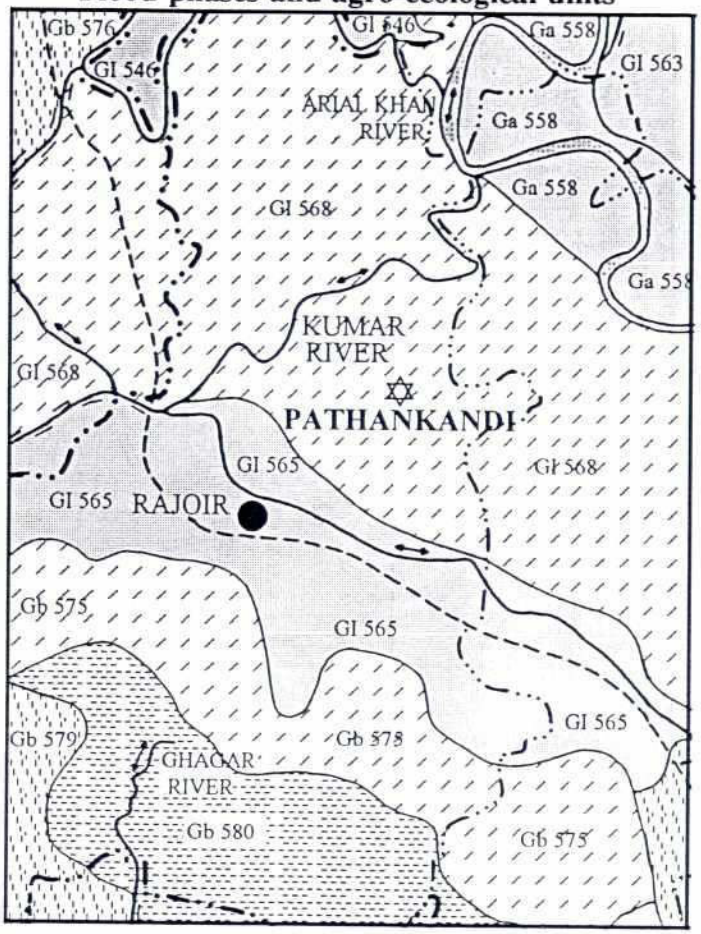
LEGEND

>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	
GL 555	1	30	45	15	0	IIIWd (60%)	Two good to moderate rice crops and a dryland crop per year.	IIIWw (20%)	One or two good to moderate rice crops per year in the monsoon season.

Source : FAO Land Resource Survey

Figure 5
Pathankandi
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	
GL 568	5	25	45	25	0	IIIWd (45%)	Two good to moderate rice crops & a dryland crop per year.	IIIWw (30%)	One or two good to moderate rice crops per year in the monsoon season.

Source : FAO Land Resource Survey

Ganges, apparently caused congestion and backflows at some times during the year. Tidal effects frequently result in the reversal of flows through the system. The Farakka Barrage on the Ganges just over the border in India has significantly reduced dry season flows through the entire distributary network to the west of the study area and many of the channels have silted up.

The relative proximity of the Padma also influences flooding patterns. The Padma has been actively eroding the area around the outlet of the Arial Khan over the last few years and is now much closer to the Chatla-Fukurhati Scheme than before.

Both areas are now protected against the worst overbank flooding from the Arial Khan. Flood waters enter through the network of *khal* linking the *beel* systems around Kafurpur and Pathankandi with the rivers outside. In Kafurpur, water enters primarily through the Nuchunganj *khal* from its off-take on the Arial Khan at Balihati. This off-take was originally blocked by the scheme embankment but was quickly reopened by river erosion. Water is also allowed into the scheme from the Bhubaneswar River after *boro* crops have been harvested in *baishak* (April/May) or *joisthya* (May/June) through the Maijhali *khal*. This *khal* is controlled by the only functioning sluice-gate in the scheme.

In Pathankandi, floodwaters normally enter by an even more indirect route, through the main Kumar River channel, then into the subsidiary, seasonal channel running past Rajoir *thana* headquarters, and into the Gopalganj *khal* to enter Amdoli *beel* from the south. The *khal* leading into the area more directly from the Kumar River just north-west of Pathankandi is normally blocked but was opened by erosion during the floods in 1993-94, allowing floodwaters to enter from the north as well.

1.5 Waterbodies and access

The majority of the *beel* and floodplains in both areas are not subject to formal leasing, though this is not to say that all fisheries resources are open access. This is a reflection of the lack of **perennial** *beel* which is typical of much of the south-west. Most of the areas referred to as *beel* dry out almost completely during the winter season leaving few residual waterbodies and almost none of any size. Consequently there has been a very extensive development of *kua* or fish-pits throughout the region. These fish-pits are locally referred to

simply as *pukur* or *pushkunni* (ponds) emphasising the careful management which these submersible waterbodies are generally subject to. The excavation of these ponds in low-lying areas effectively creates man-made "*beel*" into which fish from the surrounding floodplains will take refuge as the floods recede; they also allow fish to be held for market and harvested with greater ease. Increasingly, natural stocks are also being enhanced through feeding or additional stocking.

Tables 3 and 4 below give a breakdown of the types of control exerted over different types of waterbodies around both Kafurpur and Pathankandi.

Table 3

Kafurpur

Principal waterbodies and access arrangements

Waterbody	Institutions controlling waterbody	Leaseholders	Social & occupational groups involved in fishing
khal	mostly village-level institutions : mosque committees, union *parishad*	fishing communities & some seasonal fishermen	mostly traditional Hindu fishermen & seasonal Muslim fishermen
Chatal *beel*	reportedly some *khas* land (Land Revenue Department) : some *debottar* estate *de facto* privately controlled: mostly privately owned land or ponds:	not applicable	open water : seasonal Muslim fishermen ponds : traditional Hindu fishermen leasing-in, and pondowners
other *beel*	all privately owned land or ponds	not applicable	"
floodplain	all privately owned land or ponds	not applicable	mostly seasonal Muslim fishermen & subsistence fishermen

Source : FAP17 Village Appraisals

As a result of the lack of natural perennial water, formal leasing arrangements in both the inside and outside areas under study are limited to local rivers and *khal*. Some areas of Chatal *beel*, inside the Chatla-Fukurhati Scheme are still *de jure khas* land or *debottar* estate. Otherwise, access to *beel* around both Kafurpur and Pathankandi is unrestricted.

The main rivers, such as the Kumar and the Arial Khan, are all *jalmahal* under the government leasing system. These *jalmahal* are theoretically leased out to fisheries *samity* with members drawn from local fishing communities. Some *khal* are also leased out, usually

through local union *parishad* with the benefits going towards the maintenance of local religious or educational institutions, such as mosques or *madrassa*. Yearly leases for *khal* are taken by both traditional and non-traditional fishermen. Regulation and enforcement of access restrictions is not strict.

Table 4

Pathankandi

Principal waterbodies and access arrangements

Waterbody	Institutions controlling waterbody	Leaseholders	Social & occupational groups involved in fishing
rivers	Land Revenue Department	fisheries *samity*	mostly traditional Hindu fishermen
khal	mostly local-level institutions (mosque committees, union *parishad*)	fishing communities & some seasonal fishermen	mostly traditional Hindu fishermen & seasonal Muslim fishermen
beel	some areas controlled by local level institutions (mosque committees) : mostly privately owned land or ponds	not applicable	open water : seasonal Muslim fishermen ponds : traditional Hindu fishermen leasingin & pond owners
floodplain	all privately owned land or ponds	not applicable	mostly seasonal Muslim fishermen, subsistence fishermen

Source : FAP17 Village Appraisals

2. FISHERIES IN KAFURPUR and PATHANKANDI

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 carried out 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 situation in both Kafurpur and Pathankandi illustrated the importance of having multiple sources of data on fishing activity as a means of cross-checking and arriving at a realistic picture of the importance of fisheries. The tensions surrounding fisheries access and, in particular, the use of illegal fishing gear meant that it was extremely difficult to collect accurate data on gear ownership and use during the course of the census and baseline surveys. Repeated interventions by local fisheries officials and police during the period of the FAP 17 studies in the area meant that local people were understandably wary of releasing any information which could jeopardise what turned out to be an important source of livelihood for many households.

In the case of Kafurpur, the situation was further complicated by the concurrent efforts of private parties from outside the village, accompanied by threats, to persuade people owning land in the principal fishing area for the village, Chatal *beel*, to lease it out to a company for "fisheries development".

2.2 Patterns of fisheries involvement

The proportion of people reporting fishing as a source of household income was significantly higher in Kafurpur, **inside** the Chatla-Fukurhati Scheme, than in Pathankandi, located in an ostensibly "unprotected" area. In Table 5, data collected during the census survey of all households in each of the two villages shows the proportion of households reporting different first and second ranked sources of household income in each landholding category.

The importance of fishing for the far larger group of landless households in Kafurpur is immediately obvious. 19% reported fisheries as their most important source of income and a further 23% as a secondary source. Even this high figure understates the importance of fishing in the village as the illegal *current jal* constitutes the most important single gear type. A considerable proportion of landowners also mentioned fishing as a source of income, many of these being submersible pond owners.

Respondents in Pathankandi certainly hid a considerable amount of fishing activity during this initial survey for the same reasons. However, as these data indicate, the levels of fisheries income in Pathankandi were considerably less than in Kafurpur. Small and medium landowners reporting income from fishing are mostly owners of submersible ponds in the

beel who play a very significant part in dictating local patterns of fisheries exploitation.

Table 5

Kafurpur and Pathankandi

Ranking of sources of household income by landholding category

SW3-1 Kafurpur **Main village** **Inside**

Land Cat.	No.	First Rank Occupation *					Second Rank Occupation **				
		Farm	Fish	Lab	Trade	Other	Farm	Fish	Lab	Trade	Other
Large	3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medium	17	76.5	5.9	0.0	5.9	11.8	23.5	5.9	5.9	23.5	5.9
Small	45	51.1	13.3	6.7	15.6	13.3	31.1	11.1	20.0	8.9	8.9
Landless	115	5.2	19.1	31.3	34.8	9.6	13.0	23.5	8.7	7.8	1.7

Source: FAP17 Village Census

SW4-1 Pathankandi **Main village** **Outside**

Land Cat.	No.	First Rank Occupation *					Second Rank Occupation **				
		Farm	Fish	Lab	Trade	Other	Farm	Fish	Lab	Trade	Other
Large	3	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.3	0.0
Medium	17	88.2	0.0	0.0	5.9	5.9	11.8	17.6	0.0	0.0	47.1
Small	35	77.1	0.0	2.9	5.7	14.3	20.0	14.3	20.0	14.3	14.3
Landless	15	33.3	0.0	26.7	13.3	26.7	33.3	0.0	20.0	0.0	0.0

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

Table 6 uses the number of sample households from different landholding categories who reported fishing income from different types of gear during the one-year socio-economic monitoring to estimate gear ownership for the main villages. During the routine monitoring at least some of the reticence over reporting fishing activity was overcome, so these data can be taken to give a more accurate picture of fishing involvement. Average annual income generated by use of the different gears is also shown.

Table 6
Kafurpur and Pathankandi
Gear ownership and average annual
income from gear types and landholding category

SW3-1 Kafurpur **Main village** **Inside**

Gear Type	Bengali Name	Medium Farmers			Small Farmers			Landless		
		No.	%	Tk.	No.	%	Tk.	No.	%	Tk.
Gill nets	Current jal	6	36.3	1038	34	76.4	1864	27	23.7	6726
	Koi/Fashi jal	3	17.6	1240	5	11.6	713	5	4.4	1200
	Pangas jal	0	0.0	0	0	0.0	0	5	4.4	1805
Seine nets	Ber jal	0	0.0	0	8	17.3	3880	51	44.3	3484
	Dora jal	2	8.8	3600	3	5.8	3700	0	0.0	0
Katha	Katha	0	0.0	0	3	5.8	3700	0	0.0	0
Trap	Doiar	0	0.0	0	0	0.0	0	11	9.2	1800
Hooks	Sip	0	0.0	0	8	17.8	1245	16	13.6	826
	Nol barsi	0	0.0	0	0	0.0	0	5	4.4	3650
Push net	Thella jal	0	0.0	0	0	0.0	0	1	0.9	950
Other	Dewatering	0	0.0	0	0	0.0	0	26	22.8	1283

Source : FAP17 Socio-Economic Monitoring

SW4-1 Pathankandi **Main village** **Outside**

Gear Type	Bengali Name	Medium Farmers			Small Farmers			Landless		
		No.	%	Tk.	No.	%	Tk.	No.	%	Tk.
Gill nets	Current jal	2	9.8	300	13	37.3	943	2	13.3	623
	Koi/Fashi jal	6	35.3	922	14	39.8	864	3	18.9	1514
Lift net	Veshal jal	0	0.0	0	2	4.8	3695	0	0.0	0
Trap	Doiar	2	9.8	200	5	14.3	918	1	6.7	1050
Hook	Sip	1	7.8	2050	2	4.8	30	0	0.0	0
Spear	Koch	2	9.8	400	0	0.0	0	0	0.0	0
Cast net	Jhaki jal	5	27.5	408	7	19.8	365	0	0.0	0
Push net	Thella jal	0	0.0	0	2	4.8	450	3	18.9	194

Source : FAP17 Socio-Economic Monitoring

Even taking account of under-reporting in Pathankandi, the far greater importance attached to fisheries in Kafurpur is clear. The use of *berjal* (seine net) by almost 45% of the landless households in Kafurpur is striking as this is a relatively large and expensive gear[1]. Small and medium landowners tend to use smaller gears, notably *current jal* (monofilament gillnet), but for all groups the considerable income earned indicates the important role played by fisheries in local livelihoods.

Current jal (monofilament gillnet) is the mostly widely used gear in both villages. It is probable that most of the *koi* and *fashi jal* (ostensibly **multi**filament gillnet - and therefore legal) reported was, in fact, *current jal* as well. This would mean that up to 60% of small farmers in Pathankandi use *current jal*, a figure which corresponds closely to the estimates given informally by respondents in the village. Incomes from fishing in Pathankandi are clearly generally lower, but the higher proportional involvement of small landowners is significant, as it reflects some of the problems regarding ownership and access to the fisheries resource which are increasingly important in the area.

There does not seem to be any particular social stigma attached to fishing as an occupation in this area, unlike many other parts of Bangladesh. People from practically all social strata seem to be willing to involve themselves in fishing when lucrative.

The historical patterns of fisheries involvement in the village have had an important influence on current practice. As seen in the community profile, there is a sizeable Hindu community in Kafurpur, consisting of 24 *koibarta das* households and two *mandal* carpenters. The *koibarta das* were originally fishermen, and some still engage in fishing in the *beel* and floodplain round about. Their fishing involvement no doubt encouraged this group to stay on in Kafurpur when the rest of the Hindu community moved out in the 1950s. However, since then, the growing involvement in fishing of local Muslim farmers and landless labourers has made access more and more difficult for the *koibarta das*. Consequently they have mostly shifted to fish trading.

[1] It should however be noted that the *berjal* used here are smaller and cheaper than those used on floodplains and *beel* in other regions.

02

2.3 Women in fisheries

The lack of stigma associated with fishing does not extend to women's involvement. In spite of considerable NGO activity with women's groups in the area, the degree to which women are able to work out of the homestead is still limited, particularly compared to the North-Central Region.

Very poor women, such as widows or female heads-of-household are sometimes seen fishing, particularly on *khal*, river banks and around homesteads in ponds and ditches. However, women clearly only feel confortable fishing where they can maintain a degree of seclusion and not be out in the open.

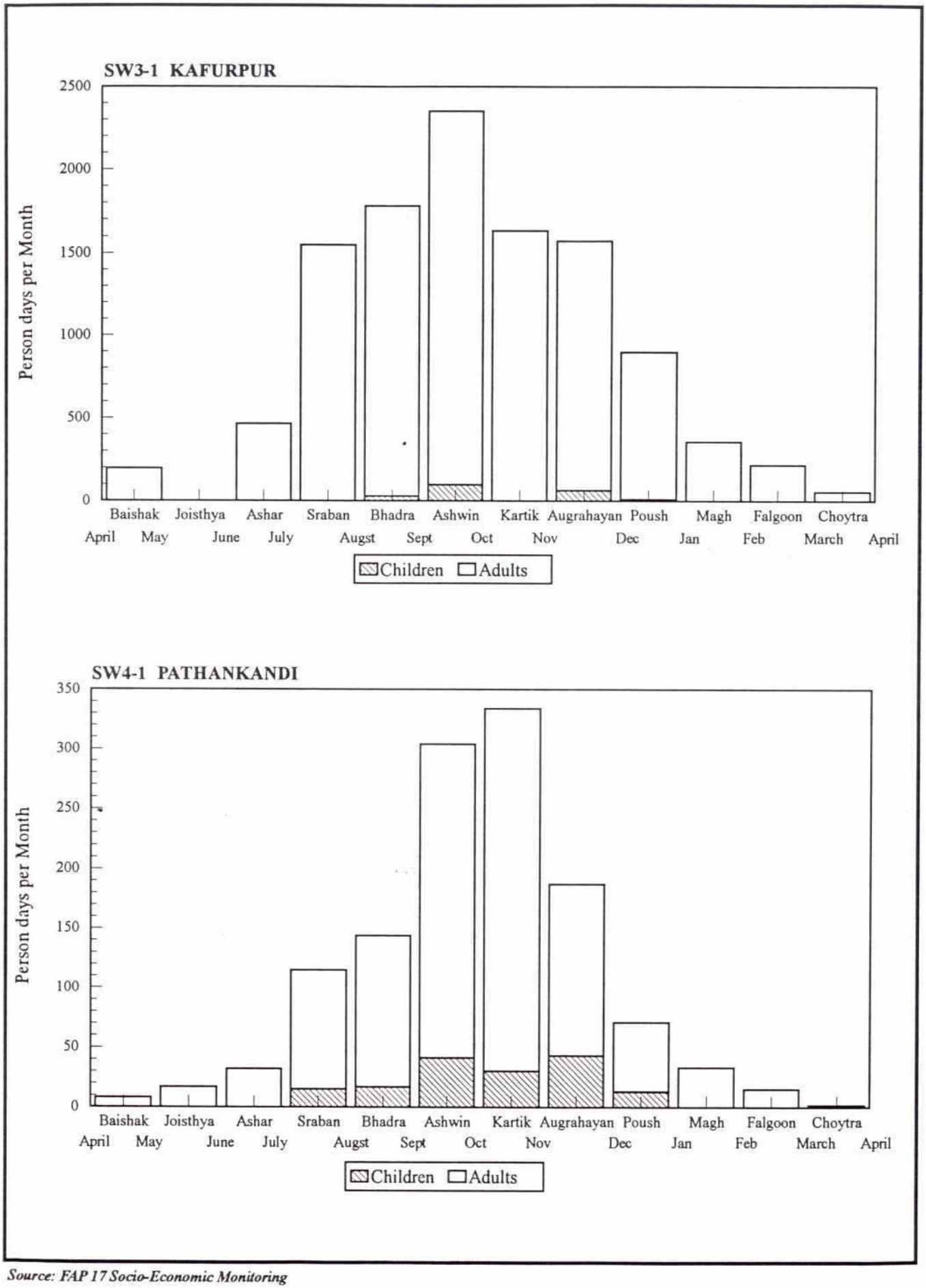
2.4 Children in fisheries

The proportion of fishing effort by children is limited, see Figure 6. In Kafurpur, this reflects the very high levels of adult activity rather than the lack of effort by children. Especially in the month of *ashwin* (September/October), which marks the peak of the flood recession in the scheme, children are actively involved in the operation of small gears on the floodplain.

Children from small farming households seem to be **more** involved than those from the landless category. This is probably due to the fact that they help more with the operation of *current jal* which is common among landowners, but less with the *berjal* which is preferred among the landless. Fishing effort by children on the *beel* during the year of the study was probably lower than normal because of the frequent raids carried out by fisheries officials and police to remove illegal *current jal*. Adult fishing effort was not especially affected by these controls.

The proportion of fishing by children in Pathankandi is higher, reflecting the generally shallower floodplain around the village and the more limited adult involvement. Children fish frequently on the many ponds and ditches in the area and the seasonal migration of the adult males from many landless households leaves additional opportunities for the children who remain.

Figure 6 Person Days Fishing per Month, Adults and Children



Source: FAP 17 Socio-Economic Monitoring

2.5 Fisheries access

The lack of formal leasing arrangements around both villages has encouraged widespread involvement in fishing. In many other areas of the country, decisions among non-fishermen over whether or not to fish seasonally are frequently dictated by access arrangements on adjacent fisheries. The social stigma and low status attached to fishing activity are an important deterrent to fisheries involvement, but this might well be a form of social explanation of the *status quo* : fishermen fish and farmers farm. It is worth noting that in the two areas of the country studied by FAP 17 where there are **fewer** formal leasing arrangements governing fisheries access, seasonal movement from one occupation to another is considered normal and less subject to social stricture. A labourer in North-Central region commented : "*Hal theke jale ; jal theke hale, kintu amader abasthar kono poribartan hoi na.*"("From plough to net ; from net to plough, but there's no change in our condition.") The comment could equally have been made in the area around Kafurpur and Pathankandi, where the plough and the net are equally essential to poor households trying to survive through the year. By contrast, such a comment would be unthinkable for many households in the North-West or the North-East, where the socially defined boundaries between farmers and fishermen are more clearly demarcated.

This unrestricted movement between occupations is increasingly threatened by growing competition for the fisheries resource. The conflicts generated by this competition are the culmination of a long process of changing access arrangements in the *beel* going back to the colonial period.

Prior to the abolition of the *zamindari* system in the early 1950s, the local *rajbangshi* and *koibarta das* fishermen paid an annual lease amount to the local *talukdar* who acted as an intermediary revenue collector on behalf of the *zamindar*. The area was considered a *jalkar* and was more or less exclusively exploited by the large traditional fishing community in Kafurpur and Saraibari.

After Partition and the Land Settlement Act of 1952, the areas previously controlled by this mechanism officially became *khas* land under government control. In fact, in Chatal *beel*, the majority of the large Hindu community in the village, including most of the larger landowners, migrated out to India and either sold their land to local Muslim farmers or simply abandoned it. Whatever was left was occupied, generally by the more influential

members of the Muslim community. The official process of distribution of *khas* land which subsequently took place in the *beel* seems to have merely sanctioned what had already taken effect. As a result, no *jalmahal*, or *khas* waterbody subject to formal leasing arrangements was established on Chatal *beel*.

Traditional *rajbangshi* fishermen from Saraibari stayed on and they initially maintained their long-standing rights to fish in the *beel* and surrounding floodplain during the flood season, as they had the larger gears required to exploit deeper waters. Among local agriculturists, fishing for income was rare, although subsistence fishing was widespread during the floods with small gears such as *thella jal* (pushnet) and *jhaki jal* (castnet). Population pressure was still relatively contained and fisheries resources abundant.

During the dry season however, as the area of water in the *beel* receded, all the communities living around about would organise a community fishing event to exploit the rich fish resources concentrated in the residual area of the *beel*. This usually took place in the month of *poush* (December/January) on a date decided upon by the elders of all the surrounding villages. Large numbers of people, and especially large numbers of children, would take part using mostly *polo* (a type of trap) as well as *thella jal* (push nets) and *jaki jal* (cast nets).

This community fishing, and the wide distribution of fisheries benefits it ensured, apparently continued until the late 1960s. During the 1960s, repeated and severe episodes of flooding had driven many local people to distress-sales of land and there is reported to have been a great increase in the numbers of landless households. For many of these households, fishing became an important safety-net. By the end of the decade, the first elements of the *beel* drainage scheme had been completed and the depth of Chatal *beel* began to decrease. Siltation during the serious floods also played a role in this process. These changes in depth encouraged some people owning land in the *beel* to begin excavating submersible ponds. By doing this, landowners took the first steps in establishing individual, as opposed to community, rights over fish resources. As soon as the boundaries of these ponds became visible as the floods receded, fishing would be restricted by their respective owners. *Boro* cultivation, which provided the other principal impetus for people to take control of lower-lying land, only became widespread during the 1970s.

The progressive occupation of the *beel* area throughout the 1970s was marked by the excavation of more and more ponds, the extension of *boro* cultivation and the steady increase

in the numbers of non-fishermen turning to seasonal fishing as a source of income. Each period of natural disaster or extreme hardship, such as flood or famine, pushed more and more people into fisheries. The value attached to the fishery resource, and control of it, also increased. Whereas previously, only professional fishermen regarded the resource as a source of livelihood, now a far wider range of farmers, labourers and traders were seeking to extract a living out of the same resource. Rising competition has led to an increase in conflicting claims over the resource and attempts to limit access : pond-owners restricting fisheries even before their ponds emerged from the flood, landowners restricting fishing in the flooded area covering their landholdings.

Table 7 shows the changes in land and water use which have taken place in Chatal *beel* since the 1960s and how they have affected fisheries access for different social groups.

The *beel* areas around Pathankandi, such as Amdoli and Joyagir, have always been more completely cultivated and there was never any *khas* land in the immediate area. However, apart from the lack of any *jalmahal* in the *beel*, as in Chatal *beel* during the *zamindari* period, the process which has taken place has been very similar to that in the Kafurpur area. An open-access floodplain fishery, exploited primarily by professional fishermen but, seasonally, by local people as well, has been steadily replaced by a more controlled and more limited fishery. The excavation of submersible ponds (*pushkunni*) in low-lying areas has become increasingly widespread and is seen as a viable alternative use of land, giving generally better returns, even with little or no inputs, than cultivation of crops. Just as in Chatal *beel*, pond owners are enlisting the support of local officialdom in preventing people from fishing with *current jal* in the floodplain in order to ensure maximum returns from their ponds.

There has never been the high level of fishing effort applied to the *beel* around Pathankandi which is seen on Chatal *beel* near Kafurpur. The resource is not rich enough to sustain such intensive fisheries, but the level of conflict over increasing restrictions on fishing is no less severe. Both landless households and small farmers who do not own submersible ponds are bitter about what is perceived as the privatisation of a common resource. However, while expressing bitterness, almost everyone is looking for ways of joining in. There is great activity in the area in the improvement of almost every possible pond, ditch, *maital* and borrow-pit. Many ditches near to homesteads have also been re-excavated and are being used as submersible ponds, sometimes with extra stocking of fingerlings and even feeding once

Table 7

Chatal *beel* :

changes in fisheries access for different social groups - 1960s to 1993

	SOCIAL GROUPS			
TIME PERIOD	**Trad. fishermen**	**Land-owners**	**Landless labourers**	**Other changes**
1960s	open fishing in *beel* & floodplain leases on *khal*	subsistence fishing: annual community fishing: *khas* & *debottar* land being occupied	subsistence fishing: annual community fishing: rise in numbers of landless	limited agriculture in low part of *beel*: repeated serious floods
	⇓	⇓	⇓	⇓
1970s	fishing in *beel* more restricted during flood recession: open fishing on floodplain: leases on *khal*	ponds in *beel* excavated: increased seasonal fishing: community fishing stopped	increased seasonal fishing: community fishing stopped some landless start using *berjal*:	local *boro* introduced: more crops in low part of *beel*
	⇓	⇓	⇓	⇓
1980s	harvesting of ponds in *beel* on hire or lease: fishing on floodplain restricted during drawdown: leases on *khal*	more ponds excavated in *beel*: increased seasonal fishing in *beel* & floodplain: *current jal* available	increased seasonal fishing: many landless fishing fulltime during floods	HYV *boro* introduced: intensification of *rabi* season agriculture: reduction of area under crops during flood
	⇓	⇓	⇓	⇓
1990s	harvesting of ponds in *beel* on hire or lease: fishing on floodplain increasingly restricted: leases on *khal*	ponds harvested with LLP: sustained seasonal fishing: widespread *current jal* use: efforts by outsiders to acquire land in *beel* for "fisheries development"	sustained seasonal fishing: widespread *current jal* use:	widespread HYV *boro* cultivation

Source : FAP17 Village Appraisals

the floodwaters have receded. Almost everyone who undertakes such pond improvement then has an interest in limiting open fishing in the vicinity. Ultimately, in Pathankandi, as there are very few landless households, not many people will lose out by the increasing extension of private property rights to the floodplain fisheries resource. But it is clear that the landless, in general, would suffer in the long-run as the areas and periods of the year in which they can fish freely are increasingly restricted.

However, the increasing value of the resource and general competition for **any** available resource in rural areas is creating steady pressure on the "open" fisheries. Wherever anyone can find a means of establishing a property claim over fish, it is used to restrict access. This is a cumulative process. Clear-cut moves by individuals to restrict fishing by others are generally opposed; but gradual changes are harder to stop. As siltation and hydrological changes bring even the lowest land into cultivation, property rights follow, as do claims on the fisheries resource which concentrates there during the drawdown. To emphasise their claims landowners in these more deeply flooded areas have excavated submersible ponds (locally called *pukur* or *pushkunni*). The next stage has been for these owners to attempt to restrict fishing during the drawdown and, in recent years, the flood season as well. Pond owners cite the widespread use of illegal *current jal* as an excuse to elicit official support for the suppression of open fishing.

The erosion of the open-access nature of the fishery has been subtle. Most respondents would still say that fisheries are open, or at least should be. But the signs that this is changing are clear and reflected in frequent accounts of conflicts and disputes.

The developments seen in Kafurpur over the last year take the process one step further. A private company has been putting pressure on local people to lease out their land in Chatal *beel* to them for a "fisheries development project". "Pressure" has consisted of threatening "official intervention" if people refuse to cooperate and enlisting the support of the union *parishad* chairman, support which was reportedly amply rewarded. A translation of one of the series of pamphlets distributed in Kafurpur and other villages surrounding Chatal *beel* is shown in Box 1. Local people are extremely suspicious over the apparently very high rates being offered by the prospective lessees and it is widely thought that, as soon as they have taken control of the land, they will find ways of retaining possession of it, possibly exploiting ambiguities over the status of what used to be *khas* land in the *beel*. What is especially alarming is the fact that official sanctions and force have been threatened to push people into

accepting the deal.

Having said this, it is ironic that many of the pond- and landowners complaining most bitterly about this development are the same people who are effectively using the same methods to restrict open fishing on the *beel* by other villagers. The owners of some of the larger submersible ponds in Chatal *beel* have had no reservations about enlisting local fisheries and police officials to carry out raids to prevent the use of *current jal* in the *beel*. Needless to say, the pond-owners real concern is to ensure that the maximum possible amount of fish survive through the flood season to aggregate in their ponds.

Bangladesh Sangstha Matsya Bibhag Dhaka
(Fisheries Division Dhaka)
Kusum Kali Krishi Unnayan and Matsya Khamar
(Kusum Kali Agricultural Development and Fish Farm)

Kindly abide by fisheries laws and regulations and help eliminate the unemployment problem. Violators of fisheries regulations will be tried under the Bangladesh Penal Code. The residents of Wards 1 and 2 in Tujapur Union, under Bhanga *thana* in Faridpur District are hereby informed that those who have land in the area covered by Hawlader *para* road to the south and Buruj gaach to the north; from the eastern part of Gaichcha *pukur* on the east up to Saraibari *khal* on the west, from henceforward are subject to and are requested to abide by the following conditions:

1. For every year the price of each 42 decimals of land (1 *bigha*) is fixed at Taka 3,000/-.

2. The company will bear all the cost and the landowner will get half of the produce. If any landowner wants more than this share, he may take recourse to law. If any one fails to abide by any of conditions numbers 1 and 2 by August 20th to September 20th, then he will forfeit his claim to one year's produce of the land.

   For those who own ponds, the prices will be fixed as per demand with the cooperation of the local chairman.

N.B. All residents of Ward No.2 within the age range 18 to 35 years' are requested to send an application in plain paper to the address below. The company will retain a group of legal advisors and any one wishing to sell their land can do so by applying to the company who will endeavour to offer a fair price.

Box 1 : Fisheries development ?

The level of tension surrounding both these developments in Chatal *beel* is very high and constituted a major obstacle in effective data collection during the FAP 17 surveys. Local people inevitably associated any group of outsiders coming and asking questions about fisheries with the planned "development" of the *beel* and everyone involved in fishing on the *beel* assumed that the survey work was all part of the attempts to suppress *current jal* fishing.

2.6 Seasonality and fisheries

Figure 7 and Table 8 show the movement of fishermen from the two villages from one type of waterbody to another through the year. The table also quantifies the intensity of use of the most important types of gear. The following discussion covers each of the important seasons of the year in turn.

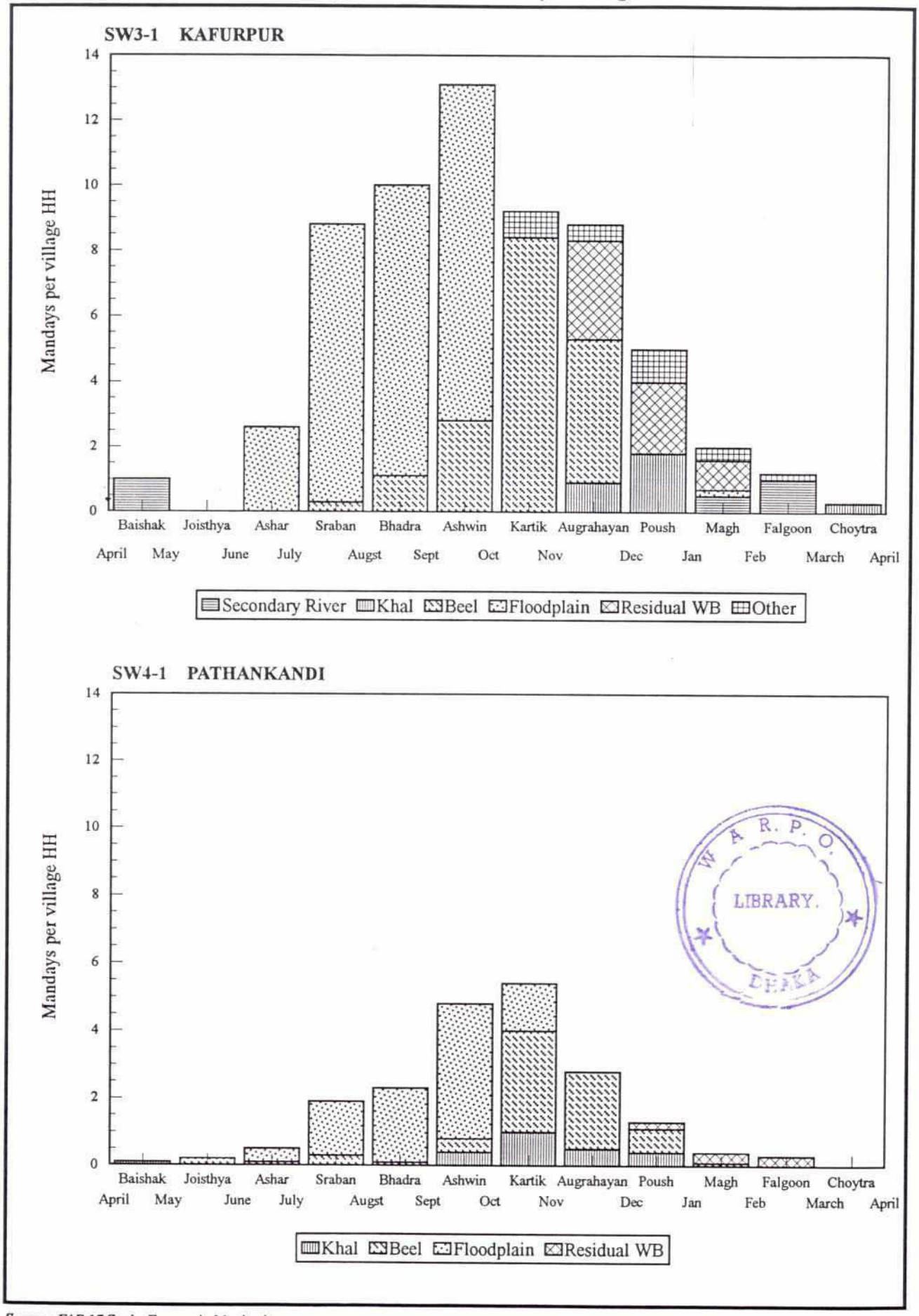
Fishing intensity during the 1993 flooding season may have been higher than normal. The breaching of the Chatla-Fukurhati embankment at Balihati by the Arial Khan River meant that one of the most important access routes for migratory fish was reopened for the first time in several years. Erosion also reopened the connection between the Chandra *khul,* in the south-eastern corner of the scheme, and the main river although this should not have directly affected Chatal *beel*. The full implications of this for the fishery in the *beel* are not clear. Catch assessment surveys in the *beel* during the course of 1993-94 indicate that it is a productive waterbody, but not exceptionally so compared to other *beel* in the South-West Region. However, the levels of effort applied by some fishermen are high, as are incomes. It is possible that the knowledge among local people that more fish would be entering the *beel* through the breaches from the year before led to greater levels of fishing activity than normal. However, the levels of fishing investment in gear such as *berjal* indicate that, in Kafurpur, the interest in fisheries is sustained.

Pre-monsoon

During the pre-monsoon period, from *baishak* to *joisthya* (April to June), fishing activity is minimal in both Kafurpur and in Pathankandi. In Chatal *beel*, pre-monsoon rain storms can lead to fluctuations in *beel* depth and, occasionally, in-flow of flood waters through the *khal* from the Arial Khan. However, above all if there is some flood, agricultural activity is extremely intense to bring in the *boro* harvest before rising water levels cause crop damage. The complete lack of fishing activity in *joisthya* reflects the tendency to plant *boro* later than normal in this area, with the harvest consequently continuing right up to the start of the monsoon proper.

In early *baishak* (mid April), some landless *berjal* operators may take their gears out to the Kumar River where there are still *katha* (brush-piles) to be harvested, but only before the *boro* harvest begins.

Figure 7 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 8
Principal Gears, Use by Month and Waterbody

SW3–1 Kafurpur — Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Sip	Beel						1.4							1.4	2.3
	Floodplain			0.7	0.7	0.5								1.9	3.1
Ber jal	Secondary River	1.0									0.5	0.8		2.3	3.7
	Khal									1.2			0.3	1.6	2.6
	Beel				0.2	0.7	0.7	1.9	2.1					5.5	8.8
Ber jal labour	Beel							1.6	1.0					2.6	4.2
Ber jal	Floodplain				1.7	2.5	2.7							6.9	11.1
Ber jal labour	Floodplain				1.6	1.6	1.6							4.7	7.6
Ber jal	Residual WB								0.5		0.9			1.3	2.1
	Other							0.6	0.5	1.0	0.4	0.2		2.7	4.3
Current jal	Beel						0.2	3.8	0.2					4.2	6.8
	Floodplain			1.9	3.8	3.2	4.8							13.8	22.2
Doiar	Beel							0.7	1.0					1.7	2.7
Net/Basket+Dewatering	Residual WB								1.2	0.9				2.2	3.5
	Residual WB								1.3	1.1				2.4	3.9
Koi/Fashi jal	Floodplain					0.6	0.7							1.3	2.1

SW4–1 Pathankandi — Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Sip	Floodplain				0.7	0.2	0.2							1.1	5.6
Current jal	Beel				0.3		0.2	0.9	0.2					1.5	7.6
	Floodplain				0.3	0.7	1.4	0.5						3.0	15.2
Doiar	Beel								0.9	0.5				1.4	7.1
Koi/Fashi jal	Beel					0.1	0.2	1.9	0.8					3.0	15.2
	Floodplain			0.4	0.6	1.1	2.3	0.6						5.1	25.8
Jhaki jal	Khal	0.1						0.1	0.4					0.8	4.0
	Beel		0.1					0.2	0.2	0.1				0.7	3.5
	Residual WB									0.2	0.3	0.3		0.7	3.5
Veshal jal	Khal						0.4	0.8						1.3	6.6

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

In Pathankandi, the level of fishing activity is even more limited. There is no water flow into the *beel* around Pathankandi until later in the year, so fishing is mostly restricted to residual submersible ponds in the floodplain.

Peak flood

With the arrival of the monsoon proper, the water levels in the Arial Khan, the Bhubaneswar and the Kumar all rise, starting from early *ashar*(late June) and then rising rapidly until they peak in *bhadra* (August/September).

In the flood season of 1993, in both Chatal *beel*, by Kafurpur, and in Amdoli *beel*, near Pathankandi, the rise in water level was very rapid during *ashar* and then flattened out for about one month until the end of *sraban,* when it rose again to its peak level at the end of *bhadra*. The flood then declined slowly until late *ashwin* (early October) and then with greater rapidity from then on.

The increase in fishing activity in both villages follows the expansion of inundated area of the floodplain quite closely. It is notable that fishing does not begin in those areas that fill up with water first, i.e. the lower parts of the *beel,* but increases as fish move out onto the periferal areas of the floodplain.

Fishing in *ashar* (June/July) is limited as there is still some agricultural activity, mainly harvesting and processing of jute, but in *sraban* (July/August), as water levels rise and alternative sources of employment dwindle, fishing becomes the mainstay activity for many landless and small farming households in Kafurpur. *Berjal* fishing on the floodplain, which requires generally deeper water, is most active during this peak flooding period, accounting for about 26% of total annual village fishing effort and the bulk of the fishing carried out between *sraban* and *bhadra* (see Table 7). *Current jal* use on the floodplain is also intensive, with 22% of annual effort. Peak effort, averaging 13 man-days per village household, is in *ashwin* (September/October). For those active in the *berjal* fishery, it is then a full-time occupation.

Theoretically, fishing everywhere around both villages is open to all during this period. However, some pond owners in Chatal *beel* and the *beel* around Pathankandi attempt to limit *current jal* fishing by requesting police raids to seize illegal gear. In Chatal *beel*, inside the Chatla-Fukurhati Scheme, this has encouraged local fishermen to set up net drying stations

out in the *beel* where approaching police or fisheries officers can be easily spotted and gear quickly packed away and moved. It is felt that gear is safer there than in the homesteads. The speed and efficiency with which the *beel* can be cleared of *current jal* and fishermen whenever a suspicious boat is seen approaching is impressive.

Drawdown

As water begins to recede, from *ashwin* (September/October) on, fish move back into deeper areas of the floodplain and *beel*. The catchability of fish increases as they become more concentrated and fishing effort begins to focus on deeper areas. *Katha*, or brush piles are placed in the submersible ponds and in the *khal* early in the drawdown to further encourage fish aggregation. From *kartik* (September/October), the recession is rapid with floodplains and *khal* drying out quickly.

In Kafurpur, people from all socio-economic categories were involved in fishing during the peak flood, during the drawdown, the landless play the most active role. Children are frequently engaged in dewatering *maital* (ditches) around homesteads and on the floodplain as these begin to dry up. Agricultural activity begins to pick up and many small landholders are engaged in harvesting deep-water *amon* crops from *kartik* (October/November) on, followed immediately by the preparation of fields for *rabi* crops or of *boro* seed-beds.

The drawdown in Pathankandi is the peak of fishing activity, when small farmers set their *current jal* throughout the *beel* and floodplain, despite attempts by owners of submersible ponds to get restrictions enforced. All fishing is stopped on the submersible ponds as soon as their boundaries are clear. Offical raids become more frequent as the area left for fishing reduces. Submersible ponds are sometimes leased out to fishermen at this time, or fishermen are hired in to manage them. Many of the traditional fishermen are also involved as pond managers and harvesters from this period.

Dry season

By *augrahayan* and *poush* (late November to early January), much of the fishing activity consists of dewatering of residual waterbodies in the *beel* and floodplain. Most of the floodplain and homestead area ponds fished out by seasonal fishermen from Kafurpur dry up by the end of *magh* (January/February). Some fishermen continue to use their *berjal* on some of the *khal* and then out on the surrounding rivers, where there are *katha* to be harvested. Many others leave fishing for agricultural work on *rabi* and *boro* crops.

Whereas some open water used to remain in the centre of Chatal *beel*, this is now erratic, with the *beel* drying up completely in most years. After the end of *augrahayan* (mid-December), there is only a very small area of *beel* left and people from Kafurpur engaged in fishing are mostly pond-owners or people working on their behalf. Villagers also own ponds in Charaldi and Hasandia *beel,* to the south-west of the village, and these continue to hold water right through to the end of the dry season in *choytra* (March/April). Work on these ponds tends to be mostly handled by professional fishermen from Saraibari.

The man-days of fishing involvement decline considerably although, as the income data in section 2.7 show, the fishing income for landless fishermen in Kafurpur is considerable until the end of *magh* (early February).

2.7 Agriculture, landlessness and fishing

Apart from those who own or work on the harvesting of submersible ponds, fishing activity is clearly concentrated when the area of open-access waterbodies is greatest. Twenty years ago, as outlined in the discussion of access in Section 2.4, the situation was probably somewhat different. The great majority of those involved in fisheries were traditional fishermen. Their fishing activity would have peaked above all during the drawdown and dry season as this was the period when fish were easiest to catch. Fishing by members of the agricultural community, such as the Muslim farmers and labourers, would have been far more limited.

The departure of many of the traditional Hindu fishermen and the increasing levels of poverty have been mentioned as factors which have contributed to the move of agriculturalists into fishing. The shifts in agricultural patterns, and consequent changes in labour demand, have also played an important role.

In common with large areas of the floodplains in Bangladesh, the last 20-30 years has seen a clear shift in cropping patterns in both of the village clusters under study. The agricultural emphasis has changed from *kharif* or summer season rice crops followed by *rabi* or winter season crops such as pulses or oilseed, to cropping patterns dominated by a variety of *rabi* season crops, with particular emphasis on *boro* rice and the adoption of high-yielding

varieties making use of higher levels of input and irrigation.

The extent to which flood control measures have played a role in encouraging these changes is not always clear. Though flooding patterns have been altered, hydrology has also been changed by the construction of roads and siltation. However, the shift in cropping patterns is a countrywide phenomenon, often following the spread of mechanical irrigation, particularly low-lift pumps and shallow-tube wells, and the introduction of new HYV rice varieties.

The corollary of this shift from summer to winter crops is the creation of more extended fallow periods with consequent limited agricultural labour demand. Table 9 illustrates the changes in cropping patterns which have taken place over the last 40 years in Kafurpur and Pathankandi. Periods when land is left fallow are shaded in order to emphasise the shifts in period of relative inactivity in the agricultural cycle.

Impact on labour demand

These patterns of areas under cultivation do not necessarily translate directly into patterns of labour demand. The traditional summer rice crops in low-lying areas, broadcast mixed *aus* and *amon* require relatively limited labour inputs during their long growing period but give rise to two peaks of demand, one at the end of the *kharif* I season, in *sraban/bhadra* (July/August) and again at the end of the *kharif* II season, in *kartik/augrahayan* (October/November). The new cropping patterns, based on *boro* rice cultivation, have practically eliminated the labour demand peak at the end of the *kharif* II season in both communities, while, at the end of the *kharif* I season, labour demand is concentrated in jute harvesting and processing.

These changes in agricultural patterns have reduced employment and labour opportunities during the flooding season and raised it during the dry season.

Table 9
Kafurpur and Pathankandi
Changes in cropping patterns

KAFURPUR	Principal crops	- 1950s-60s		
Kharif I	**Kharif II**	**Rabi**	**Area (%)**	**Landtypes**
mixed *aus-amon*	mixed *aus-amon*	fallow	40%	very low/low
broadcast *amon*	broadcast *amon*	fallow	30%	low
jute	fallow	mustard/pulses	30%	medium-low
PATHANKANDI	**Principal crops**	**- 1950s-60s**		
mixed *aus/amon*	mixed *aus-amon*	fallow	40%	very low
mixed *aus-amon* /	mixed *aus-amon* /	pulses	20%	low
mixed *aus-amon* /	mixed *aus-amon* /	sesame	20%	low
broadcast *amon*	broadcast *amon*	mustard/pulses	20%	medium-low

KAFURPUR	Principal crops	- 1993		
Kharif I	**Kharif II**	**Rabi**	**Area (%)**	**Landtypes**
fallow	fallow	local *boro*	10%	very low
mixed *aus/amon*	mixed *aus/amon*	mustard/wheat	10%	low/medium-low
HYV *boro/aus*	fallow	mustard	70%	low/medium-low
jute	fallow	mustard/wheat	10%	low/medium-low
PATHANKANDI	**Principal crops**	**- 1993**		
fallow	fallow	HYV *boro*	55%	very low/low
mixed *aus/amon*	mixed *aus/amon*	sesame/mustard/ pulses/wheat	10%	low/medium-low
jute	fallow	wheat	20%	low/medium-low
HYV *boro/aus*	fallow	mustard	15%	low/medium-low

Source : FAP17 Village Appraisals

Combined with population pressure and the rise in landlessness (see below), this has made the task of sustaining a livelihood during the summer months harder.

In response, outmigration from the area has risen, with many male members of households migrating to urban areas (Faridpur, Jessore, Khulna or Dhaka) during the flooding period where they work as *rickshaw* pullers, porters or construction workers. A group of people from 10 landless households in Pathankandi have regular work during the summer months as house-painters in Dhaka, returning during the winter season to work in agriculture on *rabi* crops and *boro*.

But for those landless households who remain, and for many of the small landowners whose land now remains fallow during the summer, fishing now constitutes the primary source of income and livelihood during the flood season.

Extensive jute cultivation around Pathankandi probably contributes to the more limited fishing involvement of many small farmers and landless households there as its labour intensive crop and its harvesting occupies much of the village during the peak flooding months of *baishak* and *ashar* (April to July). Many farmers in Pathankandi are in the process of returning to the traditional cropping pattern of deep-water, broadcast *amon* rice followed by a *rabi* crop as the cost of inputs for HYV *boro* cultivation has made the crop unviable, especially for smaller landholders.

Impact on floodplain environment

The impact of these changes in cropping pattern on the fisheries environment in the *beel* and floodplain areas is also important. The previously dominant pattern of lowland agriculture - broadcast *amon* rice either by itself or mixed with *aus*, meant that large areas of the floodplain were covered with vegetation during the flooding season, providing shelter for fish grazing on the floodplain. This vegetation cover restricted the use of many gears, particularly the larger nets.

Boro cultivation, combined with general pressure on land resources, has also led to the extension of cultivation into the deepest parts of *beel*. The natural vegetation which used to persist in the areas of perennial water has therefore been cleared leaving a far more impoverished environment for floodplain fish during the flooding season.

Landlessness

An overall growth in the proportion of landlessness has also contributed to the rates of involvement of that group in fisheries, at least in Kafurpur. The reasons for these patterns of landlessness need to be understood.

Before the Partition of India and Pakistan in 1947, Kafurpur was part of the *zamindari* of Choddo Rashi given into the caretakership of a local Brahmin family. With the abolition of the *zamindari* system in the early 1950s, members of the Fakir *gusti* in Kafurpur acquired the *pattan*, or settlement rights for much of the land in the area which had previously been part of this *zamindari* estate. Some of the *koibarta das* households in Kafurpur acquired similar rights. During this period, there were reportedly no absolutely landless people in the community. From the 1950s on, as Hindu families moved out of the area, their land was generally bought up by members of the same Fakir lineage group. Rights to the areas of *khas* land in the *beel* also came under private ownership or occupation.

The period from 1961 to 1969 was reportedly marked by repeated, severe flooding in the area which drove many of the smaller landowners in Kafurpur into making distressed land sales. Land prices fell to very low levels during this period, one *bigha* reportedly costing as little as 15 *taka*. Land was generally purchased by wealthier families already owning land in the area. A large proportion of small landholders and the *das* fish traders in the village were thus rendered landless. From the 1970s on, there has also been some in-migration by landless households, particularly as extensive areas of *boro* cultivation developed in the lower parts of the *beel*. The end result, in Kafurpur, is the current situation of almost 64% of the households in the village owning less than 0.5 acres of cultivable land. These 115 landless households altogether dispose of only 5.75 acres of cultivable land, an average of only 5 decimals while the 3 large landholders admitted to owning a total of 31.5 acres, though the real figure is probably higher.

The development of this pattern of landholding in Kafurpur has taken place simultaneously with the tremendous growth in fishing activity among the Muslim landless and was certainly a contributing factor.

2.8 Fisheries income

Figure 8 shows the distribution of household fishing incomes among different income ranges.

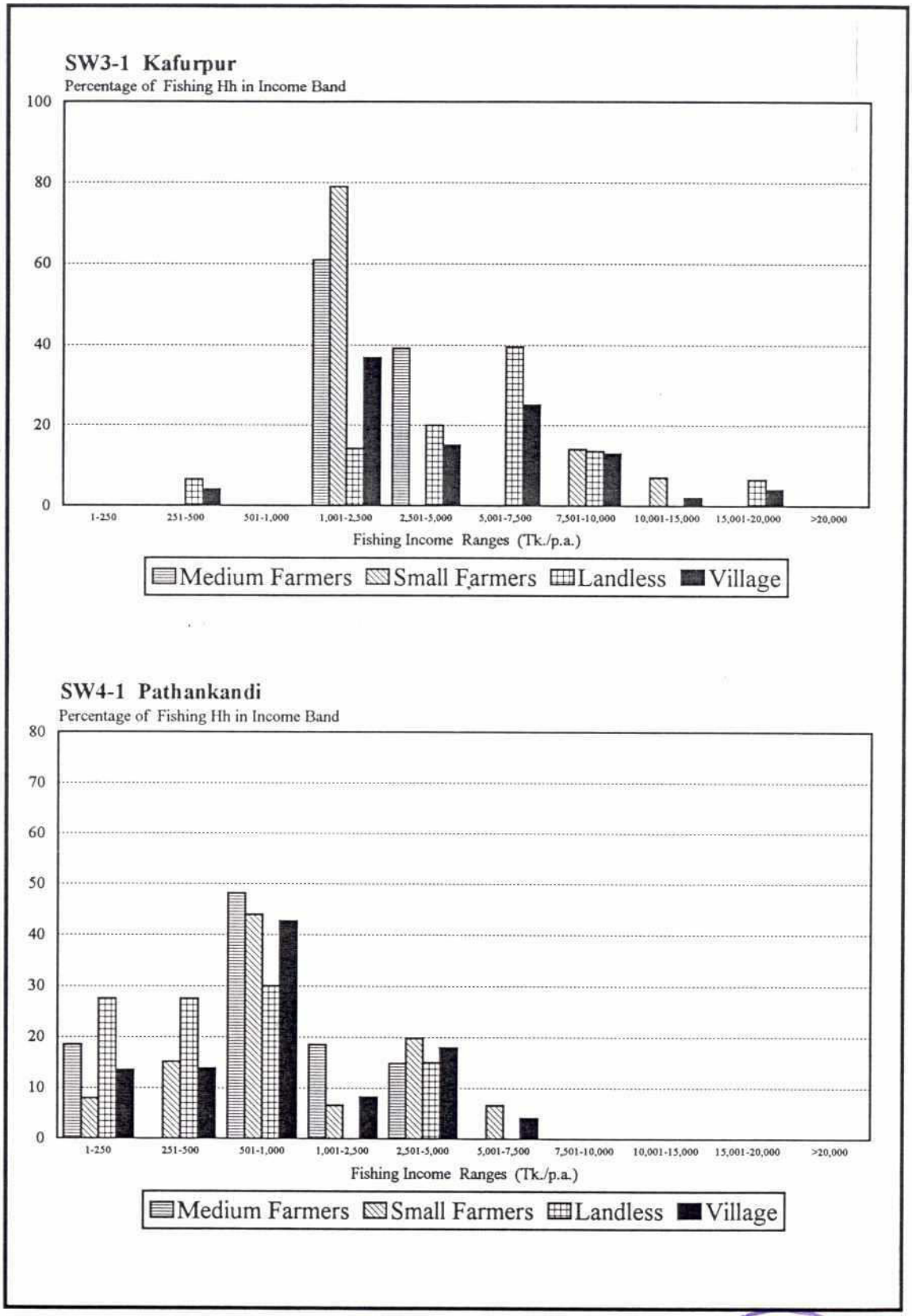
The clustering of Kafurpur households towards the higher end of the fishing incomes range is striking. The availability of a productive open-access fishery near the community has led to a sizeable proportion of the village making fishing a major component of their livelihood strategies. Among the landless in particular, about 80% of those households involved in fishing are earning over Tk.2,500 per year from fishing. The contrast with small landholders engaged in fishing is notable ; almost 80% of this category earn less than Tk.2,500 per year. The *berjal* operations which absorb much of the landless households' fishing effort clearly offer good returns compared to the *current jal* operations more common among small and medium landholders.

In Pathankandi, fishing is clearly more occasional, with only about 20% of the households fishing earning more than Tk.2,500 per year from this activity. Even the submersible ponds in Amdoli, Chatla and Joyagir *beel* do not produce anything like the high incomes obtained from those in Chatal *beel*.

From the income data for Kafurpur, shown in Table 10 and Figure 9, several points become clear regarding the socio-economic structure of fishing activity. First of all, as indicated in Figure 8, most of those landless households involved in fishing are involved intensively. Their principal form of gear is the *berjal* or seine net, representing a relatively high investment; most of these gears (78%) were purchased on credit. This emphasises that, here, movement into fishing is not simply a stop-gap but a choice of occupations involving a careful assessment of the potential gains. It was noticeable, in interviews with people fishing with *current jal* on the *beel*, that several respondents explained their choice in terms of perfectly straightforward cost and returns analysis : investment for the season - Tk.2,000-2,500 for 25-30 panels of *current jal* gives average gross returns over the 3-4 month fishing season of Tk.7,500-8,000 (net returns Tk.5,000-6,000). Given the profitability of the activity, even *current jal* fishermen apparently borrow money in order to fish for the season.

While changes in patterns of agricultural labour demand and landlessness may have given added impetus to the movement of poor households into fisheries, there was always a strong draw: for the period from *sraban* (July/August) up to *kartik* (October/ November) fishing

Figure 8 Distribution of Fishing Incomes for Fishing Households



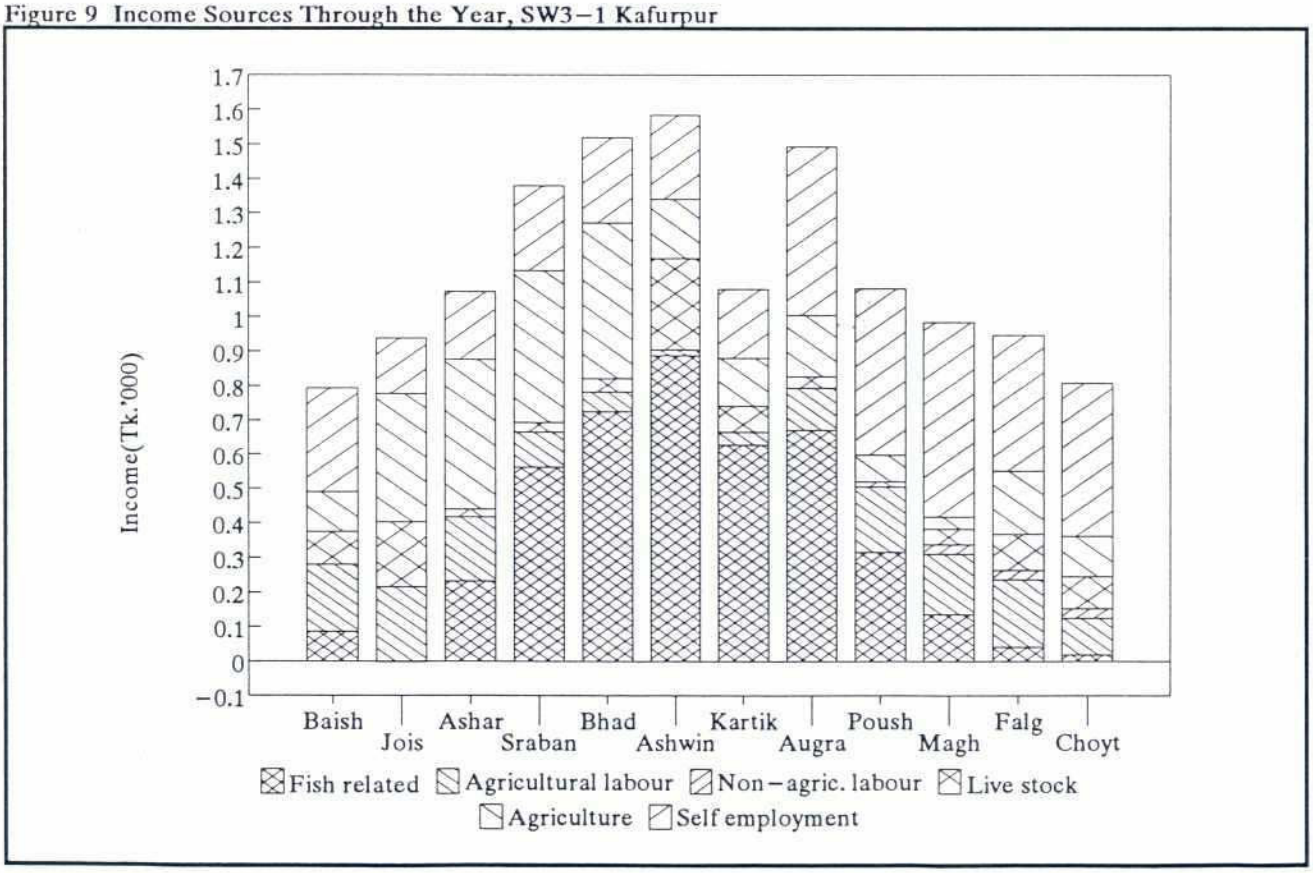
Source : FAP17 Socio-Economic Monitoring

Table 10 Income Sources Through the Year, by Landholding Category, SW3–1 Kafurpur

UNIT: TK.

LAND CAT.	ACTIVITY	BAISH	JOIS	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
Medium	Fishing	–	–	–	115	319	356	–	124	–	–	–	–	913	4.0
	Fish culture	–	–	–	–	–	–18	14	–	194	–	–	–	190	0.8
	Small stock	30	32	8	55	3	79	31	59	13	4	65	–	380	1.7
	Large stock	782	782	41	–	–	–	686	–	27	178	693	755	3,946	17.4
	Agriculture	752	1323	1116	1855	1006	492	933	1137	262	33	60	584	9,554	42.0
	Self employment	419	417	279	282	282	419	336	2480	1108	940	227	556	7,744	34.1
	Total	1983	2554	1444	2307	1610	1328	2000	3800	1604	1155	1,045	1,895	22,727	100
Small	Fishing	173	–	117	355	641	710	412	321	98	–	–	–	2,828	18.4
	Agricultural labour	140	102	121	84	–	–	60	160	216	128	117	84	1,214	7.9
	Small stock	7	6	31	9	26	–	–	5	18	7	12	5	126	0.8
	Large stock	34	371	14	47	45	1007	17	17	17	88	83	57	1,798	11.7
	Agriculture	117	902	1047	737	484	348	144	209	201	111	108	25	4,434	28.9
	Self employment	222	144	396	492	440	378	311	500	627	559	455	433	4,957	32.3
	Total	693	1525	1726	1724	1636	2443	944	1212	1177	893	775	604	15,357	100
Landless	Fishing	52	–	320	717	810	1020	772	854	370	208	80	31	5,232	44.8
	Fish trading	–	–	–	–	16	26	32	47	–	–	–	–	121	1.0
	Fish culture	–	–	–	–	–	–	–	–	4	–	–	–	4	0.0
	Agricultural labour	245	291	239	124	88	24	36	126	208	220	253	130	1,986	17.0
	Non–agric. labour	–	–	–	–	–	–	–	–	–	44	44	44	132	1.1
	Small stock	9	19	7	15	29	3	2	34	4	5	11	5	144	1.2
	Agriculture	19	21	95	115	356	52	19	23	3	6	230	85	1,024	8.8
	Self employment	318	132	106	142	166	164	137	187	335	515	398	433	3,032	26.0
	Total	643	463	767	1113	1465	1289	998	1271	924	998	1,016	728	11,675	100
Village	Fishing	78	–	237	566	719	877	605	647	265	134	52	20	4,200	30.7
	Fish trading	–	–	–	–	10	17	20	31	–	–	–	–	78	0.6
	Fish culture	6	–2	–5	–5	–5	–7	1	–8	49	–	(11)	(2)	9	0.1
	Agricultural labour	195	215	186	102	57	16	39	123	190	175	194	106	1,597	11.7
	Non–agric. labour	–	–	–	–	–	–	–	–	–	28	28	28	85	0.6
	Small stock	11	17	13	17	26	10	4	29	8	5	16	4	162	1.2
	Large stock	84	171	8	12	12	257	71	4	7	40	88	88	841	6.2
	Agriculture	115	372	437	442	452	170	139	178	79	35	183	118	2,720	19.9
	Self employment	303	162	196	245	247	243	201	488	484	567	396	445	3,979	29.1
	Total	792	935	1072	1379	1518	1583	1080	1492	1082	984	946	807	13,671	100

Figure 9 Income Sources Through the Year, SW3–1 Kafurpur



Source : FAP17 Socio–Economic Monitoring

generates the best average household earnings for landless families during the whole year.

It is noticeable, however, that even during the peak period for agricultural labour demand in the area, during the *boro* harvest, the average household earnings from agricultural labour among landless households shown in Table 10 seem extremely low : between Tk.250 and Tk.300 per month. Self-employment, usually in the form of seasonal migration to Faridpur or other urban centres is preferred.

Income data for Pathankandi are shown in Table 11 and Figure 10. Although the fisheries incomes are generally lower in Pathankandi, people there have a greater range of income-generating options open to them than in Kafurpur and higher average incomes. The seasonal fluctuation in agricultural incomes is far less severe than in Kafurpur, where the peak flooding season sees a drastic reduction in agricultural activity and labouring opportunities.

As a result, in both absolute and proportional terms, far fewer landless households in Pathankandi reported any reliance on fishing, only about 20% out of 15 households. Table 11 indicates other reasons as well. Share-cropping arrangements are available for landless households. These provide them with better income through the flooding season, when much of this share-cropped land is used for traditional deep-water *amon* or mixed *aus* and *amon* cultivation. Jute cultivation and harvesting is also widespread.

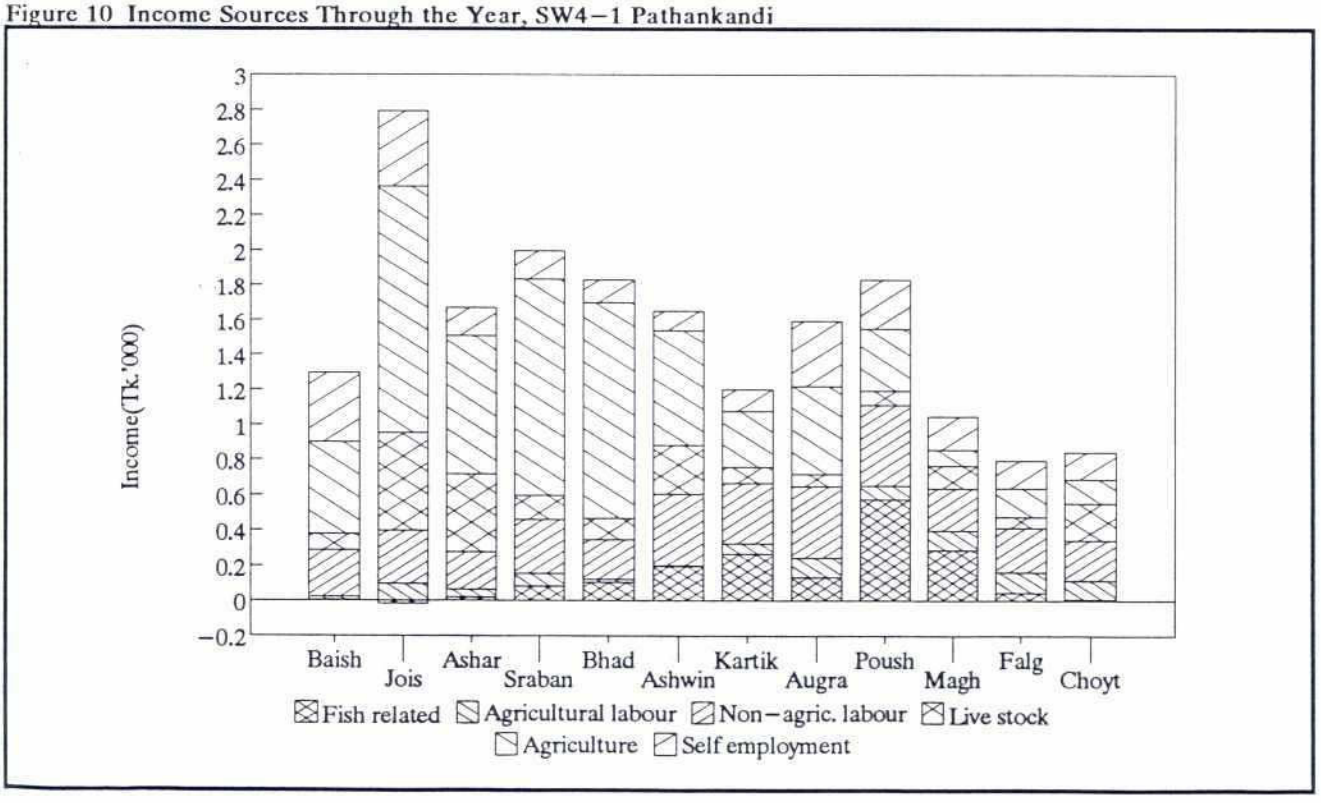
The other preferred option is to look for non-agricultural labouring jobs, often in Rajoir *thana* headquarters. A substantial number of community members also seasonally migrate out to Dhaka. They leave precisely at the time when fishing incomes are becoming important elsewhere.

Table 11 Income Sources Through the Year, by Landholding Category, SW4–1 Pathankandi

UNIT: TK.

LAND CAT.	ACTIVITY	BAISH	JOIS	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
Medium	Fishing	30	19	15	196	140	267	249	209	77	70	25	–	1,296	6.5
	Fish culture	–	(152)	–	–	–	(130)	(42)	(1)	1,168	563	196	4	1,606	8.1
	Small stock	6	12	17	52	4	18	11	10	6	29	21	9	196	1.0
	Large stock	72	80	28	37	30	–	–	–	–	–	–	958	1,204	6.0
	Agriculture	472	3,272	1,324	2,410	2,561	1,077	755	886	591	162	267	189	13,965	70.1
	Self employment	51	811	23	50	42	25	19	204	224	104	64	45	1,664	8.3
	Total	631	4,042	1,407	2,745	2,777	1,257	992	1,308	2,066	928	573	1,205	19,931	100
Small	Fishing	–	7	13	72	113	330	366	120	40	23	12	1	1,098	5.8
	Fish culture	–	–	–	–	–	(82)	(5)	7	433	285	5	14	657	3.5
	Agricultural labour	29	125	31	72	18	5	55	130	84	141	153	134	975	5.2
	Non–agric. labour	371	442	222	343	281	523	402	432	502	305	275	277	4,376	23.2
	Small stock	31	75	34	14	17	40	19	22	24	25	25	20	347	1.8
	Large stock	103	575	403	147	125	403	109	76	98	175	77	78	2,369	12.5
	Agriculture	714	1,267	870	1,248	1,130	592	251	499	381	119	190	131	7,393	39.1
	Self employment	61	375	145	147	134	93	66	133	163	137	114	109	1,677	8.9
	Total	1,309	2,866	1,718	2,043	1,818	1,904	1,263	1,419	1,725	1,210	851	764	18,892	100
Landless	Fishing	–	–	32	39	68	105	102	71	59	–	–	–	475	2.8
	Fish trading	–	–	–	–	–	–	–	–	171	–	–	–	171	1.0
	Fish culture	–	–	–	–	(6)	(2)	(21)	34	175	24	7	–	212	1.3
	Agricultural labour	12	87	113	115	20	14	91	133	111	101	108	102	1,008	6.0
	Non–agric. labour	165	147	312	403	232	367	409	577	643	232	328	251	4,065	24.3
	Small stock	5	61	7	12	12	–	3	19	6	11	10	8	155	0.9
	Large stock	–	550	672	86	110	49	49	10	19	–	–	–	1,544	9.2
	Agriculture	93	629	298	518	670	545	222	277	150	–	17	117	3,535	21.1
	Self employment	1,390	316	275	256	185	230	317	1,036	594	355	314	321	5,591	33.4
	Total	1,665	1,790	1,709	1,429	1,291	1,308	1,172	2,157	1,928	723	784	799	16,756	100
Village	Fishing	5	7	18	82	106	263	281	121	51	25	11	1	970	5.2
	Fish trading	–	–	–	–	–	–	–	–	43	–	–	–	43	0.2
	Fish culture	–	(23)	–	–	(2)	(69)	(15)	13	479	261	35	9	689	3.7
	Agricultural labour	20	96	47	72	16	6	56	111	78	110	118	105	835	4.5
	Non–agric. labour	262	300	211	306	226	404	343	403	462	240	247	228	3,630	19.6
	Small stock	21	62	25	19	14	26	13	20	17	22	20	15	275	1.5
	Large stock	72	493	414	115	107	251	77	47	63	104	45	193	1,982	10.7
	Agriculture	519	1,411	794	1,240	1,231	654	321	502	354	95	158	136	7,415	40.1
	Self employment	397	427	159	160	133	117	123	374	282	188	158	153	2,670	14.4
	Total	1,296	2,773	1,668	1,994	1,831	1,652	1,199	1,591	1,829	1,045	792	840	18,509	100

Figure 10 Income Sources Through the Year, SW4–1 Pathankandi



Source : FAP17 Socio–Economic Monitoring

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 that have often been more strongly affected by wider political and social changes than by changes in the fisheries resource due to flood control.

A better understanding of the impact of flood control measures on the livelihoods of "professional" fishing communities can be gained from the following indicators:

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.

Caution must be taken in interpreting migration data, for the following reasons:

- 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 those of 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 those most affected by the nationwide changes in fisheries access arrangements which have taken place over the last 40 years. In some situations, flood control has been a contributory factor to such changes.

Seasonality and 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 gears are designed for use on waterbodies with specific characteristics and to catch particular species. As the waterbodies change, the gears used on them must change also. 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

Patterns of waterbody exploitation are often due to long-term changes in the waterbodies themselves, the communities around them and the social structure of Bangladesh as a whole. 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 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.

Occupations and incomes

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 they are able to do this varies 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

Saraibari

Saraibari, located immediately next to the main village of Kafurpur is both the closest "professional" fishing community to Kafurpur and the one with which Kafurpur people interact most ; most of the *rajbangshi* fishermen in Saraibari fish on the submersible ponds in Chatal *beel* owned by Kafurpur farmers. As in Kafurpur next door, there was a sizeable Hindu community in Saraibari until the 1950s. Most of these were *namasudra* from various sub-castes, but only those involved in fishing elected to stay in Bangladesh.

Rajbangshi fishermen are generally associated with the exploitation of "closed" waterbodies, such as *beel*, *khal* and floodplains. From existing documents on the history of caste groups in Bengal and the stories told by members of the caste themselves, it appears that the *rajbangshi* are probably relative newcomers to fisheries, although they are now well-established as one of the most important fishing groups throughout the North-Central, North-

West and part of the South-West Regions. Indications are that, until sometime in the early 19th Century, they were a tribal group in the hills of north-western Bengal and eastern Bihar who then moved down onto the floodplains, found a niche for themselves as fishermen and have gradually entered the caste system. Such a niche may have existed in *beel* areas as most of the older castes of traditional fishermen, such as the *malo* and *barman*, were more concentrated on riverine fisheries.

The fishermen of Saraibari, who are almost entirely concentrated on fishing on Chatal *beel* and surrounding *khal*, seem to conform to this picture.

Kutibari

There are a total of 11 *malo* communities in the vicinity of Rajoir. In the past, these *malo* were apparently associated with the local *zamindar*, Bijen Babu, and fished for him on local rivers and *beel*. The numbers in these communities now seem to be greatly reduced, either by out-migration or changes in occupation.

Malo fishermen seem to be an "original" fishing caste. Nowadays, they are distinguished by being most active in fishing on rivers. In the past, when there were relatively few other people fishing, *malo* such as those in Kutibari would have worked for the local *zamindar*, either paying a yearly nominal revenue (*khajna*) or as *nankar* bonded to the *zamindar*'s family. All year round, they would have fished the rivers and *khal* and then, during the drawdown and dry season, moved onto the *beel* to harvest them. In the case of Kutibari and the nearby *malo* community in Dighirpar, the fishermen were closely linked with Bijen Babu, a *zamindar* living in Rajoir. Both communities still live amid the ruins of the old houses of the family.

As competition for fisheries resources has increased, *malo* have tended to be forced more and more onto the riverine fisheries where only they possess the large gear and the skills necessary to exploit the fisheries. Kutibari fishermen's current speciality is the *veshal* (liftnet) fishery on the local *khal* although they once covered far wider areas as they followed the seasonal movement of fish.

3.3 Migration

Table 12 shows the numbers of households migrating from the two fishing communities over the last 40 years, with the timing and causes ascribed by respondents in the communities.

Table 12
Saraibari and Kutibari
out-migration of fishing households - 1950s to 1993

VILLAGE	Saraibari		Kutibari	
Timing	**nos. H/H migr. out**	**Reasons for migration**	**nos. H/H migr. out**	**Reasons for migration**
before 1950	7	(moved to India) • Partition	0	-
1950-1970	0	-	0	-
1970-1980	3	(moved to India) • communal conflict • Independence	1	• alternative work
1980-1990	1	(moved to India) • increased competition for fisheries resources	1	• marriage into neighbouring village
1990-1993	1	(moved to India) • communal conflict	0	-

Source : FAP17 Village Appraisals

It can be seen that there has been considerably greater out-migration from Saraibari than from Kutibari, although by far the most important part of this migration occurred immediately after the Partition of India and Pakistan in 1947. The bulk of migration has been to India with one case, from Kutibari, of a household moving to another nearby fishing community, Kashimpur, as a result of marriage. While political changes and communal conflict have played the leading role in migration decisions, changes in the fisheries resource also contributed. In particular, the increase in non-traditional, Muslim fishermen and consequent competition for resources, in which the minority Hindu fishermen find themselves at a considerable disadvantage, has had an important influence.

These figures on migration from these two Hindu communities acquire significance when seen in the context of migration from other surrounding communities. Kafurpur and Saraibari both contained large Hindu communities prior to 1947, practically all of whom left at the time of Partition. At least 20 households from different castes, including three *brahmin* families, left for India from Kafurpur and, subsequently, the remaining *koibarta das* community has been steadily dwindling as groups of families leave, either to West Bengal or, recently, to move to Jessore or Dinajpur. The thirty *namasudra* families previously living in Saraibari left for India in 1947.

Although Kutibari has not seen any very great change in composition over the past 20 to 25 years, some of the neighbouring *malo* communities have experienced greater change. Data on one of these neighbouring communities, Dighirpar, shows a somewhat different pattern from both Kutibari and Saraibari. No complete households have migrated but 12 individuals have left the village for India at different times since 1976. The reason for migration of these individuals has apparently been connected with the steady decline of fisheries as a viable occupation for this community. By contrast, from one of the other nearby *malo* communities, Dignagar, it is reported that more than 50% of the inhabitants migrated to India following Partition.

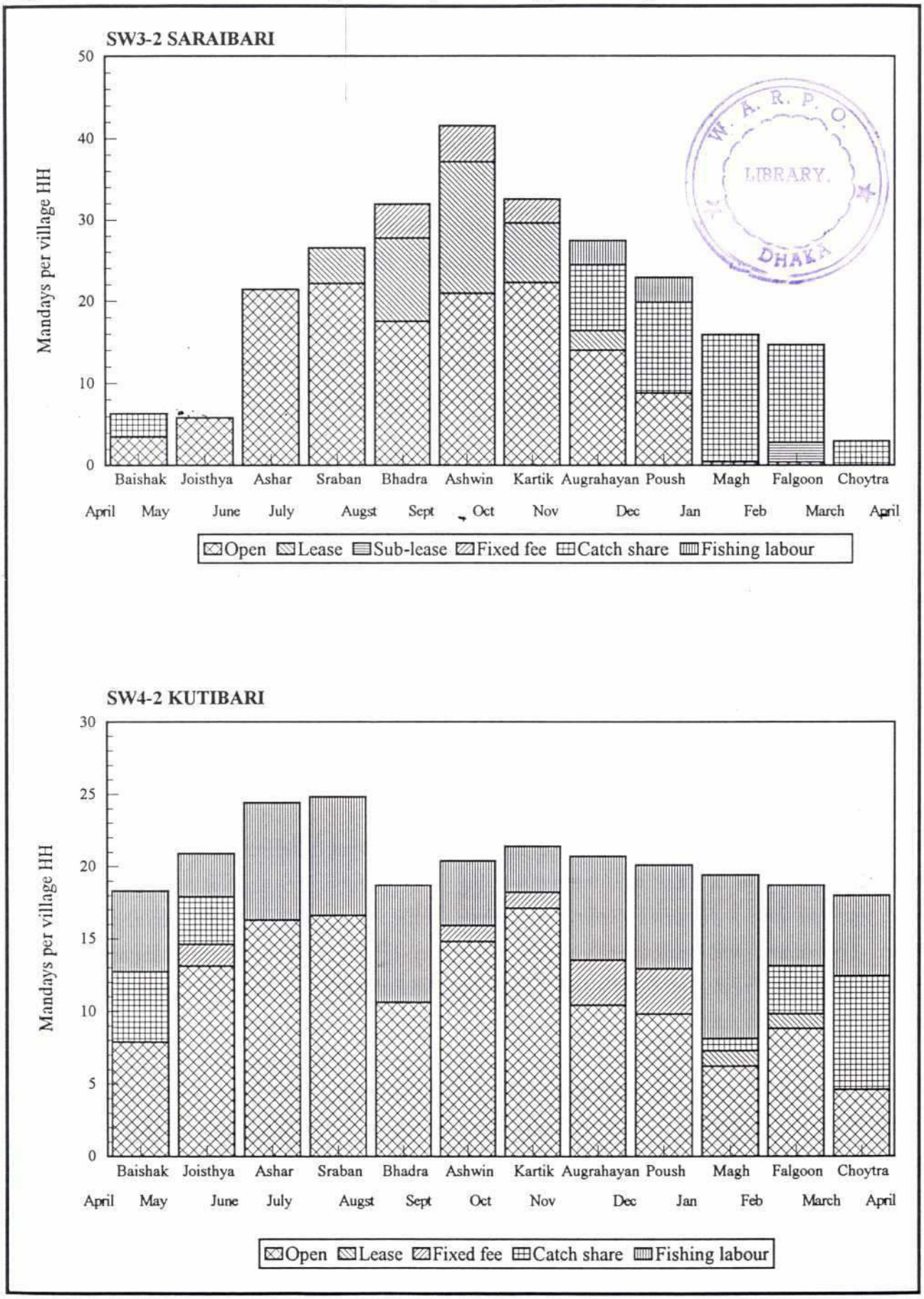
The variations in patterns of migration highlight the difficulty in coming to any clear conclusions about changes in fisheries and flood control impacts based on migration data from traditional fishing communities. It is very likely that changes in the condition of fisheries resources caused by flood control measures can influence migration decisions by many Hindu fishing households, but many other factors are as, if not more, important.

Taken as a whole, although there has been a higher level of migration of fishing households from Saraibari, inside the Chatla-Fukurhati Scheme than from Kutibari, located in a outside area, it is doubtful if flood control has had any significant impact on patterns of migration.

3.4 Fisheries access

The distribution of fishing effort in Saraibari and Kutibari under different types of access arrangement through the year is shown in Figure 11.

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



Source: FAP 17 Socio-Economic Monitoring

Saraibari

Until Partition, and the restructuring of patterns of land ownership in Chatal *beel* which followed, the *rajbangshi* fishermen of Saraibari seem to have had reasonably assured access to fishing grounds in the *beel*. The development of submersible *pushkunni* in the 1970s changed this and, though they still retained some access on a catch-share basis, they have been forced to seek alternatives where their "tenure" over the fishery is more secure.

Their success has been mixed. The households from the *majumdar gusti* have obtained the lease for a series of *veshal* (liftnet) sites on Saraibari *khal* from the Saraibari mosque committee for a yearly fee, which now stands at Tk.26,000. But the *biswas* households remain dependent on the adjacent floodplain areas, such as Barrakanda and Kamardanga *chak*. Here they face competition with Muslim fishermen from Kafurpur, but the area of floodplain open to them still seems sufficient to sustain high levels of effort.

During the drawdown and dry season, the scope for fishing in the floodplain and in the *khal* steadily reduces and progressively more of the remaining water areas come under controlled access. The *rajbangshi* fishermen seem to have established a particularly close relationship with the owners of some of the biggest ponds located in the deepest part of Chatal *beel*. These are regularly harvested by both groups of *rajbangshi* under a range of contractual forms common in agriculture. Many owners simply hire fishermen as labourers to maintain the ponds, place *katha* and harvest them. Others offer contracts on a catch-share basis. Some fishermen lease-in ponds directly and even cultivate small amounts of *boro* rice there as dewatering proceeds.

Kutibari

For the fishermen in the *malo* community in Kutibari, a somewhat different picture emerges. Unlike the *rajbangshi* of Saraibari, the *malo* living in 11 communities around Rajoir were joined together into a fisheries *samity* immediately after the abolition of the *zamindari* system. This *samity* was subsequently given preferential leasing rights over three separate *jalmahal* in Rajoir *thana*. The fishing rights to these *jalmahal* were then redivided among the fisheries *samity* members.

Whatever the original intent of this arrangement, it is described by local fishermen as being, at present, purely cosmetic. The *samity* still exists on paper and is still given preferential access to the leases for local *jalmahal* but is reportedly completely controlled by non-

fishermen who simply sub-lease out sections of the various *jalmahal* to the highest bidder. The enforcement of access regulation on all of these waterbodies which are nominally controlled by the local *samity* is apparently very lax. Most access to the rivers and *khal* is reported to be open. A few fishermen hold sub-leases, sometimes several times removed from the principal lessee. In these cases, access is not the main problem for the *malo* but the fact that there is **too much** access ; just as they are able to fish almost everywhere, so is everyone else in the area.

While fishing on smaller local *beel*, such as Amdoli and Chatla *beel* adjacent to Pathankandi, still plays an important role for these fishermen, they report similar problems to fishermen in Kafurpur. Access is increasingly being contested by local seasonal fishermen and landowners anxious to exert control over an increasingly valuable resource.

From Figure 11, the predominance of fishing on open access waterbodies can be seen. From the point of view of Hindu fishermen, open access means insecure access and this highlights the problems faced by them. The importance of fishing labour for the Kutibari fishermen is also clear. Some of this is in the form of hired labour on ponds, some working as *veshal* operators or members of *berjal* fishing teams.

Adapting to these new circumstances, some of the *malo* fishermen in the area have taken to fish culture. In Digirpar, a *malo* community near Kutibari, several of the wealthier fishing households started leasing in disused ponds in the area about eight years ago and stocking them with fingerlings caught in the nearby Kumar River. Aquaculture techniques were picked up from fish fry traders in nearby Tekerhat and from other fish culturists in the area. Much of the work as fishing labour, which now accounts for a significant portion of Kutibari fishermen's effort through the year, is labour on ponds. While Kutibari fishermen participate mainly as labourers, other fishermen with greater resources, such as some of the richer *malo* in Digirpar, have become involved more directly as lessees of ponds or managers on behalf of larger investors.

The historical processes influencing *malo* fishermen's access to fish resources are laid out in Figure 12.

The culture system adopted depends on the types of pond available. Submersible ponds on the floodplain may be "enhanced" by adding fry to the natural stocks. In ponds which are

safe from flooding, the *malo* fish culturists raise fish fry for sale, mostly from locally caught spawn, and then grow out residual stocks after the season for collecting fish eggs in local rivers has finished in early September.

Availability of ponds for leasing is already becoming a constraint for local people. Observation of the high returns has encouraged pond owners to culture their own ponds. Lease fees have risen considerably and lease periods progressively shortened from an average of 3-4 years to the present one or two. Outside investors are also affecting this by leasing in large numbers of ponds to feed the ever increasing demand for fish in the urban centres. While creating labouring opportunities by the intensification of pond culture methods, this is also pushing out local pond lessees from the fishing community.

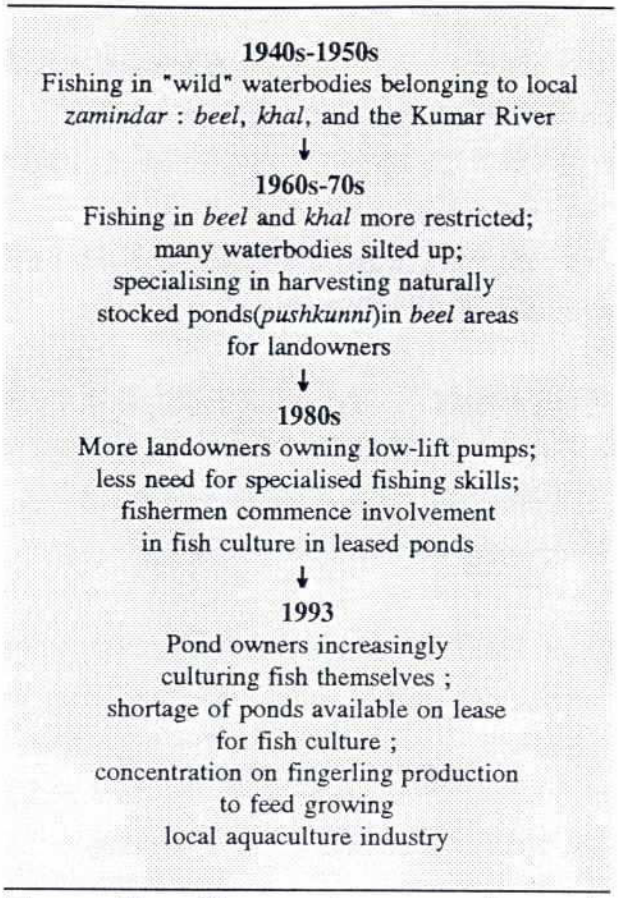


Figure 12 : Changes in access for *malo* fishermen in Kutibari

3.5 Seasonality and fisheries

The gear owned in the two communities emphasises the very different fishing strategies pursued by the two groups. As shown in Table 13, Saraibari fishermen have gear adapted to the exploitation of the three habitats at their disposal: *berjal* for fishing on the floodplain during the height of the floods, traps (called *doair* in the table but locally referred to as *gunni*) for the shallower ares of the floodplain and *veshal* for the *khal*. *Current jal* are probably even more extensively owned than indicated. An interesting feature of these ownership patterns is that a large proportion of the community owns **all** these major gears. This is a significant feature of the community which is also reflected in the intensity of fishing effort at certain times of the year.

The average yearly earnings listed, based on household monitoring, are suspiciously high. The incomes reported for Saraibari were among the highest for any landholding or fishing category in any of the FAP 17 study villages and were certainly inflated by respondents for reasons discussed in Section 3.6 below.

Table 13 Distribution of Gears, Saraibari

Gear Type	Bengali Name	No.	%	Tk.
Gill net	Current jal	9	36.7	5935
Seine net	Ber jal	15	64.2	8168
Lift net	Veshal jal	18	73.3	17857
Trap	Doair	20	82.5	17272
Hooks	Sip	4	18.3	2800
	Daun	2	9.2	15350
	Nol barsi	2	9.2	14730
Other	Akra	2	9.2	1850

Source : FAP17 Socio-Economic Monitoring

The distribution of fishing gear in Kutibari is shown in Table 14. The relative lack of access to floodplains is clearly indicated by the absence of *current jal*, traps and lines. The *veshal jal* are principally used on *khal* and rivers, while the *berjal* are used for harvesting *beel*, submersible ponds and *katha*. The *jhaki jal* is a traditional gear for the *malo* and can be used in a wide variety of environments.

Table 14 Distribution of Gears, Kutibari

Gear Type	Bengali Name	No.	%	Tk.
Seine net	Ber jal	5	31.2	7998
Lift net	Veshal jal	8	50.0	6395
Cast net	Jhaki jal	10	60.4	4921

Source : FAP17 Socio-Economic Monitoring

The data on fishing effort shown in Figure 13 further highlights these differences. This is emphasised by Table 15 which takes the principal combinations of gear and waterbody and shows the relative intensity of operation through the year.

Saraibari

The seasonal pattern of fishing effort in Saraibari mirrors, almost exactly, the pattern seen in the neighbouring Muslim village of Kafurpur. The main feature, as seen in Figure 13, is the seasonality of fishing effort which is concentrated into the period from *ashar* (June/July) to *poush* (December/January) - the period of flooding and drawdown of Chatal *beel*. This reflects Saraibari's relatively limited access to perennial waterbodies during the dry season.

The extremely high average per household fishing effort in the months of *bhadra* to *kartik*

(August to November) is explained by the involvement of several members of the household.

Effort, as shown in Table 15, is relatively evenly distributed between the principal gears, with both *veshal* (on the *khal*) and *berjal* (on submersible ponds) accounting for about 20% of overall fishing effort. Traps take almost 30% divided between *beel* and floodplain.

Kutibari

The fishing pattern for Kutibari, shown in Figure 13, reflects the less floodplain-reliant strategy employed by the *malo*. Fishing effort, at lower levels of intensity, is evenly spread through the year. The *khal* fishery with *veshal* and *jhaki jal* accounts for the most effort at almost 40% of the yearly household average. The harvesting of ponds, both cultured and submersible, with *berjal*, is the next single most important fishery, accounting for over 20% of fishing effort.

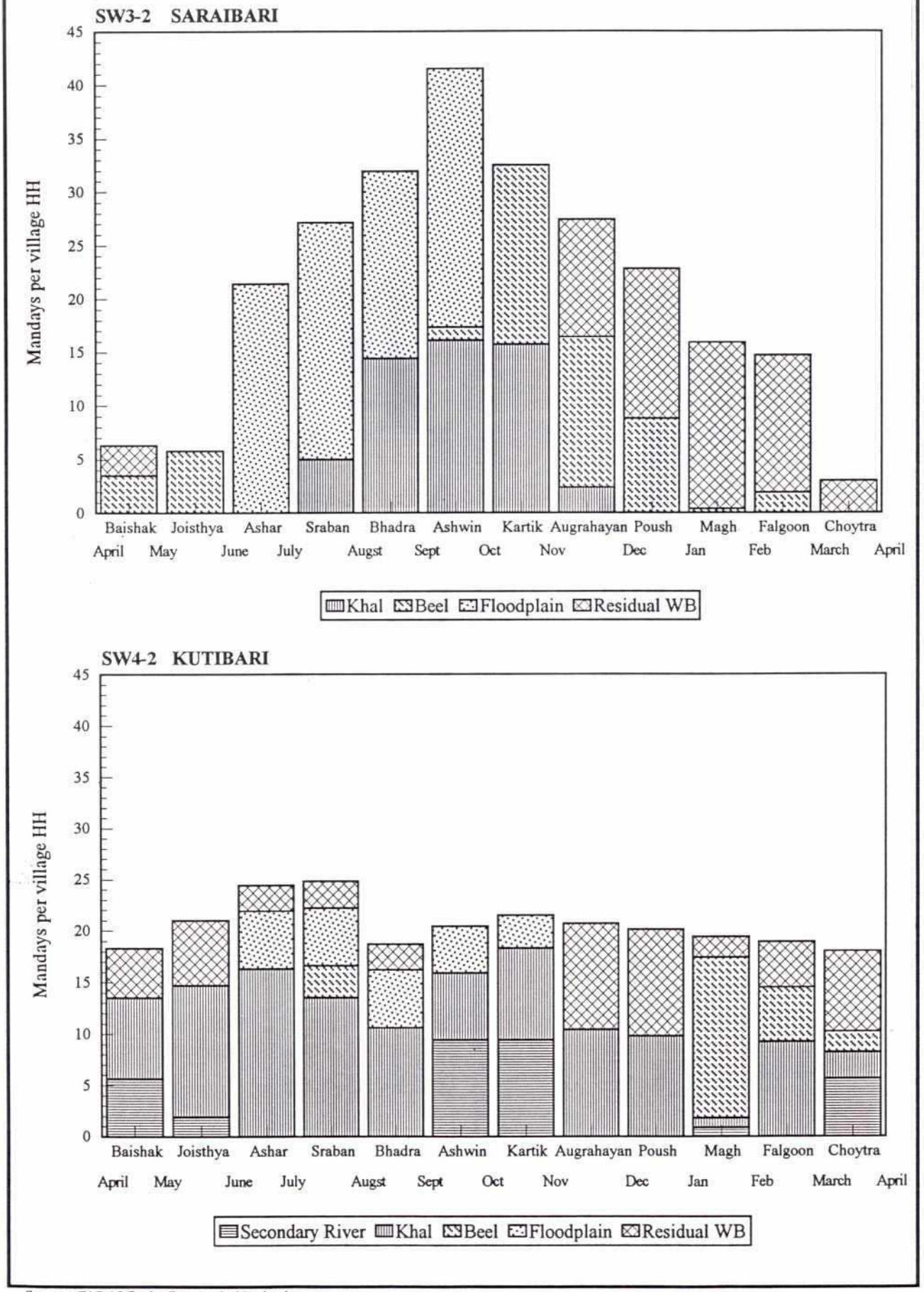
Beel fishing is limited to a short intensive period in the month of *magh* (January/February) when many Kutibari fishermen travel to work as labourers in *berjal* and other fishing operations on the extensive and heavily fished seasonal *beel* down to the Bagihar beel area. This seems to be have always been one of the traditional fisheries for the *malo* around Rajoir, although originally they would have been among the only fishermen involved. Now, the fishery is dominated by fishermen from Muslim farming and fishing communities in the area and various *namasudra* communities who have become extensively involved in fisheries. The importance of this fishery for Kutibari fishermen has considerably declined as a result.

Much of the secondary river fishing during the winter period is carried out by labourers on riverine *berjal* teams from other *malo* communities. The harvesting of *katha* (brush-piles) in the rivers is particularly important during this time.

3.6 Patterns of waterbody exploitation

In Kutibari, some of the larger gears used on the main rivers and large areas of open water on the *beel* have disappeared and fishermen have concentrated on smaller, more adaptable gears suited to a wider range of environments. *Jhaki jal*, while a traditional gear, is well-adapted to smaller and more marginal waterbodies and to the increasingly important pond-harvesting. The use of *veshal* to catch fingerlings to be kept live and sold to pond operators

Figure 13 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 15
Principal Gears, Use by Months and Waterbody

SW3–2 Saraibari — **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	2.8							5.8	9.5	15.5	12.8	3.0	49.4	19.7
Doiar	Beel	3.5	5.8				1.2	9.4	12.4	8.8				41.1	16.4
	Floodplain			11.0	10.9	3.6	5.2							30.7	12.3
Veshal jal	Khal				5.0	14.4	16.1	15.7	2.4					53.6	21.4
Daun	Floodplain			3.6	3.6	3.6	4.2							15.0	6.0

SW4–2 Kutibari — **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 labour	Floodplain			5.6	5.6	5.6	4.5	3.2						24.6	10.0
Ber jal	Residual WB	4.4	3.3						3.1	3.1	2.0	4.1	5.1	25.1	10.2
Ber jal labour	Residual WB		3.0	2.5	2.6	2.5			7.2	7.2				25.0	10.1
Jhaki jal	Khal	5.6	9.3					2.1	10.4	9.8	0.9	3.5	2.6	44.3	18.0
Veshal jal	Secondary River						9.4	9.4						18.8	7.6
	Khal		1.5	13.7	13.5	10.6	6.5	6.8						52.6	21.3

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

is another example of the adaptation of a traditional gear to changed circumstances.

The patterns of exploitation of local fisheries resources in the two mainly agricultural communities of Kafurpur and Pathankandi indicate that there have always been important differences in the size and productivity of local waterbodies. Chatal *beel* clearly dominates local fishing activities in Kafurpur while the smaller *beel* around Pathankandi support less intensive fisheries activities. An analysis of the fishing patterns in the two satellite fishing communities, Saraibari and Kutibari, helps to explain this pattern.

Saraibari

For the *rajbangshi* fishermen of Saraibari, Chatal *beel* has always represented by far the most important single waterbody for their fishing activities, with the surrounding floodplains (*chak*) and nearby *khal* playing an important seasonal role. The range of waterbodies exploited has undergone little significant change over time. Fourty years ago fishermen would occasionally move out onto the main Padma River during the period of the *ilish* (hilsa) fishery from *ashar* (June/July) to *ashwin* (September/October). This has been discontinued largely because there is now such intense competition on the river. Large numbers of farmers and labourers along the banks of the Padma and Arial Khan Rivers are intensively engaged in *sangla jal* (clap net) fishing right through the peak floods.

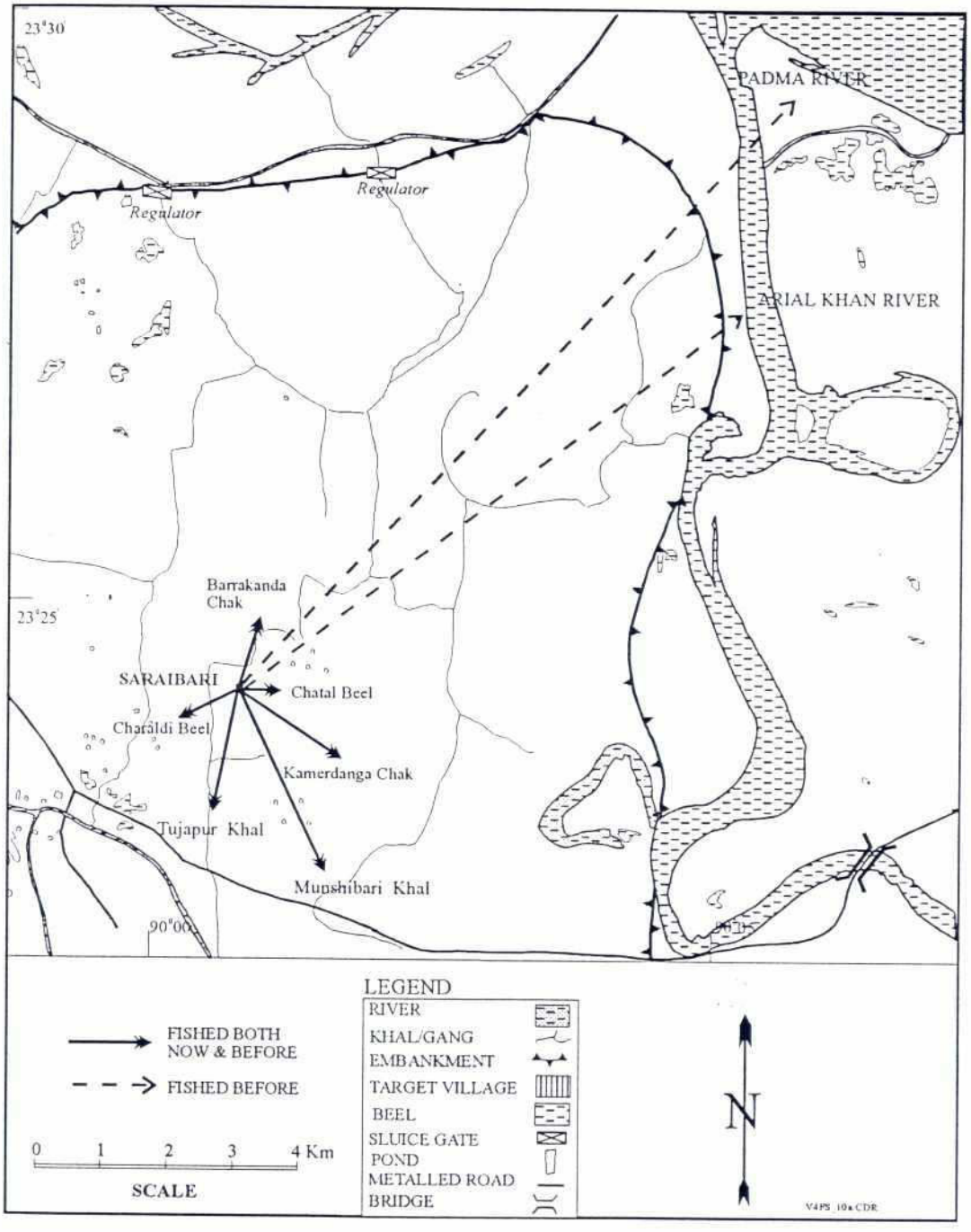
Fishermen in Saraibari have had to adapt primarily to changes in the depth and duration of perennial water in Chatal *beel* and the increasing prroportion of the catch taken by newly excavated submersible ponds. Larger-mesh *berjal* have been replaced by small fine-mesh *chapa jal* which can be used both in shallower floodplain areas and in submersible ponds. *Veshal* is a traditional gear which continues to be used on the *khal*. *Gunni* (traps) have always been used to some extent but have become more important as the area of deep *beel* available for fishing has reduced with the excavation of submersible ponds.

The current and past fishing grounds for Saraibari are shown in Figure 14.

Kutibari

The range of waterbodies exploited by the Kutibari community reflects their historical position as *malo* caste fishermen patronised by the local *zamindar*. Access to main river fisheries has declined as local *malo* have concentrated more on the developing pond fisheries.

Figure 14
Saraibari
Principal waterbodies fished: past & present



The range of traditional fishing grounds has reduced. Under the *zamindari* system, and in the context of more limited competition in fisheries, the *malo* were able to move more freely after the shifting fishery resource. Now choices are more limited. Access to Amgramer *khal* and Baghiar *beel* is more restricted as it is now controlled largely by local landowners with no particular ties to the *malo* fishing community.

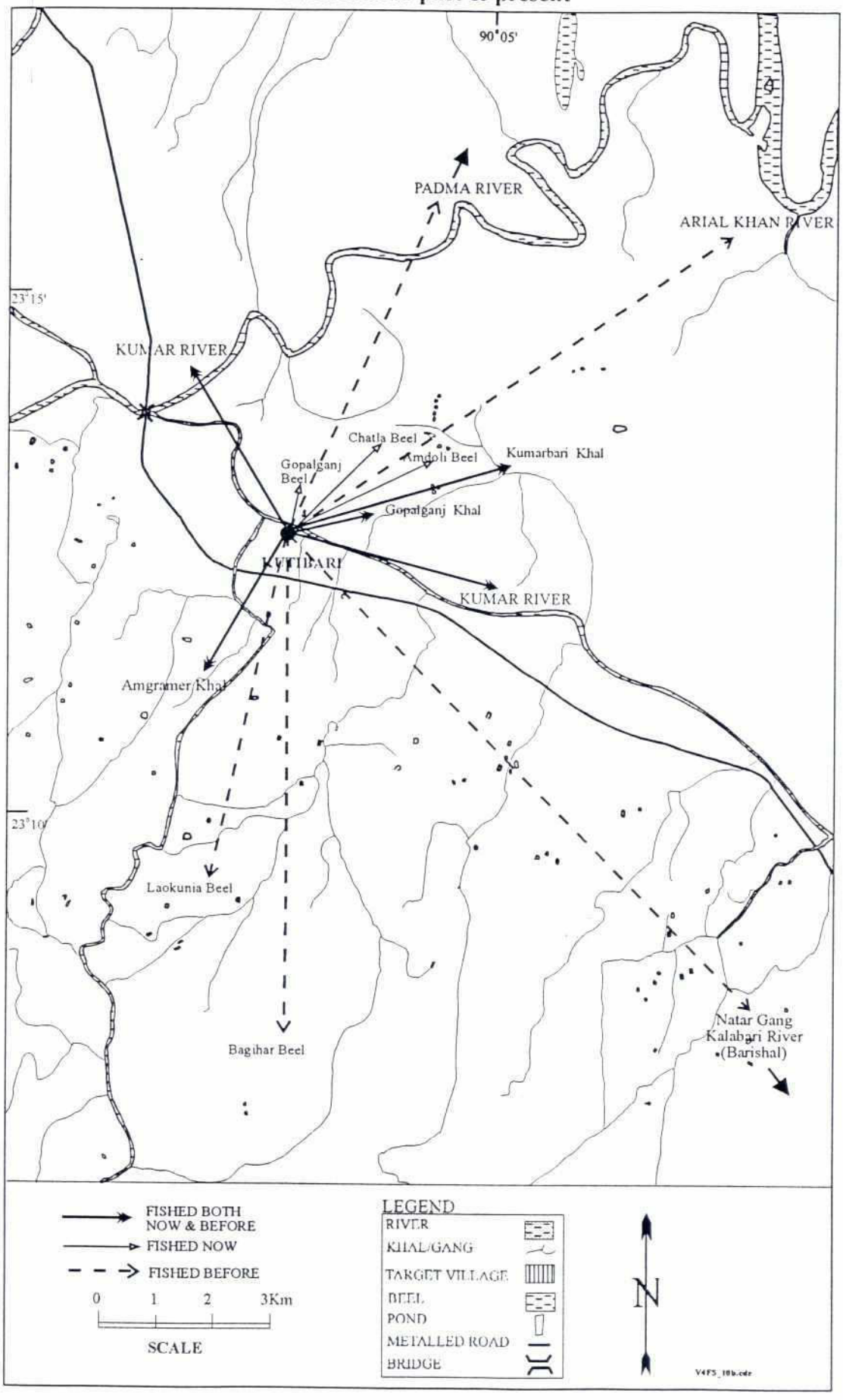
The fact that one of the *malo* fishermen's most important fishing grounds, in Baghiar *beel*, was a largely **seasonal** waterbody undoubtedly influenced events after the end of the *zamindari* system. As waterbodies were redefined and reallocated, most of the areas of seasonal waterbody in Baghiar *beel* and in many other *beel* in the vicinity have been distributed and "settled" as cultivable land. Of the areas traditionally fished under the *zamindari* system, the Kumar River and other local *khal* continued to be allocated, at least theoretically to a fisheries cooperative which included members from all 11 *malo* fishing communities in the area.

Fishing on other areas has not stopped entirely, but the changed status of *beel* areas has encouraged a steady growth in the number of local farmers and labourers fishing seasonally there during the period of indundation. This has progressively limited the fishing activity of professional fishermen and they have found themselves more and more reliant on the Kumar River and a few local *khal* such as the Kumarkhali and Gopalganj *khal* near Pathankandi. All of these *khal* are reportedly silting up seriously and catches are decreasing steadily.

Although they continue to fish on many of the local *beel* and floodplains, it tends to be for shorter periods and the activity of Kutibari fishermen in the *beel* is now more concentrated on harvesting submersible ponds as well as the numerous cultured ponds developing in the region.

The waterbodies exploited by Kutibari fishermen in the past and at present are illustrated in Figure 15.

Figure 15
Kutibari
Map showing principal waterbodies fished: past & present



3.7 Occupations and incomes

In both fishing communities studied, diversification out of fisheries has been very limited.

In Saraibari, fishermen are able to use their access to leased submersible ponds in Chatal *beel* to grow some *boro* rice and jute which brings in additional income during the period from *joisthya* (May/June) to *bhadra* (August/September). The data obtained from the community on fisheries income has been greatly exaggerated by respondents, making it difficult to judge the real significance of this agricultural income, but it probably plays a fairly important role during the early flooding season.

In spite of repeated cross-checking, the levels of fishing income reported by the *rajbangshi* fishermen of Saraibari, as shown in Table 16 and Figure 16, do not seem credible. Even taking into account the possibility that catches during 1993/94 were exceptionally good due to the breaching of the Chatla-Fukurhati embankment, the earnings per man-day fishing as recorded are over Tk.1,000 for sustained periods during the month of *ashwin* (September/October) for some households. Total average household fishing incomes of Tk.41,675 would make them better off than most medium farming households. The suspicion surrounding efforts by a private company to lease the entire *beel* for "fisheries development" (described in Section 2.5) may have encouraged overreporting, particularly as many respondents believed that FAP 17 field staff were associated with this development. Their hope may have been to improve their bargaining strength in any discussion of compensation.[2]

However, even if the **scale** of earnings has been exaggerated, the **pattern** is probably correct and an essential point can be made about fisheries in Chatal *beel* : they are very productive and have attracted, and apparently sustained, intensive fishing effort by both the fishermen/farmers of Kafurpur and the traditional fishermen of Saraibari. The intense seasonality of earnings is also highlighted by the data presented in Table 16 and Figure 16.

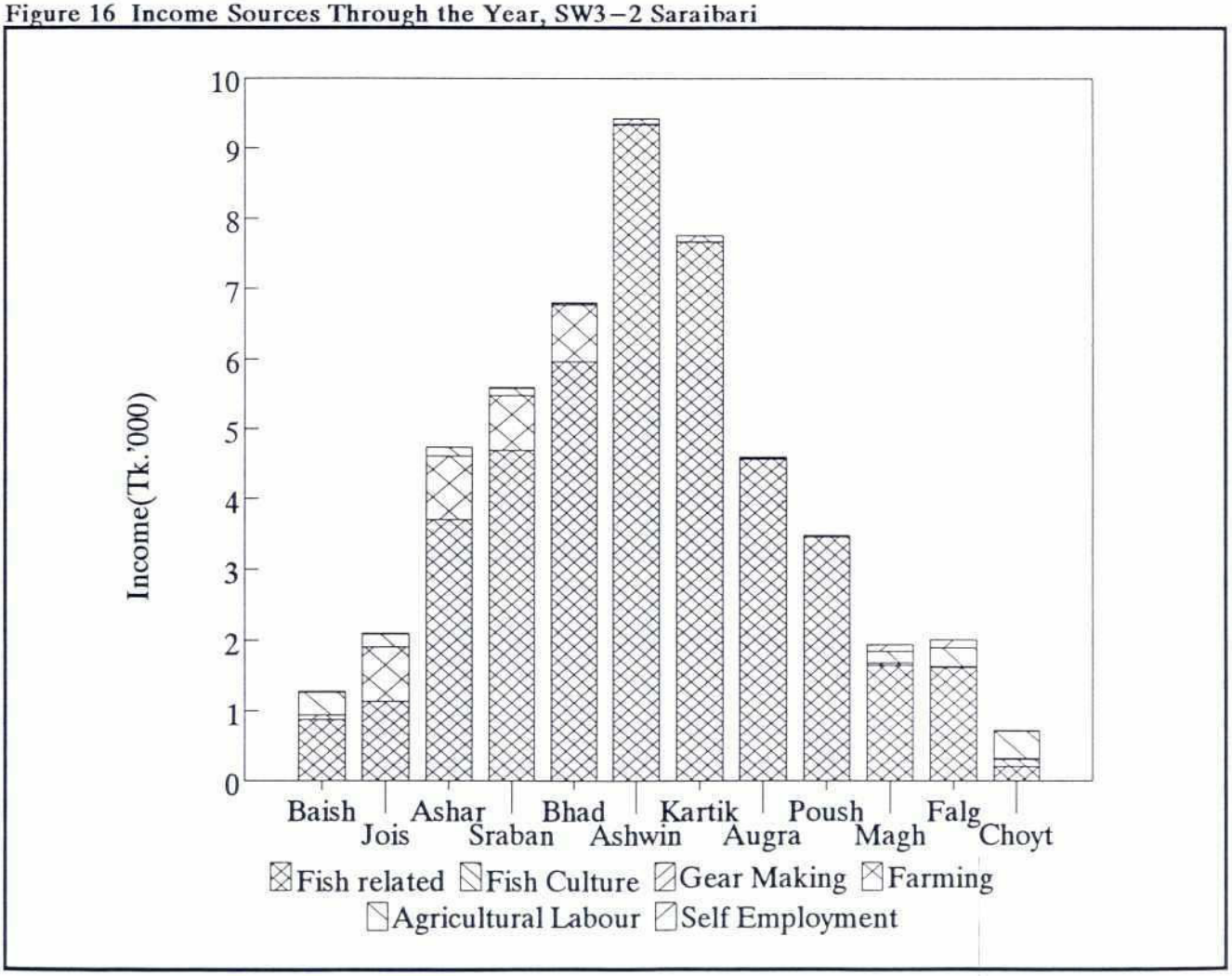
Involvement in fish trading is relatively limited in Saraibari, although it acquires some

[2] It should be noted that incomes in Kafurpur, the neighbouring main village where many people also fish professionally, do not seem to have been exaggerated in the same way. Though higher than usual, this reflects differences in effort more than in returns per man-day.

Table 16 Income Sources Through the Year, by Fishing Category, SW3–2 Saraibari UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOIS	ASHAR	SRABAI	BHAD	ASHWI	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC2	Fishing	870	1,130	3,534	4,474	5,770	9,017	7,119	3,678	2,612	1,652	1,619	200	41,675	82.6
	Fishing Labour	–	–	–	–	–	–	–	620	410	–	–	–	1,030	2.0
	Fish Trading	–	–	165	215	195	315	550	270	435	–	–	–	2,145	4.3
	Fish Culture	–	–	–	–	–	–	–	–	–	–	–	100	100	0.2
	Gear Making	–	–	–	–	–	12	12	14	14	–	–	–	52	0.1
	Farming	66	775	913	796	808	70	77	12	11	30	11	16	3,584	7.1
	Agricultural Labour	322	179	120	100	20	–	–	–	–	165	264	390	1,560	3.1
	Self Employment	15	13	7	13	12	7	1	2	2	93	110	13	287	0.6
	Total	1,273	2,097	4,739	5,598	6,805	9,421	7,759	4,596	3,484	1,940	2,004	719	50,433	100
Com–	Fishing	870	1,130	3,534	4,474	5,770	9,017	7,119	3,678	2,612	1,652	1,619	200	41,675	82.6
munity	Fishing Labour	–	–	–	–	–	–	–	620	410	–	–	–	1,030	2.0
	Fish Trading	–	–	165	215	195	315	550	270	435	–	–	–	2,145	4.3
	Fish Culture	–	–	–	–	–	–	–	–	–	–	–	100	100	0.2
	Gear Making	–	–	–	–	–	12	12	14	14	–	–	–	52	0.1
	Farming	66	775	913	796	808	70	77	12	11	30	11	16	3,584	7.1
	Agricultural Labour	322	179	120	100	20	–	–	–	–	165	264	390	1,560	3.1
	Self Employment	15	13	7	13	12	7	1	2	2	93	110	13	287	0.6
	Total	1,273	2,097	4,739	5,598	6,805	9,421	7,759	4,596	3,484	1,940	2,004	719	50,433	100

Figure 16 Income Sources Through the Year, SW3–2 Saraibari



Source : FAP17 Socio–Economic Monitoring

importance during the months from *kartik* (October/November) to *poush* (December/ January). In Kutibari, fish trading is practically the only activity other than fishing or fishing labour contributing to household livelihoods. For fishing category 2, fish trading is more important than fishing during the month of *bhadra* and *ashwin* (August to October) and in *magh* (January/February). The proximity of the village to the *thana* headquarters at Rajoir and to Tekherhat, an important regional fish marketing centre, undoubtedly encourages this. Some people in the community have also become involved in the fingerling trading which is increasingly important in the area as pond aquaculture develops. Fingerling trading combines well with *veshal* fishing activities in particular, as these are used to catch fingerlings of major carp species as they run up local rivers early in the flood season.

Income data for Kutibari is presented in Table 17 and Figure 17.

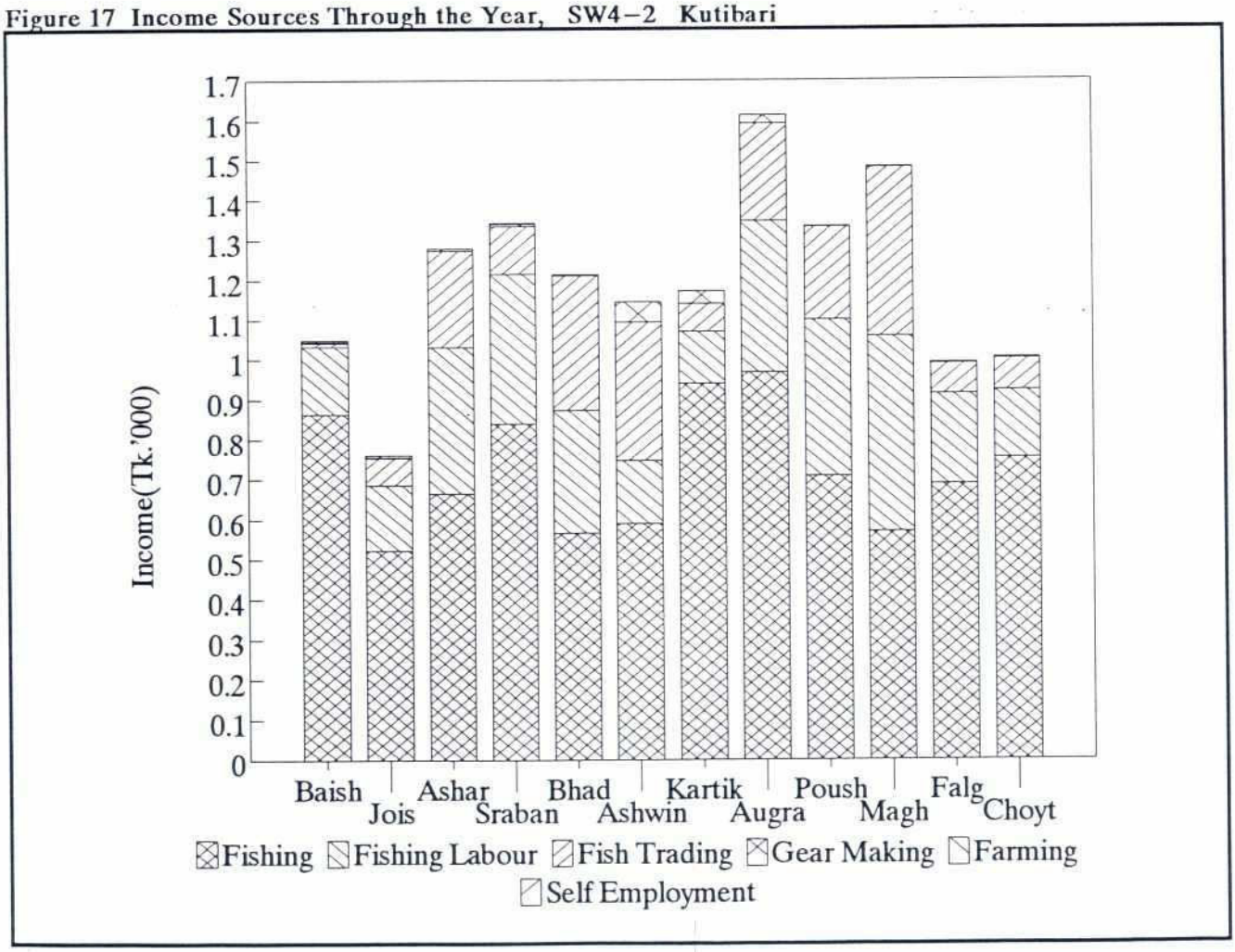
The monthly income flows in Kutibari fluctuate far less than those in Saraibari. The minimum is in *joisthya* (May/June) at Tk.762 while the maximum is in *augrahayan* (November/December) at just over Tk.1,600 while the average monthly income is about Tk.1,200. 15% of income comes from fish trading.

Unusually for fishing communities country-wide, those households which are **more** dependent on fishing, and heavily dependent on fisheries labour, which accounts for 46% over annual income, actually do better than those which are more diversified.

Table 17 Income Sources Through the Year, by Fishing Category, SW4–2 Kutibari UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABA	BHAD	ASHWI	KARTI	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	680	(26)	888	1,010	923	898	1,021	950	770	545	500	504	8,664	53.5
	Fishing Labour	450	435	675	700	520	420	350	775	810	1,308	600	450	7,493	46.3
	Gear Making	–	–	–	–	–	40	–	–	–	–	–	–	40	0.2
	Total	1,130	409	1,563	1,710	1,443	1,358	1,371	1,725	1,580	1,853	1,100	954	16,197	100
HFC2	Fishing	974	852	532	738	350	404	892	978	670	583	801	902	8,676	65.2
	Fishing Labour	–	–	180	180	180	–	–	142	142	–	–	–	823	6.2
	Fish Trading	17	108	388	189	538	555	112	392	371	677	122	127	3,595	27.0
	Gear Making	–	–	–	–	–	58	50	33	–	–	–	–	142	1.1
	Farming	3	3	–	9	–	–	–	–	3	3	3	3	29	0.2
	Self Employment	7	9	7	6	5	–	–	–	–	–	–	–	34	0.3
	Total	1,001	972	1,107	1,122	1,073	1,017	1,054	1,545	1,186	1,263	926	1,032	13,299	100
Com–	Fishing	864	523	665	840	565	589	940	968	708	569	688	753	8,671	60.3
munity	Fishing Labour	169	163	366	375	308	158	131	379	392	490	225	169	3,324	23.1
	Fish Trading	10	68	242	118	337	347	70	245	232	423	76	79	2,247	15.6
	Gear Making	–	–	–	–	–	51	31	21	–	–	–	–	104	0.7
	Farming	2	2	–	6	–	–	–	–	2	2	2	2	18	0.1
	Self Employment	4	6	5	4	3	–	–	–	–	–	–	–	21	0.1
	Total	1,049	762	1,278	1,343	1,213	1,145	1,172	1,613	1,334	1,484	991	1,003	14,385	100

Figure 17 Income Sources Through the Year, SW4–2 Kutibari



Source : FAP17 Socio–Economic Monitoring

4. CONCLUSIONS AND THE IMPLICATIONS FOR FUTURE FLOOD CONTROL SCHEMES

This study originally hoped to assess the impacts of the Chatla-Fukurhati Beel Drainage Scheme on fisheries through a comparison between villages located on similar agro-ecological areas inside and outside the scheme. But the major breaches in the scheme embankments combined with fundamental differences between the two areas and the communities which were selected for study, clearly pre-dating flood control, reduce the value of simple comparisons. However, the trends in fisheries and the changes which have occurred in both locations provide important indicators of processes taking place in floodplain fisheries. As many of these processes can be accelerated by flood control, the analysis of changes in fisheries in these two villages and their satellite fishing communities is useful in spite of the difficulties in making direct comparisons.

Trends in the socio-economics of fisheries exploitation

The socio-economic structure of fisheries in the South-West Region has always been somewhat different from that encountered in other parts of the country. To a large extent, this is due to the physical nature of local waterbodies ; most *beel* are seasonal and the area of water controlled by leaseholders or traditional fishing communities has always been limited. This has created a far more open fishery throughout the region than was encountered anywhere else during the course of the FAP 17 Fisheries Studies. Some rich fisheries, which in many other parts of the country would be subject to leasing arrangements or at least some kind of formal restrictions on fishing activity, are available for exploitation by practically anyone with a suitable net.

The situation is typified by Chatal *beel*, located inside the Chatla-Fukurhati Scheme. The fishery on the *beel* is very intense, and quite productive but, until relatively recently, there has been no formal restriction on who fishes there. This has encouraged an extremely broad-based involvement in fishing as a primary and secondary occupation for many people living around the *beel*. Landless households extract major benefits from this access arrangement, but small and even medium farmers are also heavily involved in fisheries.

In the context of the acute competition for all resources in rural areas, this freedom to exploit the fisheries resource at will is under threat. Submersible ponds excavated in *beel* and floodplains are providing a means for landowners to aggregate a greater proportion of

fisheries production. As an extension of this, the owners of these ponds are steadily imposing more and more restrictions on fishing on and around their ponds even when they are fully submerged during the floods. A progressive closing down of the open-access fishery is already underway as property rights to land are extended to the floodwaters above.

Traditional fishermen normally suffer as a result of open-access arrangements for fisheries. The leasing system, whatever its imperfections, at least ensures some limitation of fishing effort and more control over the resource for traditional fishermen. Where everyone can fish and competition is fierce, traditional low-caste fishermen belonging to a religious minority tend to find it most difficult to assert their rights to use of the resource. Fishermen in both study areas have adopted a range of strategies to deal with these changes. In Chatal *beel*, *koibarta das* fishermen from Kafurpur have moved into fish trading while *rajbangshi* fishermen from Saraibari are using a variety of fishing strategies to intensively exploit the very seasonal resources to which they have access. Around Kutibari, *malo* fishermen are still engaged in a more traditional pattern of fisheries, but are increasingly involving themselves in the management and harvest of both submersible and cultured ponds, which are rapidly developing in the area.

The flood control measures in the Chatla-Fukurhati Scheme have played a limited role in all of this. Access arrangements in Chatal *beel* were already open before the scheme was built and the movement of landless people into fishing seems to have been primarily in response to population increase, repeated disastrous flooding and the increase in landlessness which this encouraged. Changes in cropping patterns which were encouraged by flood control probably played a contributory role, but this should not be exaggerated.

Socio-economic status of affected groups and their dependence on fisheries

In comparison to other regions of the country studied by FAP 17, there is little social stigma attached to involvement in fisheries in either of the two village clusters dealt with. This factor, coupled with the lack of formal access restrictions, means that the degree of involvement of particular socio-economic groups in fisheries seems to be more closely correlated with the returns which can be gained from fishing. In Chatal *beel*, a rich fishery resource attracts many people into fishing. Returns are high and so levels of dependence are high with 44% of landless households' incomes coming from fisheries. Around Pathankandi, the resource is more limited, so fewer people fish and dependence is lower, less than 5%.

The traditional fishing communities studied appear to have been able to vary their approaches sufficiently to maintain an adequate living from fisheries. However, it is worth noting that most of the fishing communities in the area are very small, making it easier for them to find sufficient niches in the fisheries system to maintain their communities.

The involvement of fishing communities in aquaculture developments in the area is particularly interesting. As noted above, the development of submersible ponds is one factor contributing to the progressive narrowing of open-access fisheries opportunities on *beel*. To some extent, this is negative for traditional fishermen just as it is for landless seasonal fishermen. But open-access fisheries are not generally favoured by traditional fishermen as they tend to lose out in the competition with local farmers and labourers. Some fishermen have obviously been able to establish themselves as specialists in the field, particularly in the more extensive management of submersible ponds. Although very few fishermen own ponds, they are able to gain access to them through a variety of leasing, rental, catch-share and contract labouring arrangements which provide them with a greater degree of security than open-access fisheries.

However, the numbers of ponds available for leasing-in are limited and they cannot fully mitigate against changes in the capture fisheries resource, especially as more pond-owners become involved in the direct management of their aquaculture activities.

Implications for the Flood Action Plan

Given the greater liberty for a broad cross-section of rural communities to engage in fisheries in this part of the South-West Region, the impacts of any drastic reduction in fisheries resources or waterbodies containing them are likely to be considerable. There is obviously a significant number of rural landless and small farming households who obtain important seasonal income from fishing and the conservation of the resource on which they depend should be a high priority for any flood control plan.

The current conditions within the Chatla-Fukurhati Scheme suggest that it should be possible to achieve the desired effects on flooding and agriculture without destroying the fisheries resource. It is difficult to establish what the fishery in Chatal *beel* was like before the various flood control structures around it were in place. All respondents describe a significant overall decline in the resource, but this is a country-wide phenomenon which is common to both areas inside and outside flood control schemes. What is clear is that an important resource

still exists inside the scheme and that the scheme, although not entirely functioning, does provide adequate protection from most floods and facilitates increased agricultural production.

Another important implication for the Flood Action Plan is the development of submersible ponds, variously referred to as *kua*, *pukur* or *pushkunni*. These seem to develop in response to falling water levels in *beel* and the reduction of the area of perennial waterbody and therefore could be expected to proliferate inside flood control schemes which have these impacts on local *beel*. In many ways they reproduce the *beel* environment, by ensuring longer water-retention and more time for fish to grow before harvesting. However, as seen around both Kafurpur and Pathankandi, they also encourage their owners to make increasingly extensive claims on the fisheries resource which will probably eventually lead to the exclusion from the fishery of many of those who currently depend on it for at least part of their livelihood.

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 to describe fishing castes/groups

		Regions where term used		
bagdi	-	NC/SW	-	Hindu caste group apparently brought from West Bengal in the 19th century to work on indigo plantations. Involved in fishing in North-Central Region since Partition.
barman	-	NC/NW/ NE/SW	-	Hindu caste fishermen generally associated with riverine fishing. Very close to *malo* with intermarriage. Apparently a "genuine" fishing caste.

gain	-	SW	-	Hindu caste group in the South-West Region often, but not necessarily, involved in fishing. Apparently low sub-caste (*namasudra*).
haldar	-	NC/NW/SW	-	By **non**-fishermen, often used to refer to Hindu fishermen in general. By **non-riverine** Hindu fishermen, often used to refer to *malo* or *barman* Hindu caste fishermen who traditionally fish on the Padma and Ganges. Among *malo* & *barman* fishermen, used to refer to the "leading" fishermen or skipper of a riverine fishing team (**the** *haldar*). Exact usage of the term is clearly flexible but always refers to Hindu fishermen of some kind.
jala das	-	NC/NW/SW	-	Apparently a sub-caste of the Hindu *kaibarta das* caste fishing group. Distinguished from *halia das* who are *kaibarta das* who have turned to agriculture.
jele/jaola/ jeola	-	NC/NW/ NE/SW	-	Generic terms for fishermen used in different parts of the country.
jiani	-	NW/SW	-	Derogatory term used to refer to Muslim professional fishermen, particularly around Chalan *beel*.
kaibarta das	-	NC/NW/ NE/SW	-	Hindu caste fishermen, apparently found all over the country & possibly one of the biggest groups of traditional fishermen.
malo	-	NC/NW/SW	-	Hindu caste fishermen very close to *barman*.

namasudra	-	NE/SW	-	Hindu caste group, most commonly referred to in the North-East Region, particularly the Sylhet Basin, but also in SW. Often, but not necessarily, involved in fishing. Probably a generic term for a large group of *sudra* sub-castes.
nikari	-	NC/NW/SW	-	Usually used to refer to fish traders but occasionally used for Muslims involved in fisheries activities of any kind; trading, fish culture and fishing.
rajbangshi	-	NC/NW/SW	-	Hindu caste fishermen. Apparently relatively recent entrants to fisheries. Possibly a tribal group from Northern Bihar/West Bengal which moved onto the plains last century & took up fishing as occupation. Often, but not exclusively, fishing on "closed" water-bodies such as *beel* & floodplains.

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.
mahajan	-	NC/NW/ NE/SW	-	A very generic but very important term. Most 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.

Terms used to describe different types of waterbody

		Regions where term used		
beel	-	NC/NW/ NE/SW	-	Officially, a "backswamp" or depression, usually within a floodplain. 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.
baor	-	NC/SW	-	Oxbow-lake. Cut-off curve or meander of a river. Sometimes completely isolated, sometimes connected seasonally or at one end to the parent river. Also used for old river beds now far from the present course of the river which may **also** be called *beel*.
chak	-	NC/NW/ NE/SW	-	Floodplain. Often used for a **portion** of floodplain. Tends to be used for floodplains with fairly clearly defined boundaries.
danga	-	NC/SW	-	Man-made or natural ditch, usually in floodplain. Shallower than a *kua*. Used very commonly in North-Central around Manikganj. Often formed from borrow-pits where earth has been excavated for homestead mounds. Most common usage is for **high** land.
gang	-	NC/NW/ NE/SW	-	River. Colloquial word for *nadi* and therefore tneds to be used for smaller rivers.

gopat	-	NW/SW	-	Grazing land within homestead area of village generally under community ownership. In NE, also grazing area in *haor*.
halot	-	NC/SW	-	Depressed pathway running through village homestead area generally under community ownership. Dry pathway during the dry season also used for grazing livestock, flooded waterway during rainy season used for open access fishing.
jala	-	NC/NW	-	General term for waterbody, used for waterbodies like *beel*, *khal*, ponds but **not** for rivers. Comes from the word *jal* used in Hindu communities for water.
joar pani	-	SW	-	High tide.
kul	-	NC/SW	-	Same or similar to *baor*. Dead river or ox-bow lake. Most *kul* appear to be connected with the river at one end, but it is not clear whether this is a defining feature.
kua	-	NC/NW/SW	-	Man-made fish-pit excavated in the floodplain or *beel*. Deeper than a *danga*. In SW, sometimes used for borrow-pits near homesteads or roads.
khal	-	NC/NW/ NE/SW	-	Man-made or natural channel, small river or canal.
maital	-	NC/NW/SW	-	Small natural or man-made ditch. In NC & 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.
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.
pushkunni	-	NC/SW	-	Same as *pukur*. Used frequently in South-West Region.
rak	-	NC	-	Practically identical to *kumb*.
tala	-	NC/NW/ NE/SW	-	Bottom land. Used for the bottom of any wtaerbody i.e. a pond but often used for the lowest part of the *beel*.

Terms used for administrative divisions & human settlements

		Regions where term used	
mauza	-	NC/NW/ NE/SW	The lowest recognised administrative unit. It is **not** the same as a village. Some *mauza* in *beel* areas 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/ NE/SW	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.