FAP 17

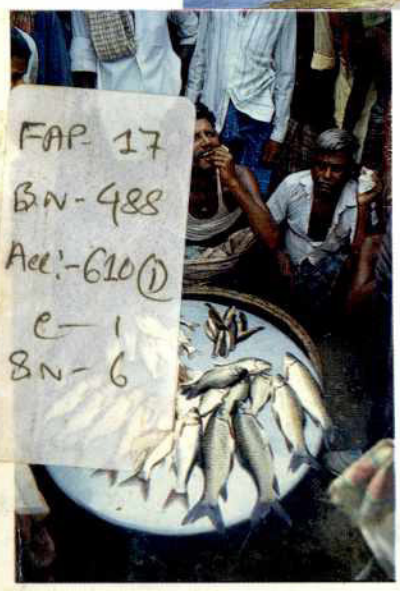
Fisheries Studies and Pilot Project

FINAL REPORT

(Draft)

JUNE 1994

Supporting Volume No. 16



VILLAGE STUDY

SATLA - BAGDA POLDER 1

Prepared for the Government of Bangladesh

FAP 17

FINAL REPORT

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** Draft **

VILLAGE STUDY

A-35

Satla - Bagda Polder 1

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FISHERIES STUDIES
AND PILOT PROJECT

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SUMMARY OF PRINCIPAL FINDINGS

1. Impacts of FCD/I on fisheries resources

The Satla-Bagda flood control drainage and irrigation scheme has impacted fisheries in a number of ways. The area and depth of flooding has decreased and fish production has reduced. Higher value migratory species, in particular, have been excluded from inside the project and the amount of fishing activity which the area attracts seems to have decreased. Certain species, particularly carp, and *sharputi* have reportedly declined in abundance since the construction of the embankment, but this is a general phenomenon not limited to the area inside the embankment.

Protection from seasonal flooding from outside *khal* is reported to have encouraged the growth of pond culture in the area. There are now about 25 ponds in the village Gopalsen as against 5-10 ponds a few years ago. Similar trends can be observed around the fishing communities of Chandtrisira and Nagirpar, located in the Polder 2 embankment to the east. Pond culture is also developing rapidly in the unprotected village of Gachapara although there it is limited to homestead ponds and borrow-pits.

2. Changes in fishing communities

The numbers of people involved in fishing has undergone a major change. Over the last 15-20 years, large numbers of Muslim farmers and labourers have been engaged in seasonal fishing during the floods and drawdown period. A sizeable number have taken up fishing practically all year round. This has been encouraged, above all by the rise in population, but also by the shift from *kharif* season agriculture, where peak demand for agricultural labour occurred during the period of the flood recession in October, to *rabi* season crops which absorb more labour during the winter months. As a result many labourers and small farmers are idle during the summer flooding season when fishing is an obvious alternative.

Although fishing is providing a significant proportion of the income of these underemployed agriculturists, seasonal out-migration and various forms of self-employment in petty trading and rural transport are more important.

The Hindu fishing communities which have a longer history of exploitation of the fishery resource in the area are tending to specialise in particular fisheries where they have some

comparative advantage. Traditionally they have tended to concentrate their effort on *khal* but many are now taking advantage of new opportunities to specialise in fish culture.

3. Changes in access

The area around the Satla-Bagda Project is characterised by a lack of major perennial waterbodies other than *khal*. The *beel* in the area are mostly seasonal with only scattered small areas of permanent water. As a result, there are no formal leasing arrangements on *beel* and floodplain and all access regulation is concentrated on the perennial *khal*. Access to these waterbodies is highly competitive. As the value of the fishery resource increases, leases have been largely taken over by *arotdar* involved in both fish trading and leaseholding. Very few "genuine" fishermen have direct control of leases but are dependent on sub-leasing arrangements from the primary lessees.

The concentration of controlled access on the *khal* has left extensive areas of floodplain, *beel* and residual waterbody free during the floods for open access fisheries, encouraging large numbers of local people to become involved. The first signs are emerging of restriction of this fishery by landowners excavating submersible ponds on the floodplain. The general interest in fish culture is such that more and more areas are liable to see extensive and intensive aquaculture development. In low-lying *beel* areas this will be at the expense of open-access fisheries.

4. Fishing in livelihood strategies

The community located inside the embankment i.e. the village Gopalsen has seen a decline in the contribution of fishing to the livelihoods of landless and small farming households. Fishing now accounts for only 4% of landless households' income in the village. Levels of dependence on fishing are far higher in Gachapara, with landless households relying on fishing for 10% of their income annually and up to 27% during the peak fishing period from August to September. For some medium farmers in both communities, fish culture is also providing considerable earnings. The levels of fishing dependence seen in Gachapara seem to be more typical of the area.

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 from 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 Satla-Bagda Project, 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
SATLA-BAGDA POLDER 1

1. DESCRIPTION OF AREA

1.1 Location

The Satla-Bagda Project is a major flood control and drainage scheme made up of three polders, covering about 18,000 hectares, and spread across parts of both Faridpur and Barisal Districts. The Polder 1 of the project is located between the Ghagar or Saildha River on the west and the Satla-Bagda *khal* (locally more commonly referred to as the Poysa *khal*) on the east. The construction of the main embankment was started in 1974 and finished in 1978, although work on the project as a whole was not completed until the 1980s.

The scheme was intended to improve drainage of the *beel* areas and provide protection against destructive flooding from nearby rivers during the wet season. Better drainage would enable the expansion of *rabi* season agriculture while flood protection would ensure the safety of *kharif* season *amon* crops.

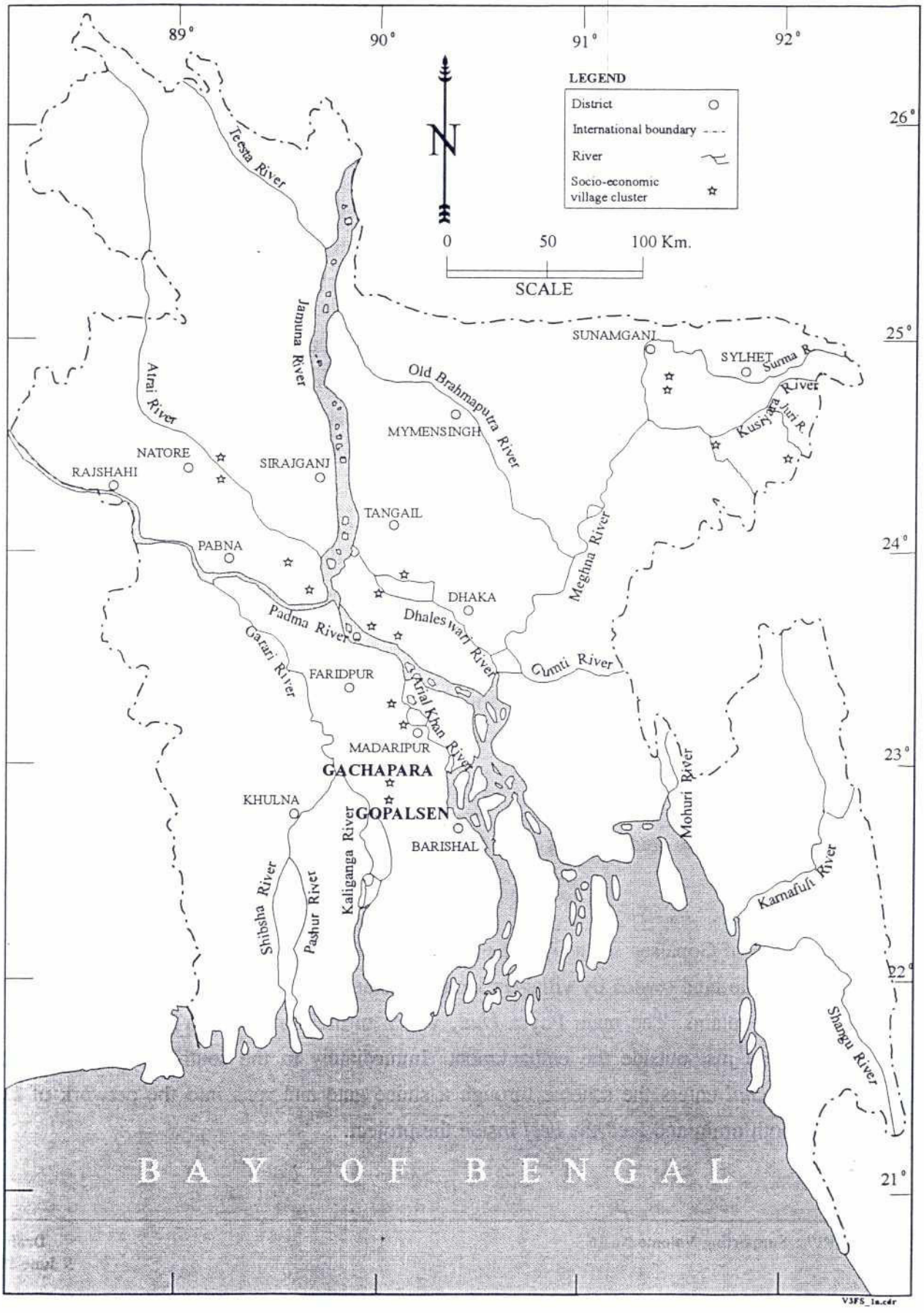
Two main villages were selected for comparison: one, Gopalsen, located inside the polder and another, Gachapara, just to the north of the project in an area unprotected by flood control.

The location of the study area is shown in Figure 1.

Gopalsen

The village of Gopalsen sits astride the Satla-Bagda Polder 1 embankment, with the bulk of the cultivable land owned by villagers located inside the scheme in the Amboila and Satla-Bagda floodplains. The main Poysa *khal*, which turns into the Satla River further to the south, runs just outside the embankment. Immediately to the south of the village, the Amboila *khal* enters the scheme through a sluice gate and runs into the network of *khal* which both drain and feed the *beel* inside the project.

Figure 1
Location of Gopalsen and Gachapara in Bangladesh



Two Muslim fishing communities were identified which fish in the *beel* and floodplain inside the Satla-Bagda Project and in other surrounding waterbodies. Chandtrisira is located on the opposite side of Poysa *khal* just inside Polder 2 of the Satla-Bagda Project while the fishing community at Poysa is actually outside the flood control scheme, just east of Poysa *ghat*.

Gachapara

Polder 1 of the Satla-Bagda Project is bordered, on the north, by the Ghagar *khal* which connects the Poysa *khal* with the Ghagar River and, further west, with the Madhumati. Just north of the river lies Gachapara, a large mauza made up of six hamlets or *para*. Just two of these *para*, the main Gachapara and Buzurirkona, were selected for study by FAP 17 as they represent a coherent community.

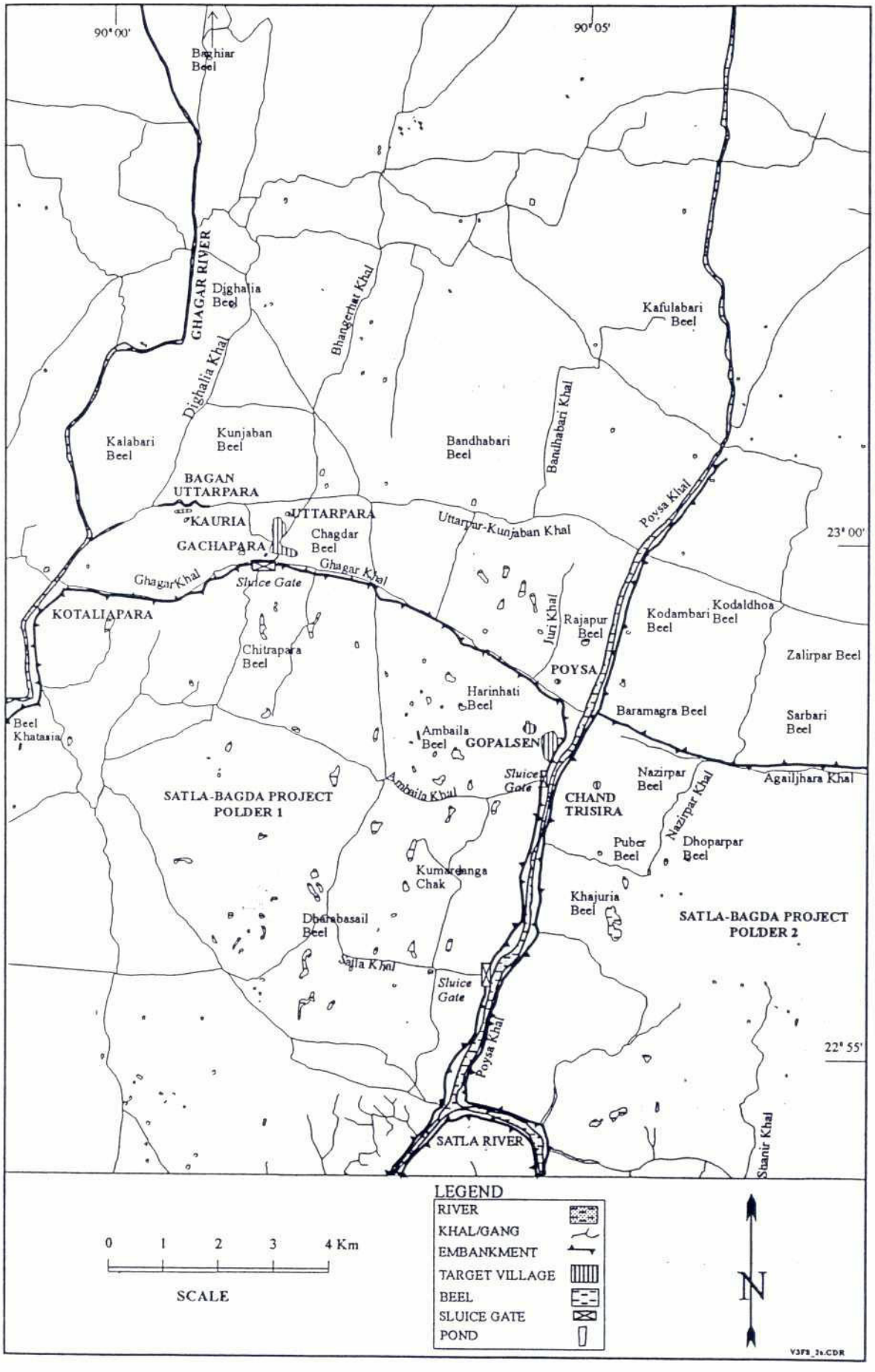
Three fishing communities in the immediate vicinity of Gachapara were selected as satellite fishing communities. Uttarpara is another *para* within the *mauza* of Gachapara itself. It is a small group of mixed Hindu and Muslim fishing households. This is, in fact, just one of a series of fishing communities, all called Uttarpara, stretching along the south bank of the Uttarpar *khal* and running through several adjacent *mauza*. One of the other satellite fishing communities, Bagan Uttarpara, is located slightly further to the east in the same series of fishing settlements while Kauria is a small fishing hamlet just next to Bagan Uttarpara. Both these two communities are Hindu *namasudra* communities.

The location of the main villages and the satellite fishing communities is shown in Figure 2 along with the principal local waterbodies. The naming of waterbodies proved difficult as almost every community has its own name for the waterbodies in its immediate area. Thus, villagers in Kauria called the neighbouring floodplain Kauria *chak* but in the next village along, Bailuhar, the same area is called Bailuhar *chak*. For some of the *khal*, this becomes even more confusing. The Poysa *khal* is called, at different points within the study area, Poysa *khal*, Rajapur *khal*, Mostafapur *khal*, Satla *khal*, Satla-Bagda *khal* and the Satla *nadi*. The names given on the map are those most commonly used in the FAP 17 study villages but are not intended to be definitive.

1.2 Community profile

Tables 1, 2 and 3 show the basic population data, religious structure and landholding

Figure 2
Satla-Bagda Scheme, location of study villages and local waterbodies, inside and outside



characteristics of the two village clusters. For the main villages, the data are disaggregated by landholding category while for the satellite fishing communities the households are grouped by fishing category. These categories are explained below.

The relatively high proportion of Hindu households in both the main villages is typical of the area which still has a sizeable Hindu population. In Gopalsen, Hindus and Muslims live in distinct clusters. Hindus were the initial settlers; Muslim settlement only began in the last hundred years.

Table 1
Gopalsen and Gachapara
Community Profile

SW1-1 Gopalsen **Main village** **Inside**

Land Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H Members	Earn members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
Large	1	40.0	4.0	12.0	2.0	100.0	0.0	20	1404	133	208	1765
Medium	18	49.2	4.4	7.1	1.8	61.1	38.9	12	354	27	11	404
Small	29	54.9	2.7	7.5	2.2	58.6	41.4	14	105	18	8	145
Landless	40	39.7	2.5	5.3	1.4	57.5	42.5	4	8	3	1	16

Source: FAP17 Village Census

SW2-1 Gachapara **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 Members	Earn members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
Large	7	55.9	4.4	9.3	2.4	71.4	28.6	55	936	87	82	1160
Medium	41	49.3	5.6	7.2	1.8	73.2	26.8	34	331	27	11	403
Small	99	43.3	3.5	5.8	1.5	69.7	29.3	15	90	10	3	118
Landless	176	41.2	1.9	5.0	1.3	84.7	11.4	5	8	3	0	16

Source: FAP17 Village Census

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

Table 2
Poysa and Chandtrisira
Community profile

SW1-2 Poysa — Satellite fishing community — Inside

Fish Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H members	Earn. members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
F1	4	33.3	0.5	5.3	1.0	100.0	0.0	1	39	3	0	43
F2	14	36.6	0.9	4.8	1.3	100.0	0.0	4	15	4	0	23
F3	4	36.0	0.0	5.3	1.8	100.0	0.0	11	128	14	0	153

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.

SW1-3 Chandtrisira — Satellite fishing community — Inside

Fish Cat.*	No.	Household Characteristics (Average)				Religious Breakdown		Average Landholdings (decimals)				
		Age H/H head	Years' educ. H/H head	H/H members	Earn. members	% Muslim	% Hindu	Homestead	Cultivable Land	Ponds	Other	Total
F1	5	36.2	0.8	5.2	1.0	100.0	0.0	10	0	9	0	19
F2	11	46.6	1.0	6.1	1.7	100.0	0.0	8	50	7	1	66
F3	1	45.0	0.0	6.0	3.0	100.0	0.0	8	10	2	0	20

Source: FAP17 Village Census

* Fishing categories are defined as follows:

F1 = Fishing as only source of income

F2 = Fishing as primary source of income but with other subsidiary source of income as well

F3 = Fishing as secondary source of household income.

Table 3

Uttarpara (Gachapara), Bagan Uttarpara and Kauria

Community profile

SW2-2 Uttarpara (Gachapara) Satellite fishing community — Outside

Fish Cat.	No.	Householding 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	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
F2	0	0.0	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0
F3	28	47.7	2.9	6.3	1.9	60.7	39.3	11	96	10	1	118

Source: FAP17 Village Census

SW2-3 Bagan Uttarpara — Satellite fishing community — 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	1	28.0	0.0	6.0	3.0	0.0	100.0	3	0	5	0	8
F2	19	46.7	1.4	6.2	1.6	0.0	100.0	8	76	8	0	92
F3	4	42.5	6.0	7.3	1.5	0.0	100.0	14	338	47	0	399

Source: FAP17 Village Census

SW2-4 Kauria — Satellite fishing community — 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	2	35.0	0.0	4.0	1.0	0.0	100.0	1	5	0	0	6
F2	14	44.1	0.9	6.1	1.6	0.0	100.0	8	66	5	0	79
F3	3	46.7	1.0	6.7	1.3	0.0	100.0	13	137	7	0	157

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.

An important feature of the land ownership data in the two main villages is the high level of pond ownership. As will be discussed later, the development of pond aquaculture is a particularly important feature of the fisheries system in both villages. While large and medium landholders have generally benefitted most from this development, small and landless households are also frequently involved where they own portions of larger ponds or homestead borrow-pits.

The land ownership status of the satellite fishing communities is also worthy of note. Most traditional fishing communities in Bangladesh are landless, with only a few of the important gear owners able to invest in land. But ownership of small plots of cultivable land is widespread among all the fishing communities studied except Poysa. None of the communities in the area are traditional caste fishing communities. Many of the Hindu communities involved in fishing are low-caste *namasudra* groups that have taken to fishing simply because they live in a remote and seasonally flooded area where historically there were few other livelihood options. The Muslim fishing communities studied have more recently become involved in fishing in much the same way.

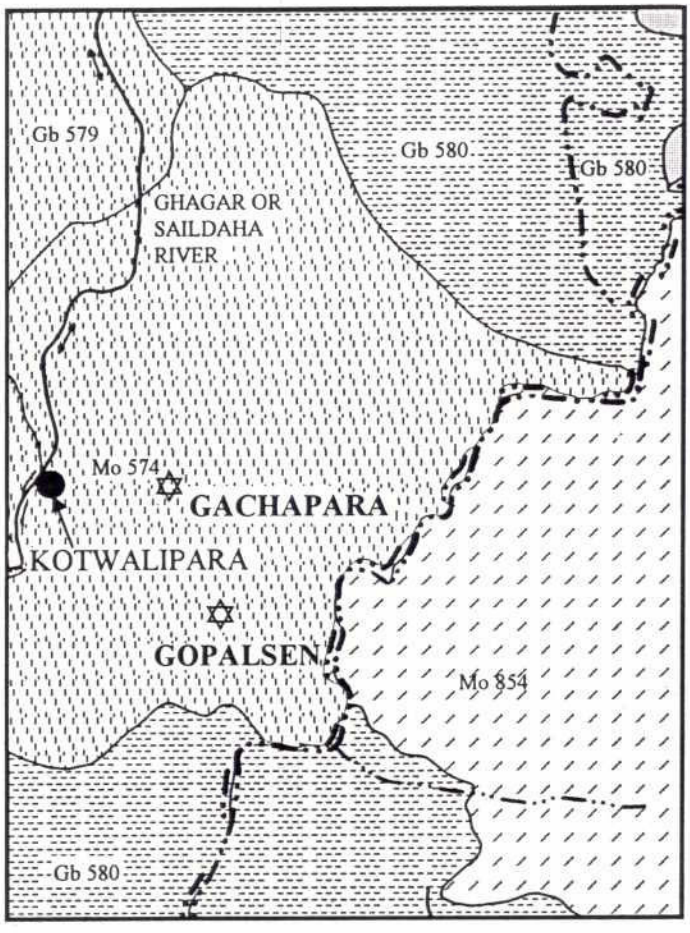
1.3 Agroecology

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

Figure 3
Gopalsen and Gachapara
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	
MO 574	0	0	26	72	2	IIIWw (75%)	One or two good to moderate rice crops per year in the monsoon season.	IIIWd (10%)	Two good to moderate rice crops & a dryland crop per year.

Source: FAO Land Resource Survey

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 Figure 3, the agro-ecological units immediately surrounding Gopalsen and Gachapara are shown. On the maps, AEUs are shaded according to their predominant flood phase while details of the particular AEU where target villages are located are given in the table below the map.

1.4 Floods

The Satla-Bagda Project is located in the Khulna-Gopalganj *beel* tracts, a lowland area characterised by peat swamps and below sea-level depressions. Tidal effects influence the area and, since the reduction of dry season water flows through the area due to the Farakka Barrage, some brackish water intrusion is reported.

The principal flooding comes from the rivers and *khal* flowing north-south through the area, which generally begin rising late in the month of *ashar* (early June). Most of the water feeding this flooding originates from the Padma and Arial Khan Rivers. Episodes of severe flooding are caused by the correspondence of peak flows through the system and high tides limiting the drainage of those flows into the Bay of Bengal to the south.

Due to tidal influence, general flows southwards are reversed on a daily basis even during peak flooding. This evidently has serious implications for flood control operation which has to account for daily as well as seasonal cycles. During the flood season in *sraban* and *bhadra* (June/July), regulators inside the Satla-Bagda Project were closed at high tide but opened at low tide to allow drainage of rainfall flooding from inside the scheme.

The entire hydrological system around the scheme has a long history of human intervention. Poysa *khal*, running down the east side of the project, is a man-made channel excavated in the 1930s as part of a programme to drain the surrounding *beel* areas. Parts of the Ghagar River (also known as the Saildha) running out of Bagihar *beel* to the north was reexcavated by the local *zamindar* from Rajoir in the late colonial period with a view to improving navigation and drainage. The Ghagar *khal*, also known as Monoshabari and Rastar *khal*, was excavated in 1892 apparently primarily to improve access and navigation. However, the rate of siltation of many of these *khal* and other waterbodies in the area has increased steadily.

Most of the principal *khal* have become shallower, particularly over the last 20-30 years. The construction of the Faridpur-Barisal highway to the north has greatly restricted water flows during the monsoon from the Arial Khan and the Farakka Barrage has caused a drastic reduction in dry season flows. One serious impact of this on local hydrology has been the intrusion of brackish water from the south. Patterns of land and water management in the area are now largely dictated by the necessity of excluding brackish water and flushing the soil with fresh water whenever possible.

Polder 1 has effectively eliminated flooding from the surrounding river and *khal* within the area of the project. However, rainfall flooding remains a serious problem as gravity drainage is practically impossible once the water levels in the *khal* outside the scheme rise above a certain level. Even with just rainfall flooding, the inside of the scheme is completely inundated with water during the rainy season, with only pathways and homestead areas remaining above water (based on 1993 experience). Although the depth of flooding within the scheme has been reduced by the embankment, the **area** of inundation has not apparently changed very much as the height differentials on the floodplain are very small.

The area around the outside village of Gachapara is reported to have generally experienced a slow reduction in water levels in most *beel* and *khal* due to siltation. The depth changes seem to range from one to two feet, which is slightly less than the changes reported inside the Satla-Bagda Project.

Some areas close to the Ghagar *khal* are reported to have been impacted by the construction of the polder. The northern embankment of the scheme, running along the south bank of the Ghagar *khal*, restricts drainage of flood water from the *beel* and floodplains around the village and, at some points, is said to be causing longer-lasting inundation. However, local level changes in hydrology caused by pathway and homestead construction also play a role in this. Due to a local road which blocks drainage into the Uttarpara and Ghagar *khal* Chagdar *beel*, located next to Gachapara, now has some areas of perennial water whereas before it was completely dried up during the winter . However, in 1988 the northern embankment of Polder 1 was breached in several places due to the build-up of pressure of floodwater on its northern side. According to local people, this greatly relieved the serious flooding which they were experiencing.

The direction of flooding is reported to be predominantly from the Poysa *khal* to the north and east, suggesting that most of the flood water is originating from the Arial Khan. People around Gachapara report that the general direction of water flow for them is from Poysa *khal* to the east into the Gaghar *khal* to drain out to the west.

1.5 Waterbodies and access

Tables 4 and 5 show the access arrangements covering the principal waterbody types in the area and some of the different access restrictions applied to various social groups.

Table 4

Gopalsen

Principal waterbodies and access arrangements

Waterbody	Control of waterbody	Leaseholders	Social & occupational groups involved in fishing
Amboila *khal*	**Official:** none **Actual :** unofficial control by landowners with land along the bank	None	Landowners setting *katha* - Small farmers and landless fishing during floods and drawdown - Some local fishermen from Poysa & Chandtrisira
Poysa *khal* (Barisal section)	**Official:** none **Actual :** unofficial control by landowners with land along bank	None	Landowners setting *katha* - Small farmers and landless fishing during floods and drawdown - Local Muslim fishermen all year round -
Poysa *khal* (Faridpur section)	**Official:** Land Revenue Office/ fisheries *samity* **Actual :** local fish trader/ leaseholder	Local fisheries *samity*	Landowners setting *katha* - Small farmers and landless fishing during floods and drawdown - Local Muslim & Hindu fishermen all year round -
Amboila *beel* & Satla-Bagda *beel*	**Official:** none **Actual :** control of fishing during drawdown & dry season by submersible pond owners	None	Landowners with submersible ponds during dry season - Small farmers and landless fishing during floods and drawdown - Local Muslim fishermen all year round -
floodplain	**Official:** none **Actual :** control of fishing during drawdown & dry season by submersible pond owners	None	Landowners with submersible ponds during dry season - Small farmers and landless fishing during floods and drawdown -

Source : FAP17 Village Appraisals

Formal controls of fisheries access in the South-West Region are restricted almost entirely to *khal* and rivers, due to the lack of any major perennial *beel* in the area. The areas referred to as *beel*, both inside and outside the Satla-Bagda Project are in fact almost entirely seasonal floodplains; they are often inundated deeply during the monsoon but most dry up completely during the winter leaving small and widely separated areas of residual water.

These residual waterbodies play an important role but they are not generally large enough to attract the kind of leasing arrangements seen on larger *beel* in the North-West and North-East of the country. Intensive fisheries in this area are therefore highly focused on the only other perennial waterbodies available: the *khal*. In the absence of major *beel*, these *khal* concentrate the fisheries resource from all the surrounding floodplains after the flood recession, making them highly productive and the subject of considerable competition.

Most of the major perennial *khal* are *khas* waterbodies controlled by the Land Revenue Department and leased by them through auctions. Both the Ghagar River and *khal* are divided into *touzi*, which correspond to individual *jalmahal* in other areas. Most of these *touzi* are minimally controlled by fisheries *samity* although, in the vast majority of cases, real control lies with powerful moneylenders or fish brokers. Links between the fish marketing system and leaseholding are particularly strong in this area with probably the majority of important *touzi* being controlled by local *arotdar* with *arot* in Poysa, Ghagar or even Tekerhat.

The District Council also directly controls some *jalmahal* and leases them in a similar way.

Formal leasing arrangements of this kind only apply on the sections of major *khal* which come under Faridpur District (Gopalganj and Madaripur *zila*). In Barisal, no leasing arrangements of this kind are in force, with the result that the Barisal sections of the Poysa *khal* running down the eastern side of the Satla-Bagda Project and the Poysa-Agailjhara *khal* are completely free of any formal leasing arrangements.

Smaller *khal* are mostly controlled by local union *parishad*. Leasing is generally by auction with proceeds given to local mosques and *madrassa* for their upkeep. These leases are generally controlled by union *parishad* officials or other local influentials.

Table 5

Gachapara

Principal waterbodies and access arrangements

Waterbody	Control of waterbody	Leasing & sub-leasing	Social & occupational groups involved in fishing
Ghagar *khal*/ Uttarpar-Kunjaban *khal*	**Official:**Land Revenue Office, Gopalganj / local fisheries *samity*- **Actual :** local fish trader/ leaseholders	**Lease :** *samity* **Sublease:**individual fishermen & local land-owners for *katha* -	Fishermen (Hindu & Muslim) placing *katha* and traps on sub-leased sites - Muslim fishermen spear fishing - subsistence fishing with *jhaki jal* & *borsi* by local people allowed
Baluhar *khal*/ other small perennial *khal*	**Official:** union *parishad*, subleased to mosque or *madrassa* - **Actual :** union officials & local influential farmers	**Lease :** local elites - **Sublease:** fishermen & local farmer/fishermen	Fishermen placing *katha* and traps on sub-leased sites - local fish trader/leaseholders arrange harvesting of *khal* sections & *katha* - subsistance fishing with *jhaki jal* & *borsi* by local people allowed
Ghagar/ Saildha River	**Official:** Land Revenue Office, Gopalganj / local & non-local fisheries *samity* - **Actual :** local fish trader/ leaseholders	**Lease :** *samity* - **Sublease:** fishermen & local farmer/fishermen	Fishermen (Hindu & Muslim) placing *katha* and traps on sub-leased sites - Muslim fishermen spear fishing - subsistence fishing with *jhaki jal* & *borsi* by local people allowed
Chagdar & other *beel* : floodplains	**Official:** private land / open access for fisheries **Actual :** open during flood season: some restriction on Hindu fishermen by local Muslim fishermen: restrictions during drawdown & dry season by submersible pond owners	**Lease/Sublease:** none	Fishermen (Hindu & Muslim) and subsistence fishing during flood season & drawdown: submersible pond owners harvesting ponds during dry season: fishermen harvesting ponds & residual waterbodies

Source : FAP17 Village Appraisals

Under both arrangements, sections of *khal* and river are then sub-leased to individuals or groups consisting of both fishermen and local farmers. There may even be several subordinate leases, fixed-fee charges or catch-share arrangements below this level leading down to the primary producer. *Katha* sites in the *khal* are the main subjects of sub-leasing arrangements, as well as locations for *veshal* (liftnets) and traps. Other gears, such as *koch* (spears), are either subject to a fixed-fee payment or an agreement regarding catch sale to the leaseholder at an agreed price.

Most *beel* and floodplains are privately-owned land and fishing when they are flooded is nominally open access. Landowners who own submersible ponds, locally referred to as *pukur* or *pushkunni*, in floodplain or *beel* areas or who own the land on or around small residual waterbodies, start imposing restrictions on fishing activity on and around the ponds during the drawdown. The severity of such restrictions varies considerably.

2. FISHERIES IN GOPALSEN AND GACHAPARA

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 ?

2.2 Patterns of fisheries involvement

From the ranking of different sources of household income shown in Table 6, a major difference is observed between Gopalsen and Gachapara. In Gopalsen, only one landless household reported fishing as a source of income, and then only secondary. By contrast, in Gachapara, 14% of all households reported fishing as a primary or secondary source of income. Fishing was reported as a **primary** source of income by 17 landless households.

Table 6
Gopalsen and Gachapara
Ranking of sources of household income
by landholding category

SW1-1 Gopalsen **Main village** **Inside**

Land Cat.	No.	First Rank Occupation *					Second Rank Occupation **				
		Farm	Fish	Lab	Trade	Other	Farm	Fish	Lab	Trade	Other
Large	1	100.0	0.0	0.0	0.0	0.0	00.0	0.0	0.0	100.0	0.0
Medium	18	38.9	0.0	5.6	50.0	5.6	55.6	0.0	5.6	27.8	5.6
Small	29	27.6	0.0	17.2	48.3	6.9	55.2	0.0	3.4	27.6	3.4
Landless	40	0.0	0.0	50.0	35.0	15.0	45.0	2.5	15.0	5.0	10.0

Source: FAP17 Village Census

SW2-1 Gachapara **Main village** **Outside**

Land Cat.	No.	First Rank Occupation *					Second Rank Occupation **				
		Farm	Fish	Lab	Trade	Other	Farm	Fish	Lab	Trade	Other
Large	7	85.7	0.0	0.0	0.0	14.3	0.0	0.0	0.0	28.6	14.3
Medium	41	65.9	0.0	0.0	4.9	29.3	34.1	7.3	4.9	12.2	26.8
Small	99	10.1	3.0	17.2	10.1	58.6	60.6	9.1	16.2	2.0	8.1
Landless	176	0.6	10.2	42.6	6.8	39.8	22.7	6.8	23.9	4.5	13.6

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 7 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. There was a general tendency to underreport fisheries income until respondents were reasonably familiar with field staff.

Table 7
Gopalsen and Gachapara
Gear ownership and average annual
income from gear types and landholding category

SW1-1 Gopalsen **Main Village** **Inside**

Gear Type	Bengali Name	Medium Farmers			Small Farmers			Landless		
		No.	%	Tk.	No.	%	Tk.	No.	%	Tk.
Gill net	Koi/Fashi jal	4	22.2	90	0	0.0	0	2	5.0	895
Scoop net	Tukri	6	33.3	1303	11	38.6	384	8	19.0	218
Katha	Katha	2	11.1	200	0	0.0	0	2	5.0	-250
Trap	Doiar	0	0.0	0	0	0.0	0	2	5.0	3660
Hook	Sip	0	0.0	0	0	0.0	0	2	4.4	105
Spear	Koch	0	0.0	0	0	0.0	0	2	5.0	420
Cast net	Jhaki jal	12	66.7	546	11	38.2	301	7	18.1	500

Source: FAP17 Socio-Economic Monitoring

SW2-1 Gachapara **Main village** **Outside**

Gear Type	Bengali Name	Medium Farmers			Small Farmers			Landless		
		No.	%	Tk.	No.	%	Tk.	No.	%	Tk.
Gill nets	Current jal	16	38.2	1230	17	17.2	623	21	11.9	2794
-	Koi/Fashi jal	0	0.0	0	5	4.7	375	16	8.8	464
Seine net	Ber jal	3	7.3	1710	5	4.7	500	0	0.0	0
Bag net	Bhuti jal	3	7.3	6240	0	0.0	0	0	0.0	0
Scoop net	Tukri	6	13.8	80	17	17.2	228	32	18.3	162
Traps	Doiar	0	0.0	0	5	4.7	2275	22	12.3	1161
	Polo	0	0.0	0	0	0.0	0	5	2.8	50
Hooks	Sip	0	0.0	0	6	5.8	150	0	0.0	0
	Daun	0	0.0	0	5	4.7	1850	6	3.1	3582
	Nol barsi	0	0.0	0	12	12.5	775	0	0.0	0
Spear	Koch	7	17.1	1380	10	10.5	617	43	24.2	1289
Cast net	Jhaki jal	10	24.4	562	29	28.9	645	22	12.2	750
Other	Dewatering	3	7.3	2780	0	0.0	0	0	0.0	0

Source: FAP17 Socio-Economic Monitoring

As a result, these data from the long-term monitoring give a better picture of fishing activity as they are based on prolonged observation and familiarity with the village and the respondents. Average annual income generated by use of the different gears is also shown.

Higher levels of fishing activity than shown in the original census are apparent in both communities. But, whereas fishing gear ownership in Gopalsen is limited to small gears primarily used for subsistence catches, such as *tukri* (scoop net) and *jhaki jal* (cast net), people in Gachapara use a far greater range and number of gears.

Although landless households are the most heavily involved in fishing, gear use is fairly evenly spread across all landholding categories. This reflects the widespread awareness of the value of the fisheries resource, the ease of access to fisheries for most local people due to lack of leasing arrangements and the relatively open attitude towards fishing which people in the area show. Whereas in other regions there are frequently strong taboos against fisheries involvement by non-fishermen, in this area there are no major social obstacles to fisheries involvement.

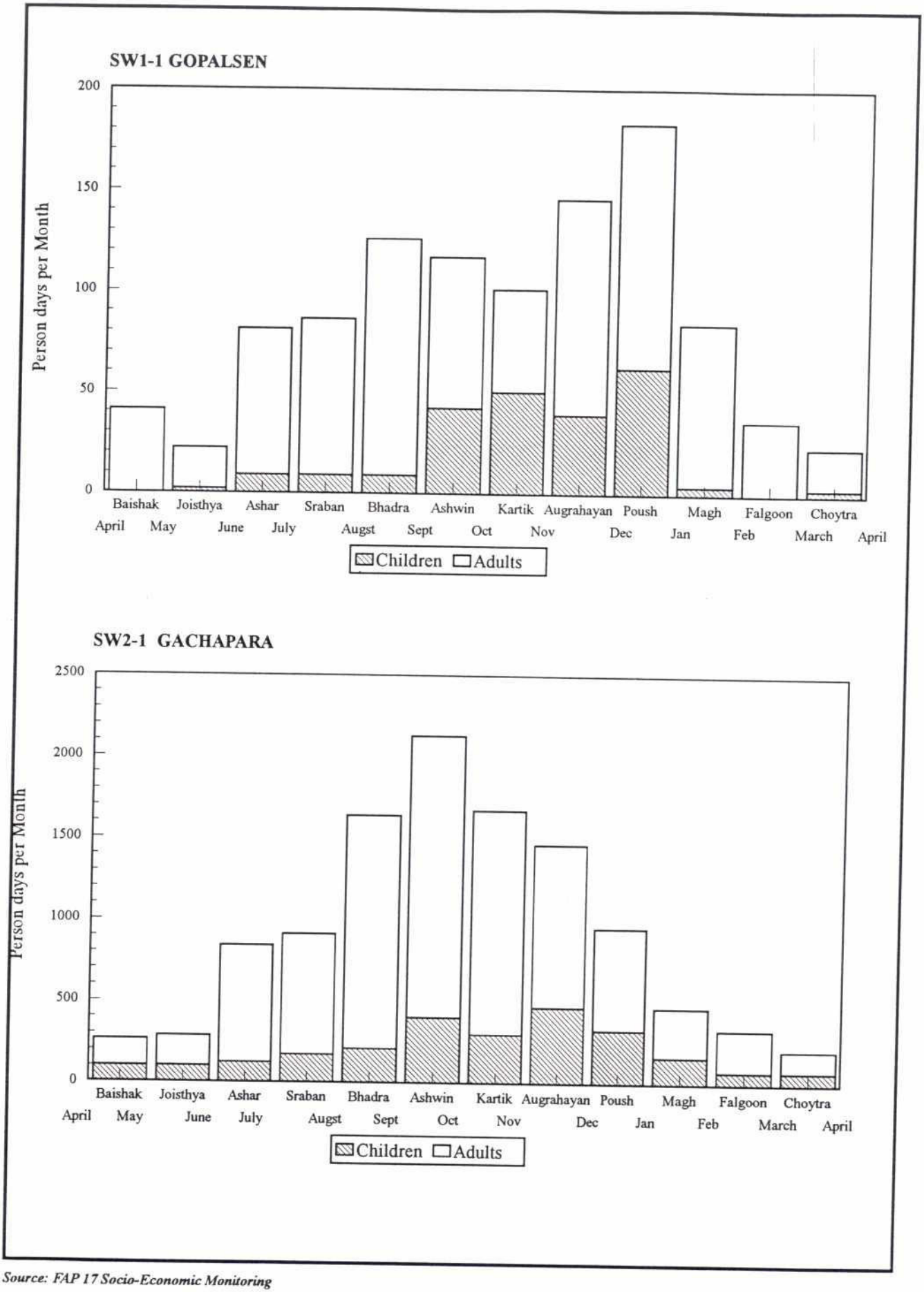
The numbers of landless involved in fishing is reported to be increasing steadily. Where such access is available, as in Gachapara, fishing during the flood season and drawdown period are widely seen as a viable income-generating option. Members of a traditional weaving community of about 30 households in Karikor *para*, part of Gachapara *mauza*, have moved into fishing as changes in the market and in raw material prices have driven them out of their traditional occupation. Other landless labourers have become involved as an alternative to seasonal migration to urban centres or nearby towns. Fishing is well-established as one of a series of options open to local people during the flooding season when agricultural activity is slack.

In Gopalsen, involvement is not nearly so widespread.

2.3 Children in fisheries

The relative amounts of fishing effort through the year accounted for by children and adults in Gopalsen and Gachapara are shown in Figure 4.

Figure 4 Person Days Fishing per Month, Adults and Children



Source: FAP 17 Socio-Economic Monitoring

The level of involvement of children in fishing activities seems to correspond to that seen in other areas. Where household dependence on fisheries is higher, such as in Gachapara, the proportion of fishing effort accounted for by children tends to decline as adults take a more active role. In communities such as Gopalsen, where more occasional fishing for consumption is the rule for most households, children's **relative** contribution is higher, accounting for over 50% of fishing effort during the month of *kartik* (October/November). However, in Gachapara, the absolute levels of children's fishing activity are **far** higher, and are sustained throughout the year. Much of this is carried out on local *khal* and makes up a considerable proportion of the line and trap fishing carried out in the village.

2.4 Women in fisheries

Given the far more general diffusion of fishing as an income source among agricultural and labouring communities, a more extensive involvement of women in fishing might be expected. However, the lack of social stigma attached to fishing does not extend to women's involvement. Norms of *purdah* are still widely accepted and activities by women outside of the homestead are still kept to a minimum.

However, the large numbers of people engaged in fishing in the area has created other opportunities for women's indirect involvement in the sector through gear manufacture. In Gachapara, women from many small farming and landless households are engaged in making some of the smaller gears such as *jhaki jal* (castnet) and *koi jal* (multifilament gillnet). In Uttarpara, one hamlet within Gachapara which was studied as a separate satellite fishing community, the manufacture of small traps locally called *dubair,* from split bamboo is a speciality. Women from the Hindu *namasudra* fishing households in the *para* are particularly involved.

2.5 Fisheries access

Gopalsen

Fishing activity in Gopalsen is limited compared to Gachapara. What fishing is carried out is mainly on the Poysa *khal* running in front of the village, outside the embankment and the Amboila *khal* just inside. Access to this, as to all other waterbodies in the immediate vicinity

of Gopalsen, is entirely open beyond the restrictions imposed by *katha* owners immediately around their *katha*.

In common with most other floodplains and *beel* in the area, Amboila and Satla-Bagda *beel* are not subject to any leasing arrangements. Both *beel* are seasonal and fishing in them is limited to floodplain fisheries during the flood season and drawdown and the extensive exploitation of *kua* (submersible ponds) during the dry season. The exploitation of the submersible pond fishery is limited primarily to landowners, with much of the actual harvesting activities carried out by fishermen from neighbouring villages such as Chandtrisira. This fishery is quite productive in the lower parts of Satla-Bagda *beel*, but in the floodplains closer to Gopalsen fish production does not seem to be sufficient to attract many households to take up fishing on a more intensive basis. The Satla-Bagda embankment seems to have played a role in this relatively low level of production.

Pond culture is also playing an increasingly important role in Gopalsen. Several of the wealthier households own large, well-excavated ponds which have been stocked and fed for several years now. Although several culture cycles are reported to have failed badly, the very large profits made by some pond owners during good years are encouraging involvement to anyone who can gain access to a culturable waterbody.

Many ponds and borrow-pits for homesteads have multiple owners but this has not generally proved a constraint. Significantly the only serious access problem regarding ponds in the village is over the single *khas* pond. In 1992, this was leased to a group of landless labourers organised to take up fish culture by a local NGO. Unfortunately, the group was from a neighbouring community rather than from Gopalsen itself; and when they attempted to take control of the pond local people prevented them. This pond had long been regarded as a community resource where anyone could fish and villagers strenuously objected to the limitation of their fishing activity there.

This episode highlights two points. First of all, the distributional problems which a major shift to culture fisheries could lead to. Much has been made of the potential for using *khas* waterbodies as a resource for ensuring that some aquaculture benefits can be directed towards poorer, disadvantaged groups in society. In reality, the amount of *khas* waterbody available is limited and, where it is available, the restriction of access and use to any particular group, no matter how deserving, can lead to conflict with other groups who still regard it as an

"open" resource.

Secondly, it is apparent that access to fisheries is something which Gopalsen villagers value. If their fishing activity is limited it would appear to be due to differences in returns to fishing effort which they are able to earn on the available waterbodies.

Gachapara

As in Gopalsen, fisheries is oriented around *khal*, ponds and *kua* in the floodplain.

Two perennial *khal* run east-west on both sides of the village. The Ghagar *khal* is controlled by an LRO lease under Gopalganj District from the point where it leaves Barisal District (where there is no leasing arrangement). The leaseholder, an *arotdar* from Ghagar, charges primarily for the placing of *katha* and traps in the *khal* but does not exert much effective control over the use of smaller gears by "non-professional" fishermen from Gachapara and other neighbouring villages. The principal concern of the leaseholder is to ensure that fish from the *khal* are sold at his *arot*. This seems to be a feature of much of the leaseholding in the area which is very tightly tied to the marketing channels centred on Ghagar, Poysa and Tekerhat.

The Kunjaban *khal*, north of Gachapara, is also under an LRO lease, with different sections held by leaseholders from various communities round about. It is clear that in most of these leased *khal*, strict limitation of fishing effort is only really applied to major static gears, like *katha* and traps. Other *khal* running through the village, like Gachapara and Baluhar *khal*, are leased by the local mosque committee to wealthy villagers who then sublease trap and *veshal* sites and *katha* locations to local fishermen from Uttarpara and Bagan Uttarpara.

Most of the miriad of smaller *khal* draining local *beel* like Kauria and Kunjaban are theoretically open but are in fact subject to informal leasing arrangements imposed by local landowners. Many landowners are also placing their own *katha* in *khal* adjacent to their landholdings.

Given the lack of extensive areas of perennial *beel*, the *khal* are very much the focus of intensive fishing activity. But during the flood season, the floodplains and *beel* round about offer considerable fishing opportunities to the many local people who own small gears. Practically no restrictions seem to be placed on fishing by villagers on these floodplains

except once the drawdown begins when fishing on and around their *kua* is prevented by their owners. Seasonal and subsistence fishermen from Gachapara are therefore allowed more or less unrestricted use of *jhaki jal* (castnet), *current jal* (monofilament gillnet), *borsi* (lines) and *koch* (spears) in Chagdar and Kunjaban *beel* and in Chitrapara *beel* located inside the Satla-Bagda Project. It is reported from some other local *beel*, notably Rajapur *beel* just north of Poysa, that local villagers engaged in fishing during the flood season and drawdown are more and more frequently preventing fishing by "professional" Hindu fishermen suggesting that the exploitation of the open fishery on the floodplains is becoming increasingly competitive.

2.6 Seasonality and fisheries

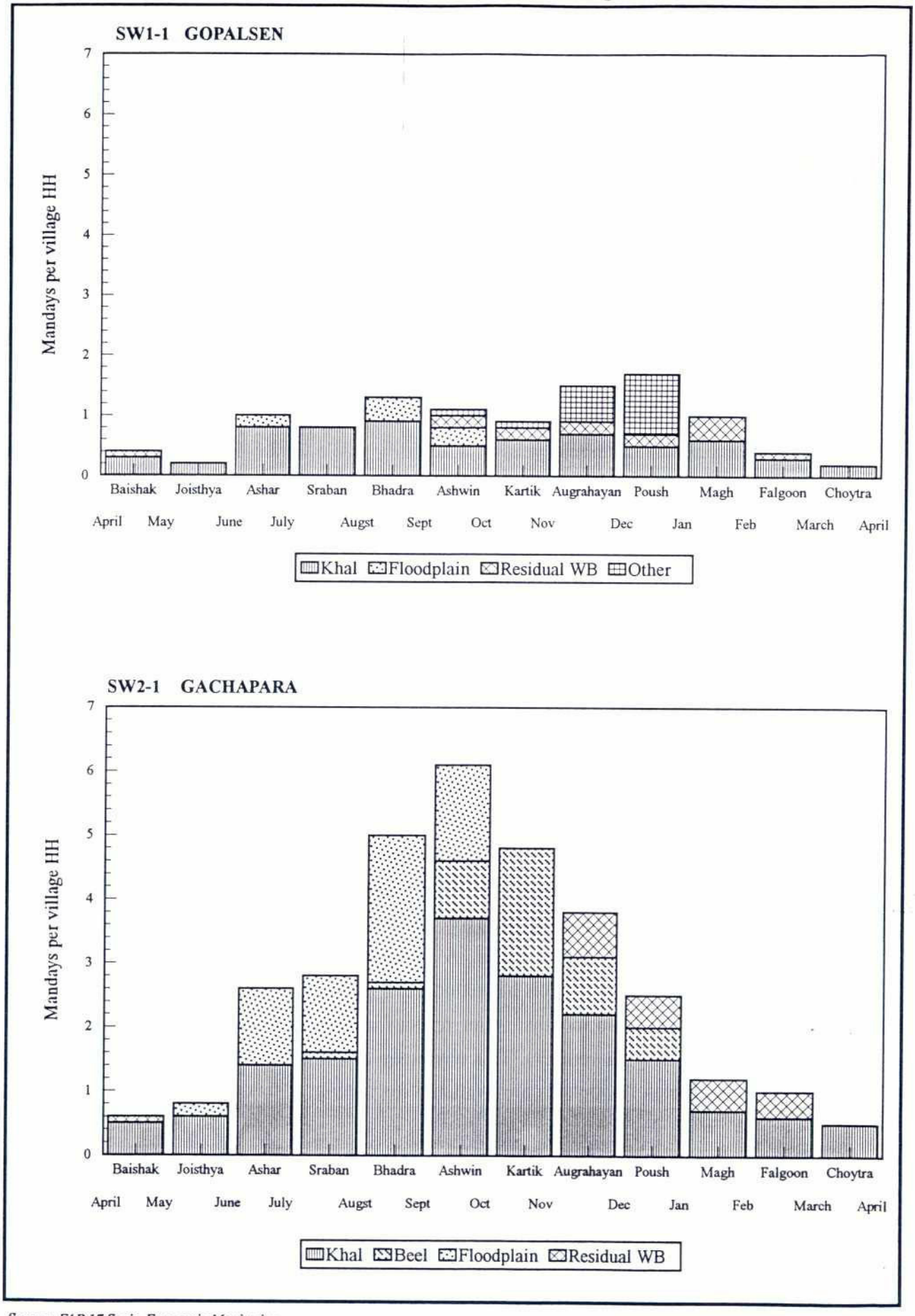
Figure 5 shows the seasonal distribution of fishing effort by people in Gopalsen and Gachapara across different types of waterbody while Table 8 shows the relative intensity through the year of fishing with the most important gears on the principal waterbody types.

Two points are clearly highlighted. In spite of the fact that *khal* are the only waterbodies in the area which are regularly subject to access restriction, subsistence and seasonal fishermen seem to be largely immune to these restrictions, either because they are not enforced for the types of gear used by non-professional Muslim fishermen, or because they are fishing in *khal* which are not subject to control.

The second point is the greater fishing effort on floodplains and *beel* applied by Gachapara villagers. There is no substantial difference in land height or distance from *beel* and floodplain between Gachapara, in an area unprotected by flood control, and Gopalsen, inside the Satla-Bagda Project and the difference is primarily explained by the changes in fisheries caused by the Satla-Bagda embankment. As mentioned above, the embankment effectively eliminates most flooding from the river except when this is required for irrigation or for flushing away salinity in the fields. A general reduction of about three feet in average flooding depth is reported. This has reduced the period of inundation on what is now medium high land by up to two months; water recedes in early *ashwin* (late September) as opposed to late *kartik* (early November). This obviously constitutes a marked reduction in the period when open-access floodplains are available for fishing.

Fishing activity in Gopalsen is largely limited to Poysa *khal*, to the seasonal Amboila *khal*

Figure 5 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 8
Principal Gears, Use by Month and Waterbody

SW1–1 Gopalsen

Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Doiar	Khal			0.3	0.3									0.6	5.6
	Floodplain					0.3								0.3	2.8
Koi/Fashi jal	Floodplain						0.3							0.6	5.6
Jhaki jal	Khal	0.3	0.2	0.3	0.4	0.6	0.2	0.3	0.5	0.3	0.5	0.3	0.2	4.0	37.0
	Residual WB	0.1							0.1	0.2	0.3	0.1		1.1	10.2
Katha	Khal			0.1		0.3	0.1		0.1		0.2			1.0	9.3
Tukri	Khal							0.2						0.4	3.7
	Residual WB						0.1				0.2			0.7	6.5
	Other						0.1	0.1	0.6	1.0				1.8	16.7

SW2–1 Gachapara

Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Sip labour	Floodplain			0.5	0.2	0.6								1.3	4.2
Ber jal	Residual WB								0.1		0.4	0.3		0.8	2.6
Current jal	Khal	0.2	0.2								0.3	0.1	0.2	1.1	3.5
	Beel				0.1	0.1	0.5	0.9	0.1					1.8	5.8
	Floodplain			0.3	0.4	1.0	0.8							2.4	7.7
Doiar	Khal			0.5	0.6	0.6	0.4							2.1	6.7
Koi/Fashi jal	Beel						0.1	0.3	0.1	0.1				0.7	2.2
Jhaki jal	Khal			0.2	0.2	0.2	0.4	0.2	0.7	0.6	0.1			2.9	9.3
	Residual WB								0.3	0.2	0.1	0.1		0.8	2.6
Koch	Khal	0.3	0.3	0.5	0.5	1.6	2.7	2.4	1.1	0.6	0.3	0.3	0.3	10.8	34.5
	Beel							0.2	0.3	0.2				0.7	2.2
Daun	Beel						0.3	0.4	0.1	0.1				0.9	2.9
	Floodplain		0.2	0.2	0.4	0.3	0.1							1.2	3.8
Bhuti jal	Khal			0.2	0.2	0.2	0.2							0.9	2.9

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

inside the scheme and other smaller *khal*. As shown in Table 8, *jhaki jal* fishing in these habitats accounts for 37% of all fishing effort while, altogether, *khal* fishing absorbs well over 50% of fishing effort with the bulk of the rest being put into ponds ("other" in Figure 5). The general levels of fishing effort in Gopalsen are also very low, the peak period being in *poush* (December/January) when activity on ponds and *kua*, as well as *katha* harvesting in the *khal*, peaks.

Fishing effort in Gachapara is both considerably higher, up to over six days fishing per village household during the peak period in *ashwin* (September/October), and more seasonally influenced. The marked peaking of activity during the flooding season and drawdown is mainly due to the more extensive exploitation of the floodplains and *beel* which still surround the village. From *ashar* (June/July) right through to *poush* (December/January) an appreciable amount of fishing effort is applied on floodplains then on *beel*.

Fishing effort is also diffused across a far greater range of gears. Spear fishing (*koch*) on the *khal* is the only gear/waterbody combination accounting for more than 10% of fishing effort. This particular gear is widely used on the many *khal* running through Gachapara and seems to be attractive to non-professional fishermen as it easily avoids controls by local leaseholders.

2.7 Agriculture, landlessness and fishing

The rise in the numbers of non-traditional fishermen seeking a livelihood in fisheries must be seen against the background of a general increase in population, levels of under-employment and landlessness. The rise in population has led to a generalised pressure on all resources. The numbers of landless people in rural areas have grown as farm plots become steadily fragmented by inheritance until they are uneconomical and people sell out whatever remains. Many households adopt the strategy of restricting the inheritance of land to one or two of the eldest sons while the rest of the family changes occupation or, as is common in the area around Satla-Bagda, migrate to urban centres.

However, beyond the increase in population pressure, certain basic changes in the patterns of agricultural activity in the area around Satla-Bagda have added to the numbers of people who, at least seasonally, are seeking out sources of livelihood outside of agriculture. Given

the relative abundance of the fisheries resource in the area, the value of fish and the lack of strict access controls, fishing is an increasingly attractive option for many of these people.

Both Gopalsen and Gachapara have witnessed significant changes in cropping pattern during the last two to three decades. Even though most of the *beel* in the area have always been seasonal, until the 1960s the lack of irrigation facilities meant that dry season agriculture in low-lying areas was difficult. The cultivation of local *boro* seems to have only started in Gopalsen during the 1960s and before that much land was permanently uncultivated while the remainder was generally single cropped with deep-water *amon* rice.

During the mid-1970s, the diffusion of mechanical irrigation technology in the form of low-lift pumps and shallow tubewells, made the cultivation of crops lower down the slopes of *beel* feasible. The introduction of flood control in Satla-Bagda was aimed to encourage this process and create a more stable environment for agriculture. In practice, this has led, at least until recently, to a wholesale shift from cropping patterns dominated by wet season (*kharif*) crops, such as broadcast *aus* and *amon* rice and jute, to irrigated dry season (*rabi*) crops, particularly HYV *boro* rice.

About 40% of the agricultural land of Gachapara is located in Chagdar *beel* while the rest is in the surrounding floodplain. Over the last forty years Chagdar *beel* has changed from being seasonal to perennial, as the construction of a road around the *beel* has caused drainage congestion. At present about 20-30 acres of land located in the centre of the *beel* normally remain under water round the year.

Tables 9 to 11 show the principal cropping patterns in Gopalsen and Gachapara during the 1950s and 1960s and compare these with current cropping patterns. Periods of fallow are shaded.

Changes in cropping pattern have two principal impacts on fisheries: they can physically change the vegetation cover in waterbodies and they can influence the amount of fishing effort being applied by changing patterns of labour demand through the year. The changes which have taken place around Gopalsen and Gachapara have had both these effects.

The widespread cultivation of deep-water *amon* and mixed *aus* and *amon* during the past meant that, for much of the flooding season, most of the floodplain was covered by crops.

Table 9

Gopalsen and Gachapara
Principal cropping patterns: 1950s - 1960s

Gopalsen	Principal crops	1950s - 1960s		
Kharif I	Kharif II	Rabi	Area (%)	Land type
Jute	Fallow	Fallow	40%	Medium low
Mixed *aus/amon*		Mixed sesame/*moog*		
Mixed *aus/amon*		Mustard/Lathyrus		
Mixed *aus/amon*		Mixed sesame/*moog*	60%	Low
Jute	Fallow	Fallow		
Deep water rice *(amon)*		Fallow		
Gachapara	**Principal crops**	**1950s - 1960s**		
Mixed *aus/amon*		*moog*	35%	Medium low
Mixed *aus/amon*		Sesame		
Jute	Fallow	Fallow		
Mixed *aus/amon*		Mustard/lentil Lathyrus/*tishi*		
Deep water rice *(amon)*		Lathyrus/sesame		
Deep water rice *(amon)*		Lathyrus		
Jute	Fallow	Mustard/lathyrus		
Deep water rice *(amon)*		Millet		
Mixed *aus/amon* Deep Water Rice *(amon)*		Fallow	50%	Low
Deep Water Rice *(amon)*		Fallow	15%	Very low

Source: FAP17 Village Appraisals

Table 10

Gopalsen
Principal cropping patterns: 1993

Gopalsen		Principal crops	1993	
Kharif I	Kharif II	Rabi	Area (%)	Land type
Fallow	Fallow	HYV *boro*	15%	Medium low
Deep water rice (*amon*)		HYV *boro*		
Mixed *aus/amon*		Fallow		
Deep water rice (*amon*)		Mixed sesame/ groundnut	75%	Medium High-I
Mixed *aus/amon* Deep water rice (*amon*)		*moog*		
Mixed *aus/amon* Deep water rice (*amon*)		Groundnut		
Mixed *aus/amon*		Fallow		
aus	Fallow	Potato Groundnut		
Deep water rice (*Amon*)		HYV *boro*		
Mixed *aus/amon*		*tishi*		
aus	Fallow	Potato Groundnut	10%	Medium High-II
aus	Fallow	Vegetable		
Jute/*mesta*	Fallow	HYV *boro* Seed bed		

Source: FAP17 Village Appraisals

Table 11
Gachapara
Principal cropping patterns: 1993

Gachapara		Principal crops	1993	
Deep water rice (*amon*)		Groundnut	25%	Medium High-II
Deep water rice (*amon*)		*moog*		
Deep water rice (*amon*)		Mixed *moog* Groundnut		
Deep water rice (*amon*)		Sesame		
Deep water rice (*amon*)		Potato		
Deep water rice (*amon*)		Potato Groundnut		
Fallow	*mesta*	Fallow		
Deep water rice (*amon*)		Groundnut	50%	Medium low
Deep water rice (*amon*)		*moog*		
Mixed *aus/amon* Deep water rice (*amon*)		Sesame		
Deep water rice (*amon*)		HYV *boro*		
Fallow	Fallow	HYV *boro*		
Fallow	Transplant *amon*	HYV *boro*		
Mixed *aus/amon* Deep water rice (*amon*)		Fallow	25%	Low

Source: FAP17 Village Appraisals

This crop cover meant that relatively few areas were open to fishing with anything except the smallest and simplest of gears which could be used in the channels running through stands of deep-water rice and on the periphery of crop lands.

The widespread shift to *boro* cultivation during the 1980s meant that far more extensive areas were left fallow during the floods, meaning that much of the floodplain was without any form of cover and therefore open to more intensive fishing effort.

During the last few years, there has been a shift back to the more traditional cropping

patterns as the costs of *boro* cultivation have risen. Groundnut cultivation has replaced *boro* on some medium-low and medium-high land as it seems to be more tolerant of current soil conditions and does not require the same outlay on irrigation.

The return to broadcast *amon* during the *kharif* season has restored some of the vegetation cover to the floodplain during the rainy season. But for the past 15 years, the cropping patterns involving HYV *boro* were reportedly much more dominant in both villages. This was particularly so in Gopalsen, where HYV *boro* remains the most important crop grown on medium-low land, which accounts for 50% of cultivable land in and around the village.

Impact on labour demand

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) when *aus* is harvested and again at the end of *kharif* II season in *kartik* and *augrahayan* (October/November) when the main *amon* harvest occurs. The introduction of *boro*, made possible largely through the availability of low lift pumps (LLPs), cut down much of the labour demand at the end of *kharif* II season, but created intense demand for labour during the *rabi* season.

Coupled with the reduction in the area under jute cultivation, this change has largely eliminated the principal sources of agricultural labour demand during the flooding season. Jute and the *aus* harvest were the two principal sources of employment during *ashar* and *sraban*, which correspond to the early and peak flooding seasons.

Fishing, particularly with *current jal*, is one easily adopted alternative.

The reduction in *amon* cultivation has probably had an even more important effect as the demand for labour in *kartik* (October/November), when the flood recession is at its peak, has also been greatly reduced. This has freed up a great deal of labour precisely at the time when the catchability of fish on the shallow floodplains around Gopalsen and Gachapara is at its height and has resulted in far more effort being applied.

The return to mixed *aus* and *amon* over the last few years has restored some of the old demand for labour at the *kharif* II season. But the changes in patterns of agricultural labour demand in the 1970s and 1980s contributed to the widespread movement of many households

into fishing. Fishing has by no means been the **only** strategy employed; many households, in Gachapara in particular, migrate to urban centres during the flooding season when labour demand is slack, but fishing is an important source of livelihood for those who remain. The return of demand for agricultural labour during the summer months does not seem to have diminished levels of fishing activity.

2.8 Fisheries incomes

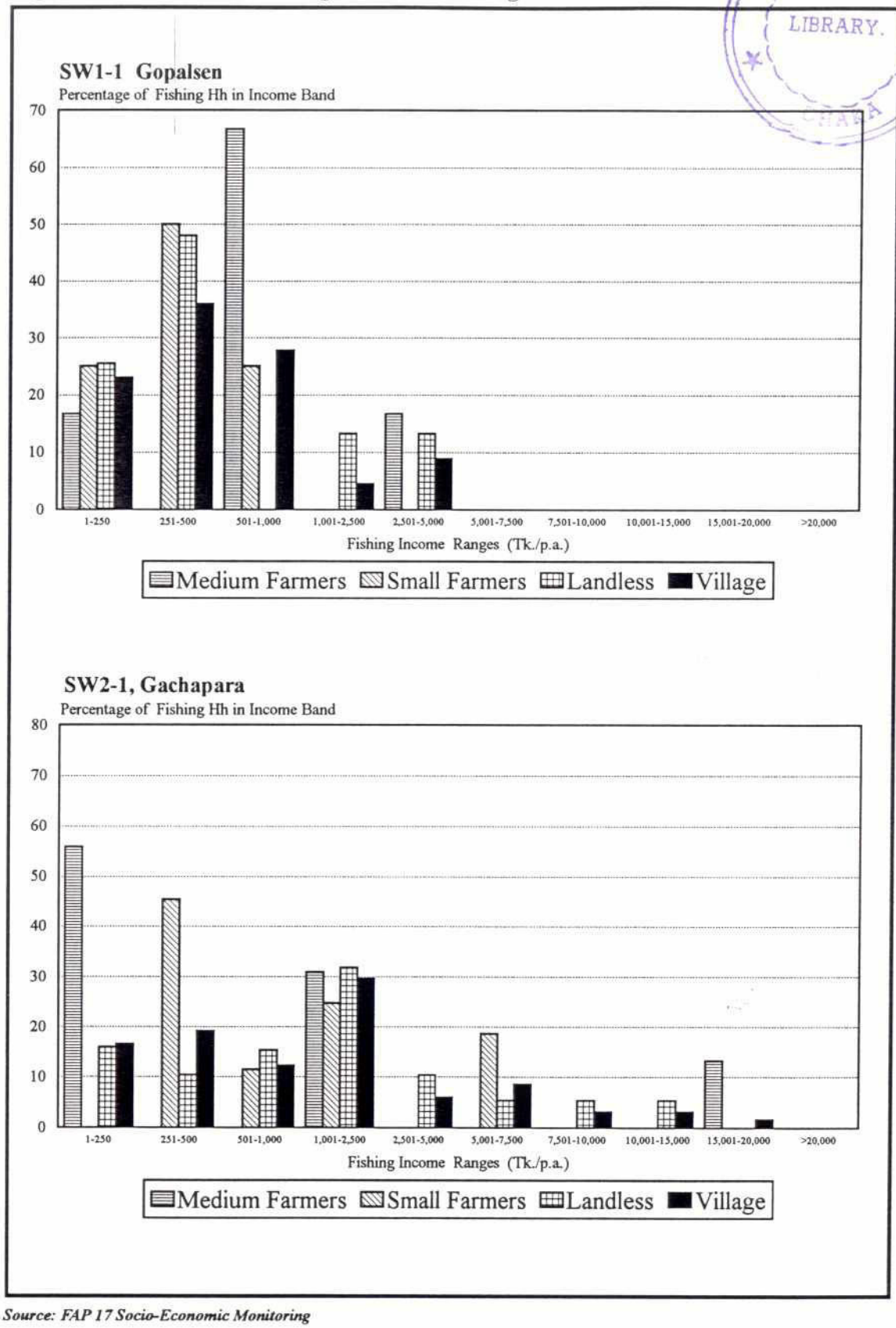
The numbers who actually exploit fisheries as an important means of livelihood are relatively few. Figure 6 shows the distribution of households from the village who fish within certain fishing income ranges. By far the majority of households are clustered in the lower income ranges. The largest grouping is seen within the ranges from Tk.251 to Tk.1,000 per year.

The contrast with Gachapara is striking. The range of incomes earned is far greater, with some medium landowning households up in the Tk.15,000 to Tk.20,000 range, this being the product of naturally-stocked submersible ponds and culture carried out in *maital* around the village. The principal clustering is around the Tk.1,000 to Tk.2,500 range where about 30% of all fishing households are found. But another 25% of landless households who engage in fishing are earning fishing incomes of more than Tk.2,500 per year.

The detailed breakdown of average household incomes from different sources across the entire village shown in Tables 12 and 13 emphasises this contrast. In Gopalsen, fishing accounts for 4.2% of landless households' incomes and 3.3% of medium farmers' incomes while the levels for small farmers are somewhat lower. The degree of dependence in Gachapara is far higher: almost 10% for landless households, 5.8% for small farmers and around 4% for medium farmers.

The seasonal breakdown of these earnings reveals an even more marked difference. Fisheries earnings in Gopalsen peak relatively late, as fishing activity is concentrated in ponds around the village. Particularly interesting is the difference in peaks across the different landholding categories: *augrahayan* (November/December) for landless, *poush* (December/January) for small landowners and *magh* (January/February) for medium landowners. This follows the general pattern of land ownership within the Satla-Bagda scheme. Landless are mainly limited in their fishing to ditches and *khal* around their homesteads; small farmers have natural or

Figure 6 Distribution of Fishing Incomes for Fishing Households



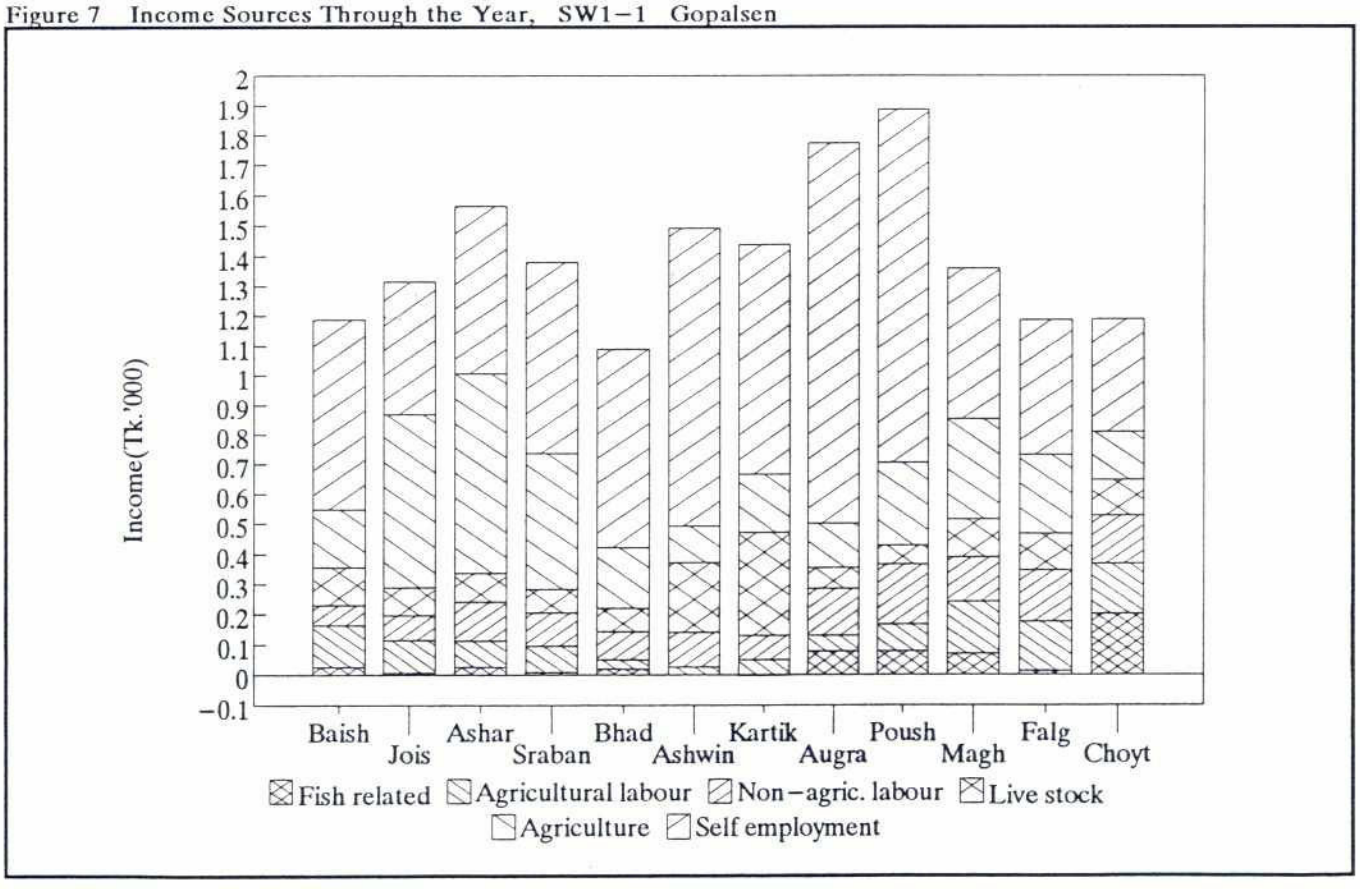
Source: FAP 17 Socio-Economic Monitoring

Table 12 Income Sources Through the Year, by Landholding Category, SW1–1 Gopalsen

UNIT: TK.

LAND CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
Medium	Fishing	–	22	72	50	(88)	52	44	213	172	279	18	6	841	3.3
	Fish culture	–	–	(125)	(6)	–	(5)	(78)	(3)	(5)	–	–	372	151	0.6
	Agricultural labour	–	–	–	–	–	56	–	–	–	–	–	–	56	0.2
	Non–agric. labour	129	167	249	194	124	68	57	152	169	133	133	167	1,741	6.9
	Small stock	48	41	20	13	24	8	33	22	21	25	39	45	340	1.3
	Large stock	186	173	84	63	29	586	1,154	97	97	214	214	181	3,078	12.2
	Agriculture	578	1,576	1,161	1,522	518	406	853	269	599	1,262	352	590	9,686	38.3
	Self employment	753	578	590	640	708	1,339	1,063	916	892	757	660	515	9,410	37.2
	Total	1,694	2,557	2,051	2,476	1,315	2,510	3,126	1,666	1,945	2,670	1,416	1,876	25,303	100
Small	Fishing	–	8	19	19	20	13	14	30	66	31	32	12	263	1.3
	Fish culture	79	–	(32)	(112)	(32)	(8)	(38)	(70)	6	–	–	355	148	0.7
	Agricultural labour	124	58	25	46	12	27	85	40	44	118	170	155	905	4.5
	Non–agric. labour	87	88	70	74	73	75	60	80	80	104	99	104	994	4.9
	Small stock	52	19	102	46	69	35	41	28	29	58	39	53	571	2.8
	Large stock	116	108	113	109	127	274	229	81	57	157	155	132	1,657	8.2
	Agriculture	157	630	1,200	395	280	108	54	258	412	231	573	116	4,415	21.8
	Self employment	1,122	526	688	788	808	1,069	794	1,965	1,790	692	598	478	11,318	55.8
	Total	1,737	1,437	2,185	1,365	1,357	1,593	1,239	2,412	2,484	1,391	1,666	1,405	20,271	100
Landless	Fishing	36	1	82	71	90	(22)	33	105	44	4	–	2	447	4.2
	Fish culture	–	–	10	–	–	–	–	–	–	–	–	–	10	0.1
	Agricultural labour	210	188	167	151	56	9	48	81	159	289	229	249	1,837	17.3
	Non–agric. labour	20	42	121	99	96	162	100	214	298	185	238	198	1,773	16.7
	Small stock	50	11	4	22	2	14	14	20	19	6	7	27	195	1.8
	Agriculture	39	93	62	18	–	–	–	10	39	–	–	–	259	2.4
	Self employment	240	331	453	540	550	800	626	933	872	257	261	246	6,109	57.5
	Total	595	666	899	901	794	963	821	1,363	1,431	741	735	722	10,630	100
Village	Fishing	17	8	59	49	30	5	29	102	78	70	14	6	467	2.8
	Fish culture	10	–	(32)	(39)	(11)	(4)	(30)	(24)	1	–	–	195	68	0.4
	Agricultural labour	138	106	85	85	30	25	51	51	88	172	162	166	1,158	6.9
	Non–agric. labour	65	83	130	110	94	114	78	156	198	147	170	160	1,507	8.9
	Small stock	50	20	40	28	29	20	27	23	22	28	24	39	350	2.1
	Large stock	77	72	55	49	48	212	315	47	39	97	96	81	1,189	7.1
	Agriculture	190	579	669	455	200	120	195	146	279	338	264	161	3,595	21.3
	Self employment	640	447	560	643	669	1,001	772	1,273	1,182	506	456	379	8,528	50.6
	Total	1,187	1,315	1,566	1,380	1,089	1,493	1,437	1,774	1,887	1,358	1,186	1,187	16,862	100

Figure 7 Income Sources Through the Year, SW1–1 Gopalsen

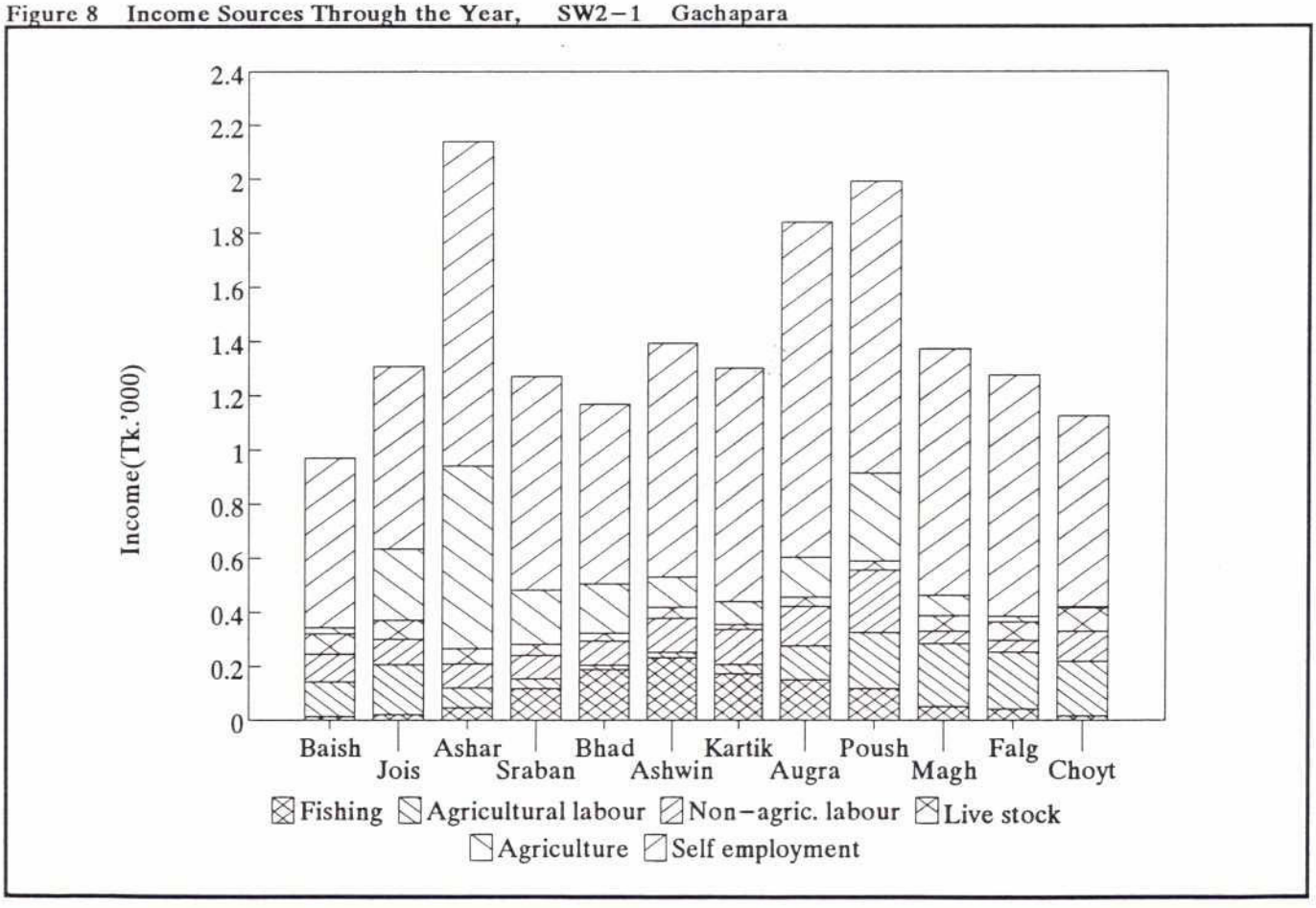


Source : FAP17 Socio–Economic Monitoring

Table 13 Income Sources Through the Year, by Landholding Category, SW2−1 Gachapara UNIT: TK.

LAND CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
Medium	Fishing	12	9	42	92	283	400	301	271	154	88	67	12	1,729	3.9
	Agricultural labour	29	–	–	–	–	–	–	4	–	–	–	–	34	0.1
	Non−agric. labour	650	650	650	650	650	650	650	650	650	309	309	650	7,122	15.9
	Small stock	27	42	10	43	35	25	22	57	72	28	39	40	441	1.0
	Large stock	186	152	118	76	59	41	41	33	64	108	146	193	1,217	2.7
	Agriculture	28	1,191	2,087	1,039	960	696	501	548	926	270	17	26	8,289	18.6
	Self employment	1,594	1,602	5,254	1,550	1,537	1,900	1,870	1,991	2,053	2,422	2,454	1,600	25,826	57.8
	Total	2,526	3,646	8,161	3,450	3,524	3,712	3,385	3,554	3,919	3,225	3,032	2,521	44,658	100
Small	Fishing	8	27	(34)	120	141	174	130	120	71	34	27	29	848	5.8
	Fish culture	98	(3)	(111)	(31)	(301)	(26)	187	190	81	8	4	4	99	0.7
	Agricultural labour	71	187	41	21	5	–	12	12	49	188	176	67	830	5.7
	Non−agric. labour	–	–	15	–	–	–	–	–	–	–	–	73	89	0.6
	Small stock	32	28	13	8	8	25	8	16	9	25	15	26	212	1.5
	Large stock	106	111	93	48	15	15	15	19	34	81	101	145	784	5.4
	Agriculture	15	208	795	88	37	2	–	153	492	128	61	3	1,982	13.6
	Self employment	565	505	668	869	832	869	863	1,512	999	684	772	549	9,686	66.7
	Total	895	1,063	1,480	1,123	737	1,059	1,215	2,022	1,735	1,148	1,156	896	14,530	100
Landless	Fishing	21	21	93	121	192	224	165	137	132	53	45	13	1,217	9.9
	Agricultural labour	181	228	105	52	26	37	55	217	348	311	276	321	2,158	17.6
	Non−agric. labour	31	11	2	5	6	75	82	110	258	9	7	6	601	4.9
	Small stock	6	4	15	13	21	33	6	23	6	12	11	7	158	1.3
	Agriculture	28	81	281	71	78	38	32	52	90	–	–	–	752	6.1
	Self employment	439	551	552	569	368	616	629	903	897	687	598	584	7,393	60.2
	Total	706	896	1,048	831	691	1,023	969	1,442	1,731	1,072	937	931	12,279	100
Village	Fishing	15	21	47	117	188	231	172	149	116	51	42	18	1,168	6.8
	Agricultural labour	127	186	71	36	16	21	34	125	209	232	209	200	1,466	8.5
	Non−agric. labour	102	91	90	87	88	126	130	146	228	45	44	110	1,287	7.5
	Small stock	17	16	14	15	19	30	8	25	16	18	16	17	211	1.2
	Large stock	58	55	44	25	12	10	10	10	19	39	51	71	403	2.3
	Agriculture	24	265	676	202	180	112	83	148	325	75	21	4	2,115	12.3
	Self employment	628	673	1,198	790	665	862	864	1,235	1,079	911	893	705	10,503	61.2
	Total	971	1,307	2,140	1,272	1,168	1,392	1,301	1,838	1,992	1,371	1,276	1,125	17,153	100

Figure 8 Income Sources Through the Year, SW2−1 Gachapara



Source : FAP17 Socio−Economic Monitoring

man-made ponds on their landholdings where residual water stands for a little longer; medium landowners, who often own more of the lower land areas in the *beel*, have properly excavated ponds there which hold water for longer. What is clear from this pattern of earnings is that fishing is concentrated on **residual** water bodies. Fishing on the floodplain during the flooding season, when the resource is dispersed, is clearly **not** regarded as a worthwhile activity except for consumption purposes. The rise in **fish-related** income seen in *choytra* (March/April) is due to the harvest of cultured ponds by a few medium landowning families. This late peak in fisheries earnings would have been considerably higher if heavy rainfall in *falgoon* (February/March) had not caused many submersible ponds in the floodplains and *beel* to be flooded out before their fish had been harvested.

By contrast, in Gachapara, peaks of income from fisheries are very similar for all landholding categories. The month of *ashwin* (September/October), as the drawdown begins, is the peak period for everyone. In *bhadra* (August/September) and *ashwin*, fishing accounts for up to 27% of average incomes among landless households in the community. Fishing income is sustained right through the period of the flood recession, up to the end of *augrahayan* (November/December) and on into *magh* (January/February) as pond and ditch owners, as well as households with *katha* (brush-piles) in the *khal* make their harvests.

The level of dependence on fishing for landless households rises to account for almost 22% of average household income during *ashwin*. At that time, all landholding categories experience a rise of similar proportions in their relative dependence : small farmers get about 16% and medium farmers 11% of their income during that month from fishing.

Figures 7 and 8 clarify these patterns for the villages as a whole.

Income from self-employment is very important in both villages, accounting for over 50% in both communities. The peak periods for self-employment earnings are in *augrahayan* and *poush* (November to January) when many households, particularly in Gachapara, are involved in small-scale rice trading. Gachapara has something of a reputation for carpentry and about 20 households supplement their agriculture incomes with seasonal wood-working.

2.9 Conclusions

Intensive seasonal involvement in fishing, such as that seen in Gachapara seems to be the norm in this area. From discussions with local Hindu *namasudra* fishermen, who have a longer tradition of fishing than most of the Muslim communities in the area, it is clear that large numbers of Muslim landless and small farmers have increased their levels of fishing activity quite dramatically over the last 10-15 years. In many cases, groups of mostly landless Muslim households have shifted wholesale into fishing and made it their main source of income. Several of these groups of Muslim fishermen are discussed in Chapter 3.

Some seasonal dependence on fishing among households who are predominantly involved in other activities is even more common, due to the lack of access regulation on many of the waterbodies, itself a function of the seasonal nature of most *beel* in the area.

The far lower levels of fishing activity and dependence in Gopalsen, inside the Satla-Bagda embankment, seem to be primarily the result of the reduction in flood depth and duration caused by the flood control scheme. The Satla-Bagda Project is one of the few flood control schemes studied by the FAP 17 Fisheries Studies where the embankment has had an appreciable impact on flooding **and** has caused a significant reduction in quantity and change in composition of catch. Given the widespread involvement in fishing, such as that seen in Gachapara, this has probably had some impact on the livelihoods of Gopalsen households, particularly the landless. Many landless Gachapara households rely on fishing as an important source of income during the flood season when other employment opportunities are limited. For many, it is an alternative to seasonal migration to urban centres. In Gopalsen, most landless are involved in non-agricultural labour or self-employment activities many of which involve out-migration.

Flood control has undoubtedly encouraged the development of more intensive aquaculture practices in Gopalsen, but it is clear that the majority of the benefits from this go to landowners and are seasonally highly concentrated towards the end of the year, in *choytra* (March/April).

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

The fishing communities in the *beel* tracts surrounding the Satla-Bagda Project exhibit quite different characteristics to those found in the other regions studied by FAP 17. In all other regions of the country, there is usually a group of people who would define themselves as "professional" fishermen. In most cases, these are caste or caste-like groups whose identity as a group is linked to their profession. Among Hindus, people who are *koibarta* or *matsya das*, *malo*, *barman* or *rajbangshi* are all immediately identifiable as fishermen by virtue of their caste title. Likewise, the term *maimul*, while referring to a Muslim fishermen, immediately places the people to whom it refers in a distinct social category identified with fishing.

In the area lying between Bagihar *beel* in the north and the Satla River in the south, the lines are less clearly drawn. While a few of the caste fishing groups mentioned above are found in scattered communities, or come from outside the area to fish seasonally on local *beel*, among the resident population the division between fishing households and non-fishing households is hazy. The social stigma attached to fishing is not particularly strong and none, no matter what their social strata, appears to feel under pressure **not** to fish. This is a **very** different situation to that found in much of North Bengal, particularly in Rajshahi and Bogra and in the Sylhet Basin.

Social hierarchy in general seems less clearly defined: communities living here 40 or 50

years ago would have been living in an extremely remote environment, far from small towns and cities, where agriculture was extremely risky and most people's livelihoods would have been based on the exploitation of wild resources, like the harvesting of *shon* (bullrushes) for roofing. Fisheries has always played an important role, but, as most waterbodies are and always have been seasonal, there was little to attract permanent fishing settlements in the area. The continuing reputation of the *beel* tracts as a wild and somewhat lawless region seems to have ensured that there is less social control over peoples means of livelihood. A *namasudra* farmer/fishermen from the village of Nagirpar, very close to Chandtrisira, stated clearly that he was "free to do whatever he wanted" when asked if he felt constrained over his involvement in fishing.

This historical perspective applies above all to Hindu communities in the area, who, though not "fishermen" have a long history of fisheries involvement. For the Muslim communities, it is different. Fishing as an occupation has only really taken off among Muslims in the last 10-15 years. Many fishermen talk of a massive increase in fishing activity in just the last 4-5 years. A slight aura of embarrassment still surrounds the activities of Muslim fishermen but the social constraints are certainly far less than those encountered elsewhere.

Poysa and Chandtrisira

The Muslim fishing communities in Poysa and Chandtrisira are good examples of this. Both are groups of households that have, over the last 15-20 years, taken to fishing as their principal means of livelihood. While not entirely landless, fishing is now by far the most important activity for everyone in these small communities.

Nearby villages are Hindu communities also involved in fishing. On the opposite side of Nagirpar *beel* from Chandtrisira is a small group of *namasudra* households who compete for fishing on more or less the same set of waterbodies as the Muslim fishermen. Likewise, just north of Poysa is a far larger community of over 50 Hindu fishermen fishing the same *khal* and *beel* as the Poysa group.

Uttarpara, Bagan Uttarpara and Kauria

The fishing communities grouped around Gachapara are all part of a long, linear settlement called Uttarpara which stretches along the south bank of the Uttarpara *khal*. While not entirely made up of fishermen, almost each section of Uttarpara has some households living there who depend at least seasonally on fishing. The degree of dependence ranges from the households in the section of Uttarpara located under Gachapara *mauza*, where fishing is just one of a range of activities undertaken by community members, to Bagan Uttarpara and

Kauria where fishing is by far the most important element in household livelihood strategies.

Uttarpara is a mixed community of Muslim and Hindu *namasudra* households engaged in a wide variety of occupations. Some households own or sharecrop-in small plots of land. Many of the women in the community are active in the manufacture of bamboo handicrafts and quilt-making, as in the rest of Gachapara. Besides extensive fishing activity, gear manufacture for sale is also a common activity among fishing households.

Both Bagan Uttarpara and Kauria are more homogeneous, being made up almost completely of *namasudra* families from the *gain* sub-caste. Both the *gain* and people from neighbouring villages readily identify both communities as "fishing" communities, but it appears that involvement in fishing for this group is primarily a function of the environment in which they live rather than any more deep-seated identification with fishing as an occupation. *Gain* are recorded in other areas as being involved in numerous other activities, such as farming, labouring and trading. It is significant that a community of *malo* caste fishermen living in Kutibari, about 30 kilometres north of Satla-Bagda in Rajoir *thana* speak slightly disparagingly of Hindu "fishing" communities who actually **live** in that area. To quote one *malo* : "They're not fishermen, they're just *namasudra*."

3.3 Migration

As in most other areas of Bangladesh, migration from fishing communities has taken place in response to important political changes rather than changes in the fisheries resource. Hindu fishing households have moved out mainly on two occasions; first after the partition of the sub-continent in 1947 and second after the independence of Bangladesh in 1971. Increased competition for declining fisheries resources has also played a role, particularly in recent years, as the number of Muslim households involved in fishing has increased sharply. Table 14 shows the numbers of households migrating from the three Hindu fishing communities studied.

It can be seen that, although the political upheavals of Partition and Independence marked the major out-flows of fishing households, a steady flow of people have continued out of the fishing communities as pressure on the resource and the level of competition increases. Fishing security, mentioned as a reason for migration for *gain* households from Bagan Uttarpara and Kauria, is linked above all with the issue of access to fishing grounds and here the increase in the numbers of local farmers and labourers has had a major impact on Hindu

namasudra fishermen.

Seasonal migration is an important factor in the entire area, although not one which is restricted to fishing communities. If anything, fishing seems to be regarded by many Muslim households as an **alternative** to urban migration during the flooding season.

Table 14
Migration of fishing households, 1950s - 1993

Village	Uttarpara		Bagan Uttarpara		Kauria	
Year	Nos. of H/H	Causes of migration	Nos. of H/H	Causes of migration	Nos. of H/H	Causes of migration
Before 1950	10	• Partition	5	• Partition	7	• Partition
1950 - 1970	5	• Communal tension	-	-	-	-
1970 - 1980	5	• Liberation of Bangladesh	10	• Liberation of Bangladesh	7	• Liberation of Bangladesh
1980 - 1990	-	-	10	• Lack of fishing security • Better employment	5	• Lack of fishing security • Better employment
1990 - 1993	-	-	-	-	-	-

Source: FAP17 Village Appraisals

3.4 Fisheries access

The principal feature of fisheries access arrangements in the area around the Satla-Bagda Project is the relative lack of formal leasing arrangements on *beel* fisheries. This is dictated almost entirely by the seasonal nature of most *beel*. The rationale behind the leasing of *beel* is based on their retention of water through to the month of *falgoon* or *choytra* (February to April) allowing fish resources from all the surrounding floodplain to be concentrated in the residual water area. As most *beel* in this area dry up earlier, in *magh* or even *poush* (December to February), and tend to fragment into many small waterbodies they cannot concentrate enough of the resource to justify the imposition of a leasing arrangement.

The lack of a permanent *beel* environment which can be controlled and efficiently harvested during the winter is one reason why there are so few traditional fishing communities in the area . Some deeper parts of Bagihar *beel* do attract professional *malo* fishing teams from Rajoir during the peak harvesting period in *magh* (January/February). This is both because there are some deeper sections of *beel* there and because this area came under the *zamindari* of Bijen Babu with whom these *malo* communities were traditionally associated. However, fishing in the *beel* and floodplain around Gopalsen and Gachapara has been left to *namasudra* communities and very little control or restriction has ever been placed on their activities.

On the *khal* the situation is somewhat different. In many respects, the *khal* in this area serve the function, in fisheries, performed by *beel* in other parts of the country. As flood waters drain off the extensive floodplains, the fish which have been breeding and growing all through the flood season concentrate in the only areas of perennial water which remain, the many natural and man-made *khal* criss-crossing the area. Attempts to control access to the fishery resource are therefore concentrated on the *khal* while fishing on the floodplain and *beel* is unrestricted. Even on the *khal* the severity of access control is erratic. In Barisal District there is no *jalmahal* even on the highly productive Poysa *khal*. This is exploited by considerable numbers of Muslim fishermen who have moved into fishing in recent years. Often these small groups of new entrants to "professional" fishing are exploiting very specific niches which are unregulated, using gears which are generally regarded as "subsistence" gears but in fact yield relatively high earnings when used intensively.

The concentration of fishing effort on the *khal* is also reflected in the large number of *katha* (brush-pile) sites found in both major and minor *khal*. Leasing arrangements now tend to be focused on these *katha* sites. Depending on the size of the *khal*, sections are leased out by individuals or groups of fishermen through fisheries *samity*. Particular sites for *katha* or traps are then sub-leased to operators. Local *arotdar* (fish wholesalers) seem to play an important role in these access arrangements, either taking leases directly or providing loans to fishermen to take them in return for guaranteed sale of catches.

It is reported that *katha* were practically unknown in the area 20 years ago and the enormous increase in the investment in their use reflects the growing appreciation of the value of the fisheries resource. In many *khal* where there are not formal leasing arrangements through the Land Revenue Office, people owning land along the banks of *khal* make similar claims on fishermen wishing to set up *katha,* or install their own.

Another critical way in which the floodplain fishery resource is aggregated in the absence of perennial *beel* is through the excavation of *kua* (fish-pits or submersible ponds) in *beel* and floodplain areas. The development of these devices is gaining pace everywhere in the country, but it has a long history in this area of the South-West and makes up a very important contribution to local fisheries. In many other areas, the excavation of *kua* is linked to the development of *boro* cultivation in lowland areas where they serve a double function as a water reservoir and fish aggregation device. Here, the fisheries function seems to be paramount. Water drawing down off the floodplain brings the floodplain fish stocks into the *kua*, enabling them to be held for longer and sometimes improved by adding further stocks and even feeding. The management and harvesting of these ponds is now an important activity for many of the local fishing communities.

In other parts of the South-West region studied by FAP 17, the development of these submersible ponds has had important implications for access to floodplain fisheries. On smaller floodplain and *beel* areas near Madaripur, the owners of *kua* are not surprisingly anxious to limit fishing on and around their ponds even during the flood season in order to maximise the amount of fish left at the end of the season. As yet, there seems to be less of this kind of restriction around Satla-Bagda. As soon as the bunds surrounding submersible ponds appear, owners restrict fisheries access but attempts to limit fishing while the whole floodplain is under water are still limited. However, in Kunjaban *beel* where fishermen from Bagan Uttarpara and Kauria fish, some submersible pond owners are reported to be attempting to impose more extensive restrictions on fishing activity around their ponds.

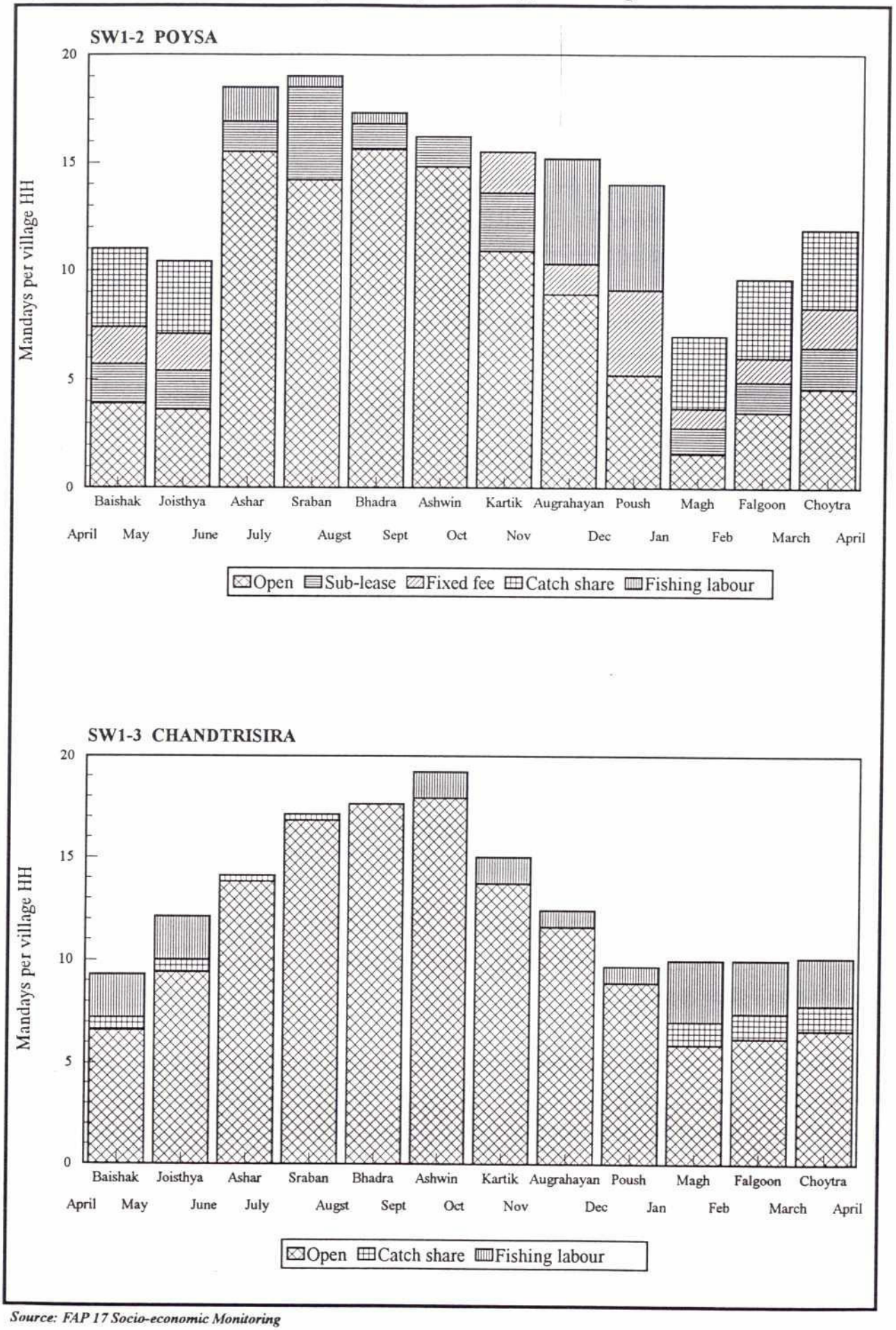
Poysa and Chandtrisira

The distribution of fishing effort through the year under different types of access arrangement by Poysa and Chandtrisira fishermen is shown in Figure 9.

Poysa fishermen are highly reliant on open-access fisheries for much of the year. The location of their settlement, on the banks of the Ghagar *khal* near its confluence with Poysa *khal* certainly encourages this, but the lack of access control in the Barisal section of Poysa *khal*, Ghagar *khal* and Agailjhara *khal* is even more important. Even where there are leases on *khal*, their reliance on *koch* (spears) seems to enable them either to completely avoid regulation or payment of access fees or come to some form of agreement regarding sale of catch where the leaseholder is also an *arotdar*.

Access arrangements in the *khal* are highly variable according to the types of gear used

Figure 9 Distribution of Fishing Effort by Access Type Through the Year



Source: FAP 17 Socio-economic Monitoring

and even the species of fish being caught. In the first section of the Ghagar *khal* leased by the LRO, Gopalganj District, the leaseholder sub-leases *katha* sites and locations for traps like *katra*; castnet fishing is subject to a fixed-fee payment, but spear fishermen are permitted to fish freely under the condition that any *golda chinggri* (*Macrobrachium rosenbergii*) which they catch be sold to the leaseholder who is also an important local fish buyer.

As long as these open fisheries are available, Poysa fishermen are able to sustain relatively high levels of fishing effort. But, after the drawdown, many of the *khal* dry up and fishing becomes more strictly controlled around *katha*, sections of *khal* being dewatered, and *kua* out on the floodplain. Poysa fishermen then shift their activities to *katha* which they have sub-leased or to pond and *kua* harvesting which they frequently carry out as labourers or on a catch share basis during the winter months from *magh* (January/February) right through to *joisthya* (May/June).

Chandtrisira fishermen are even more reliant on open-access fisheries, for their capture fishing. This is carried out both on *khal*, like the Poysa fishermen, and on the broad floodplains surrounding the village. But Chandtrisira fishermen have practically shifted from being fishermen to being aquaculturists in response to the rapid expansion of fish culture activities in the area. This activity does not show up in the fishing effort data but is clearly illustrated in the income data in Section 3.8 below. The Satla-Bagda Project has certainly benefitted aquaculture considerably. Chandtrisira fishermen have come to be regarded as local experts on fish culture and they are called upon to manage ponds in many local villages, including Gopalsen.

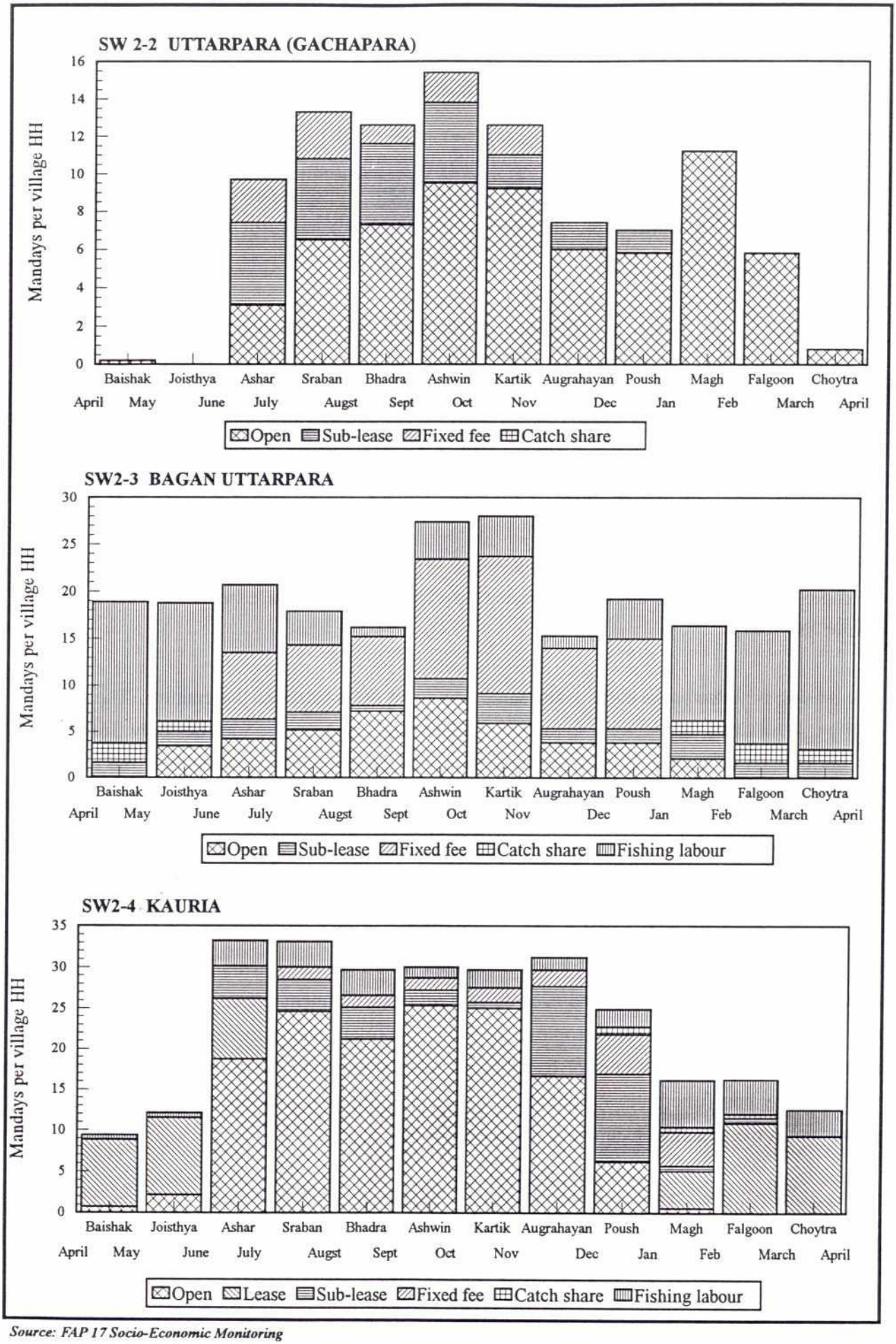
Several of the fishermen have their own *katha* placed in *khal* which are nominally open access although often some informal arrangement is required with local landowners beforehand.

Uttarpara, Bagan Uttarpara and Kauria

Figure 10 shows the distribution of fishing effort for Uttarpara, Bagan Uttarpara and Kauria by different access types.

The fishermen of Uttarpara and Bagan Uttarpara fish in three leased perennial *khal*, namely, Monoshabari *khal*, Kunjaban *Khal* and Gachapara *khal* after making necessary access payments to the lease holders. These *khal* are controlled by the Land Revenue Office of

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



Source: FAP 17 Socio-Economic Monitoring

Gopalganj and leased out on a yearly basis. The leaseholders are local people, most of them either relatively wealthy non-fishermen or *arotdar*. Most of these leaseholders then sublease sections of the *khal* or individual *katha* sites to fishermen. The leaseholders do not usually charge anything for "subsistence" fishing in the *khal*.

In addition to these formal leasing arrangements, there are some small *khal* like Baluhar *khal* and Ambarir *khal* which are controlled by the local mosque committee. The mosque committee leases the *khal*, using the income for the maintenance of the mosque and the *madrassa*.

The Ghagar River, fished by fishermen from Bagan Uttarpara and Kauria is an LRO *jalmahal* leased on a yearly basis. As in Gachapara and Uttarpara, the leaseholders sub-lease portions of the river and sub-lessees lay *katha* in their leased portions. Some villagers who maintain a good relationship with the leaseholders are also allowed to fish with spear (*koch*) on condition that they sell their catch to the lease holder at prices which are said to be slightly lower than the market price.

The *beel* in the area are open for fishing except for Kunjaban *beel* where pond owners tend to impose restrictions on and around their respective ponds to ensure better harvests at the end of the year.

The leasing of *jalmahal* is done in the same way as in other areas of the country. The first auction, in all cases, is restricted to registered fishermen's cooperative societies only. If there are not enough bidders or if the base price set by the government is not reached, the bid is cancelled and an open auction is arranged. The lease price increases at the minimum rate of 10% each year.

The situation regarding the enforcement of access controls on leased fisheries is complex. In general, they are enforced less vigorously than in other areas studied by FAP 17. Leaseholders often allow fishing by non-traditional fishermen using gears like *jhaki jal* (cast net), *doiar* (trap), *koch* (spear) and even current *jal* (monofilament gill net). However, there are conflicts over the control of some of the more important *khal* fisheries and, as in other areas, the competition for control has inflated lease values and led to most leases being controlled by non-fishermen. A substantial group of established leaseholders seems to have grown up in the area. An example is described in Box 1.

The effect on fishing communities of the introduction of a formal leasing system and the imposition of informal restrictions on the *khal* have been compounded by changes on the floodplain. The near absence of *khas* land in the beel areas has allowed a rapid expansion of excavated ponds on private land. Together with the effects of the construction of the embankment, this has significantly reduced the value of open water fisheries in areas such as Harinhati *beel* near Gopalsen.

The leases for four important *jalmahal* around Gachapara are controlled by one leaseholder who has acquired a considerable reputation for his methods and determination in controlling fishing. This *arotdar* from Ghagar is nicknamed *Daria*, a local name for a type of wild cat which generally lives near water and catches fish. One of his *jalmahal* on the Ghagar River (an area previously fished by Bagan Uttarpara fishermen) is officially leased out to a fisheries *samity* based in a community over 30 kilometres away. *De facto* control is said to have remained with *Daria* who also held the official lease two years ago. Under his control, the *jalmahal* is divided into 32 *khot* each managed by one of the fishermen or fish traders associated with *Daria* (none of whom belong to the *samity* which is said to control the *jalmahal*). Only three of these are Hindu fishermen. The *khot* holders either place their own *katha* or further sub-lease the location to other fishermen.

Box 1: Leaseholding in Kotalipara

3.5 Seasonality and fisheries

Most of the Muslim fishing communities in the area are relatively recent entrants to fisheries. The generally smaller types of gear which they use reflect their gradual movement into fishing as an occupation from occasional fishing for income. Fishing for them has always been concentrated above all on the local *khal* and floodplain and has focused on the period of the drawdown when fish are most easily caught.

Table 15 shows the fishing gear used by Poysa fishermen and the average earnings generated by the different gear through the year. The one *berjal* owned in this community is a relatively recent addition to the longer established spear fishing (*koch*) and traps.

Table 15 Distribution of Gears, Poysa

Gear Type	Bengali Name	No.	%	Tk.
Gill nets	Current jal	2	11.8	1834
	Koi/Fashi jal	4	17.6	938
Seine net	Ber jal	1	5.8	8890
Katha	Katha	5	23.4	1937
Traps	Doiar	10	47.4	1760
	Katra	1	5.8	1200
Hooks	Sip	1	6.1	500
	Daun	1	5.8	1000
Spear	Koch	11	52.3	8330
Cast net	Jhaki jal	4	17.4	3172

Source: FAP17 Socio-Economic Monitoring

In Table 16, the data for Chandtrisira are shown. The gears

used are similar. Like the Poysa fishermen, in Chandtrisira traps, spears and *current jal* (monofilament gillnet) are used in local *khal* and on the floodplain while castnet and *uttar jal* (a type of seine net) are used to harvest *katha* and *kua* and domestic ponds.

Figure 11 shows the distribution of fishing effort in Poysa and Chandtrisira across different waterbody types through the year. Table 18 shows the seasonal pattern of intensity of effort for the most important gear/waterbody combinations.

Table 16 Distribution of Gears, Chandtrisira

Gear Type	Bengali Name	No.	%	Tk.
Gill nets	Current jal	6	39.1	1878
	Koi/Fashi jal	8	45.6	5597
Seine net	Uttar jal	1	6.5	770
Scoop net	Tukri	1	6.5	180
Katha	Katha	6	35.0	6949
Trap	Doiar	6	39.1	5272
Hooks	Sip	6	34.1	2851
	Nol barsi	3	18.8	2721
Spear	Koch	2	13.8	837
Cast net	Jhaki jal	3	20.3	1046

Source: FAP17 Socio-Economic Monitoring

The overwhelming predominance of the *khal* fishery in Poysa is clear, encouraged by the lack of access regulation on the *khal* in Barisal District. The residual waterbodies which gain importance during the winter months are predominantly *kua* on local floodplains both inside and outside the Satla-Bagda Project.

In Chandtrisira, exploitation of the seasonal *beel* and floodplain immediately adjacent to the village play a more important role, with fishing on perennial *khal* as a more steady source of fish throughout the year.

Table 17 Distribution of Gears, Uttarpara (Gachapara)

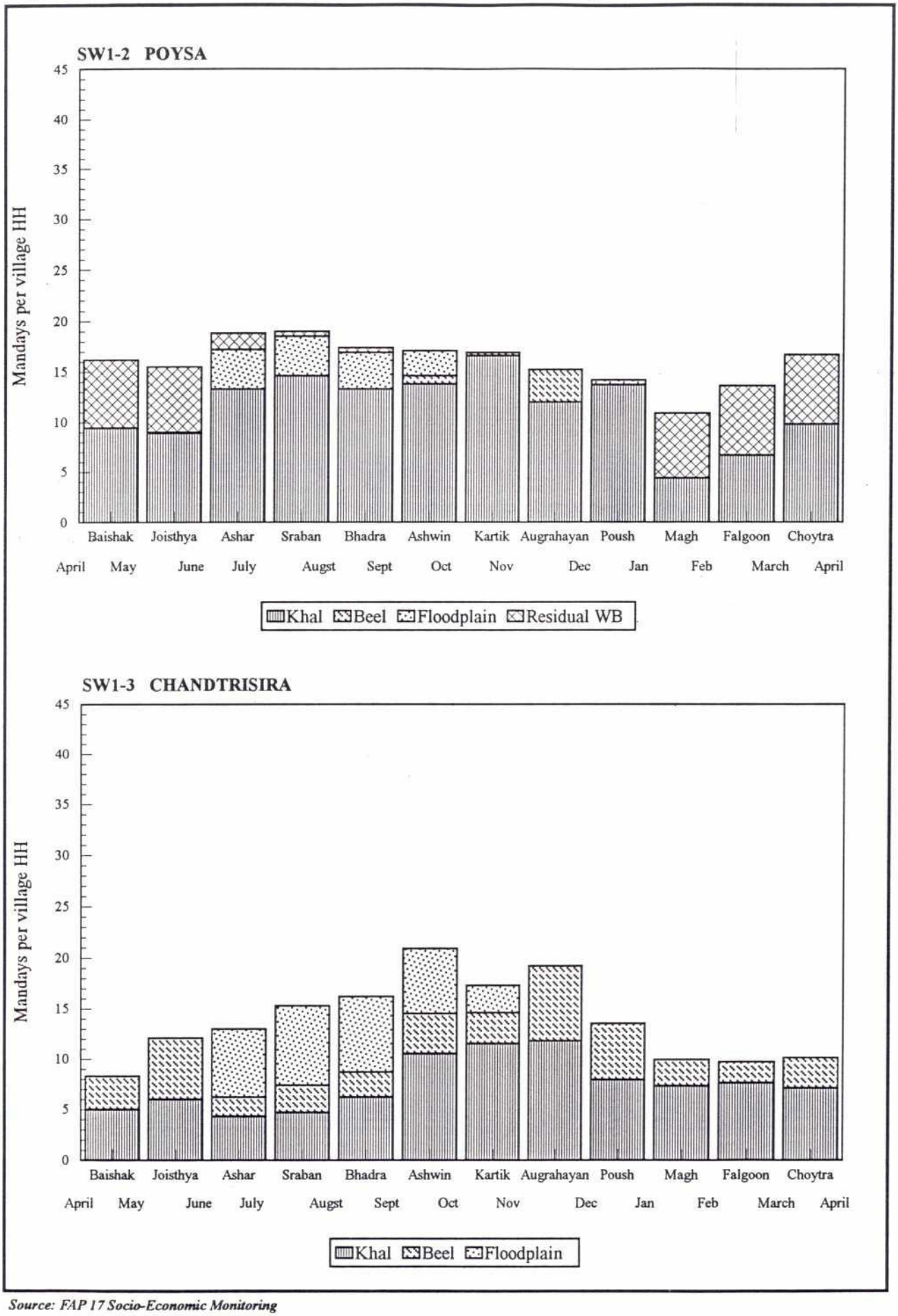
Gear Type	Bengali Name	No.	%	Tk.
Gill nets	Current jal	17	48.5	3767
	Koi/Fashi jal	13	38.2	1793
Seine net	Ber jal	3	8.8	20
Bag net	Bhuti jal	4	10.3	1870
Scoop net	Tukri	7	20.6	173
Traps	Doiar	17	48.5	2007
	Polo	10	29.4	1026
Spear	Koch	10	29.4	8447
Cast net	Jhaki jal	17	48.5	1371
Other	Hand fishing	3	8.8	400

Source: FAP17 Socio-Economic Monitoring

Uttarpara, Bagan Uttarpara and Kauria

Table 17 gives the distribution of fishing gears in Uttarpara. The basic set of gears being operated is very similar to those seen

Figure 11 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Socio-Economic Monitoring

Table 18
Principal Gears, Use by Month and Waterbody

SW1–2 Poysa

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	Khal								4.9	4.9				9.8	5.1
Doiar	Khal	2.7	2.7	3.2	2.8	2.6					0.4	0.5	2.7	17.8	9.3
Jhaki jal	Khal	1.6	1.4	0.6					1.2	1.2	1.6	1.5	1.4	10.5	5.5
Koch	Khal	2.5	2.7	8.8	11.8	10.3	10.1	11.5	4.2	6.0	0.8	3.3	3.2	75.3	39.3
Katha	Khal	1.7	1.2	0.5		0.3	3.7	4.6	0.5	0.8	1.2	0.6	1.2	16.1	8.4
Hat Tana jal	Residual WB	6.5	6.5								6.5	6.5	6.5	32.7	17.0

SW1–3 Chandtrisira

Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Sip	Khal				1.8	2.8	2.4	1.8			1.9			10.8	6.5
	Beel	1.3	2.3	1.3	1.9	0.6		0.6			1.3	1.3	1.3	12.0	7.3
Ber jal labour	Khal	1.9	1.9				1.3	1.3	1.4	0.8	1.9	1.9	1.9	14.5	8.8
Doiar	Khal	1.7	2.6	2.3	2.0	2.9	1.4	1.2				2.5	3.6	20.2	12.2
Koi/Fashi jal	Beel	1.7	2.0		0.5	1.1	1.6	1.0	5.1	4.0	0.5		1.7	19.3	11.7
	Floodplain			3.0	2.6	2.2	1.8	1.2						10.8	6.5
Katha	Khal	0.6	0.6	1.0	0.3	0.5	4.9	4.8	9.1	6.1	1.7	1.8	1.2	32.5	19.6

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

in Poysa and Chandtrisira. Traps are slightly more important as the Hindu fishermen in the hamlet also specialise in their manufacture. Like the Poysa fishermen, *koch* (spear) is an important gear which provides very high earnings.

Figure 12, showing fishing effort by waterbody type through the year, indicates a similar fishing pattern to Poysa, although the overall fishing effort is generally lower. *Khal* are the most important waterbodies, with floodplain seasonally important. Kunjaban *beel*, which is seasonal, is fished during the drawdown in *ashwin* and *kartik* (September to November) while the perennial waterbody in Chagdar *beel* is harvested in *magh* and *falgoon* (January to March). This *beel* only became perennial after the construction of a local roadway which blocks drainage to the south of the *beel*. This rather recent development explains why, in spite of being one of the few perennial *beel* in the area, it is not leased out.

Table 20 analyses the pattern of use for the principal gears on the waterbodies where they are used most. The fishing strategy is relatively diverse. No single gear/waterbody combination accounts for more than 18% of fishing effort, although *current jal* (monofilament gillnet) is clearly the most important single gear, accounting for over 22% of effort, most of which is concentrated on the *beel* and floodplain during the flooding period and drawdown. The importance of fishing on the *khal*, with traps (*doiar*), castnets (*jhaki jal*), small bagnets (*bhuti jal*) and spears (*koch*) is also highlighted, particularly as some gears can be used there almost all through the year.

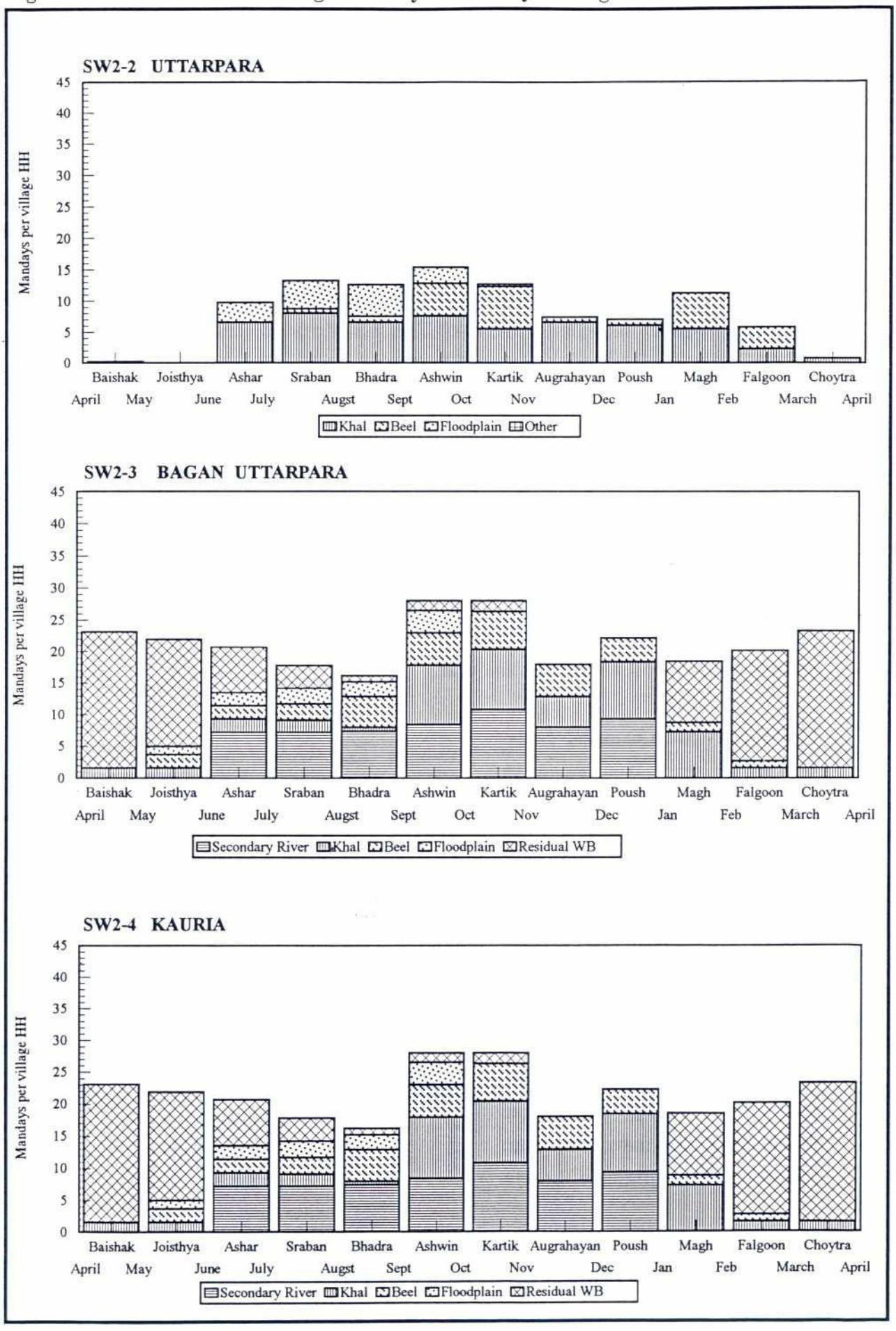
The data on gear ownership in the Hindu *gain* fishing communities in Bagan Uttarpara and Kauria in Tables 19 and 21 show a very different approach to that employed by the predominantly Muslim fishermen in Poysa, Chandtrisira and Uttarpara. Largely in response to the appearance of a large number of Muslim fishermen on all available open-access fishing areas, the Hindu fishermen have tended to concentrate their fishing effort on

Table 19 Distribution of Gears, Bagan Uttarpara

Gear Type	Bengali Name	No.	%	Tk.
Gill net	Koi/Fashi jal	4	17.6	1282
Seine net	Ber jal	2	8.8	22200
Katha	Katha	4	17.6	4350
Trap	Doiar	2	8.8	2330
Hook	Sip	6	26.4	3357
Spear	Koch	4	17.6	2415
Cast net	Jhaki jal	12	48.1	6340

Source: FAP17 Socio-Economic Monitoring

Figure 12 Distribution of Fishing Effort by Waterbody Through the Year



Source: FAP 17 Soeico-Economic Monitoring

Table 20
Principal Gears, Use by Month and Waterbody

SW2–2 Uttarpara

Units: Man Days per Village Household

Gear	Habitat	Baishak	Jois	Ashar	Sraban	Bhadra	Ashwin	Kartik	Augra	Poush	Magh	Falgoon	Choytra	Md/VHh	Eff %
Current jal	Beel						3.1	5.2			0.4	0.2		8.9	9.3
Current jal	Floodplain			2.1	3.5	3.9	2.6							12.1	12.6
Doiar	Khal			2.5	3.4	3.4	3.4	0.2	0.8	0.8	1.6			16.1	16.8
Koi/Fashi jal	Beel						1.2	0.7	0.7	0.7	1.6	1.0		6.0	6.3
Jhaki jal	Khal	0.2					0.8	2.5	0.8	0.4	2.5	1.9	0.8	9.9	10.3
Koch	Khal			1.8	1.8	1.8	3.4	2.8	2.2	1.9	1.0			16.6	17.3
Bhuti jal	Khal			2.3	2.5	1.0								5.8	6.0

SW2–3 Bagan Uttarpara

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		2.1	2.1	2.6	4.9	0.5	1.3						13.5	5.2
Ber jal	Residual WB	6.3	4.2									6.3	4.6	21.5	8.3
Ber jal labour	Residual WB	15.2	12.7	7.2	3.6	1.0	1.5	1.7			9.7	11.2	16.2	79.9	31.0
Jhaki jal	Secondary River			7.2	7.2	7.4	8.4	9.7	8.0	9.3				57.2	22.2
	Khal	1.6	1.6	1.5	1.3		5.7	5.3	1.5	1.5	2.1	1.6	1.6	25.1	9.7

SW2–4 Kauria

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	Khal			3.9	3.9	3.9	1.9	3.7	2.2	2.2				21.6	7.7
	Residual WB	8.1	9.3	7.5					11.1	10.7	3.8	10.2	9.3	69.9	25.1
Koi/Fashi jal	Beel				0.9			5.7	7.0	1.3				14.9	5.3
Nol barsi	Beel							10.7	4.1	0.3				15.1	5.4
	Floodplain			14.4	17.8	15.9	15.9	2.9						66.9	24.0

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

fewer types of waterbody. As shown by the analysis of fishing effort according to access type in Figure 10 above, most of these waterbodies are **not** open access. As is common for Hindu fishermen almost everywhere in Bangladesh, open access means insecure access; where there is no management of fishing effort, Hindu fishermen find it very difficult to compete for fishing grounds with the burgeoning numbers of Muslims involved.

Table 21 Distribution of Gears, Kauria

Gear Type	Bengali Name	No.	%	Tk.
Gill nets	Current jal	6	28.9	1897
	Koi/Fashi jal	12	63.2	2336
Seine net	Ber jal	7	34.2	21118
Lift net	Veshal jal	2	9.2	650
Scoop net	Tukri	2	9.2	330
Katha	Katha	7	34.2	-177
Trap	Doiar	4	18.4	5097
Hooks	Sip	5	27.6	536
	Nol barsi	17	90.8	5834
Other	Dewatering	7	38.2	2249

Source: FAP17 Socio-Economic Monitoring

Particularly notable are the few *berjal* (seine net) operating in each community but apparently generating very high earnings. Coupled with the data on fishing effort through the year shown in Figure 12 and Table 19, it can be seen that, between their operators and those working on the teams as labourers, the use of these gears on "residual waterbodies" accounts for a disproportionate amount of fishing effort in both communities; almost 40% in Bagan Uttarpara and over 25% in Kauria. This activity is highly concentrated in the winter months when the submersible ponds (*kua*) and many cultured ponds in the area are being harvested. This work on ponds has become something of a speciality for these fishermen.

During the rest of the year, the two communities follow somewhat different approaches. For Bagan Uttarpara fishermen, fishing on *khal* and the Ghagar River is particularly important. Through fixed-fee payments to the leaseholders, they can gain reasonably secure access for *jhaki jal*, spear and trap fishing. Several Bagan Uttarpara fishermen also held sub-leases on the Uttarpara *Khal*. The Kauria fishermen are more reliant on the floodplain and *beel* areas, such as Kunjaban and, inside the Satla-Bagda embankment, in Chitrapara *beel*. By concentrating their activity on *nol barsi* (float line), a gear owned by 90% of the people in the community, they are able to exploit areas of the floodplain where the more common *current jal* (monofilament gillnet) cannot be set.

3.6 Patterns of waterbody exploitation

Poysa and Chandtrisira

Major shifts in the types of waterbodies exploited by Poysa and Chandtrisira fishermen would not be expected. Both communities moved into fishing only shortly before the completion of the Satla-Bagda Project and have continued to exploit the same *khal*, floodplains and *beel* which they initially targetted as shown in Figure 13. There is however one notable exception to this.

Amboila *khal*, running from the Poysa *khal* into Amboila *beel* used to be one of the most important waterbodies for Chandtrisira fishermen in the late 1960s and early 1970s when they had just begun fishing seriously. Since the construction of the embankment, the importance of this *khal* has greatly reduced. What fishing is still carried out there is primarily done by local people and landowners who have placed *katha* in the *khal*. The change in status of this waterbody seems to be the direct result of embankment construction. Otherwise, fishing grounds have not changed.

Poysa fishermen have always fished extensively on Poysa and Ghagar *khal*. In recent years they are said to have claimed more exclusive rights to the exploitation of Rajapur *beel*, just north of their village. This has been at the expense of Hindu fishermen from Rajapur who have had to move onto other *beel* as a result. Overall, however, Poysa fishermen say that in the past they did more fishing on local *beel* where there were small areas of perennial water which have now mostly silted up. As a result, apart from Rajapur *beel*, almost all their fishing is now on local *khal*.

Uttarpara, Bagan Uttarpara and Kauria

The fishing grounds of Uttarpara fishermen have changed very little. As several of them are more recent Muslim fishermen, they have always tended to exploit any niche in local waterbodies where they are able to fish freely.

The situation for Bagan Uttarpara fishermen is quite different. The Uttarpara-Kunjaban *khal* which runs past the village is, and always has been, their most important single fishing ground. Several fishermen from the community have leased *katha* sites along this *khal* for many years and one Kauria fishermen currently holds the sub-lease for a section of the *khal*. However, a major shift has occurred in the secondary fishing grounds. The Ghagar River to the west was, in the past, also important for the *gain* of Bagan Uttarpara, but the recent

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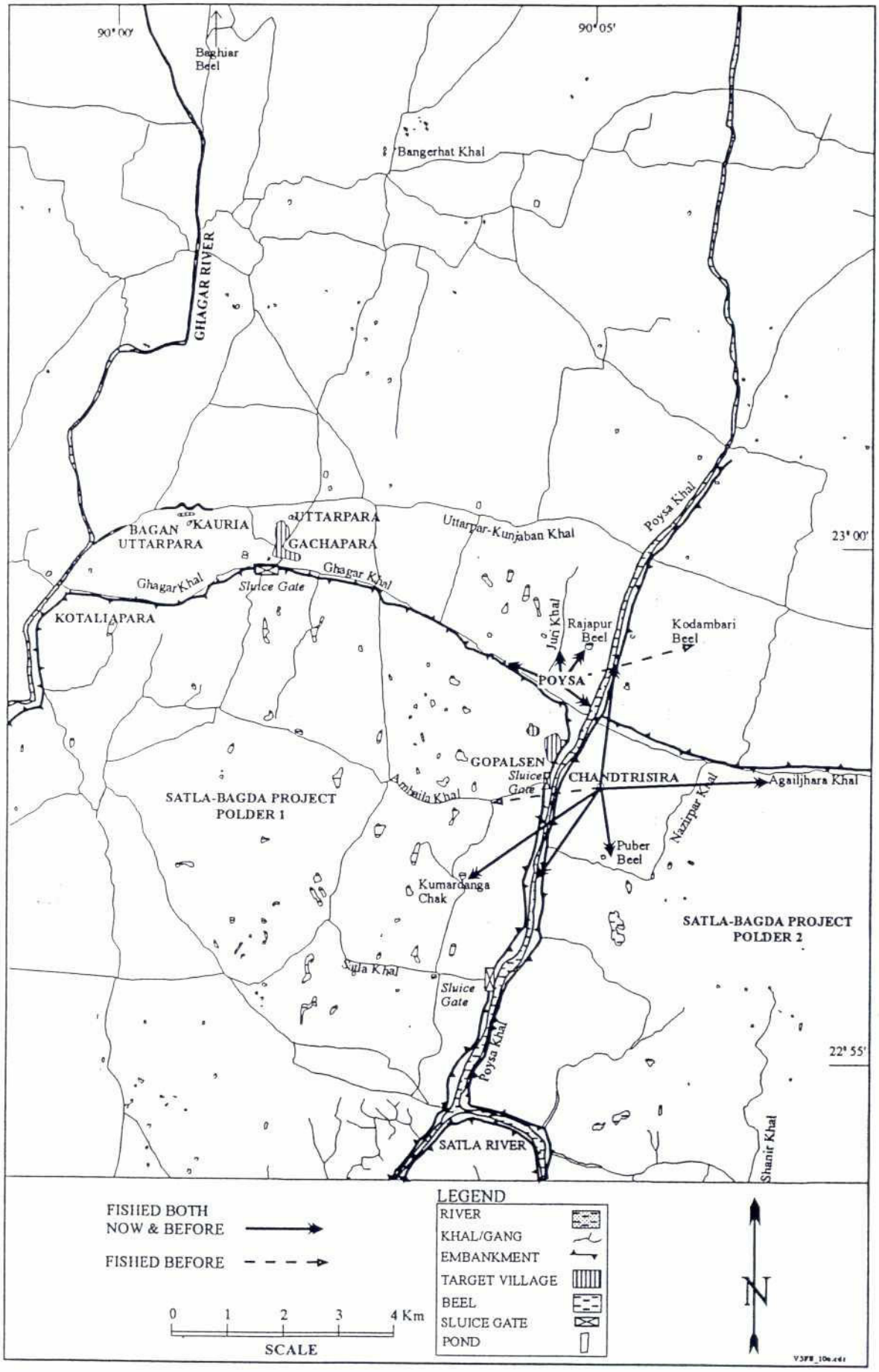
Figure 13
Poysa and Chandtrisira
Principal waterbodies fished: past and present



changes in the balance of power between different groups of leaseholders have resulted in tighter control over the *khal* and riverine sites, limiting the number of fishermen who can fish there. Their subsequent switch to local seasonal floodplain and *beel* such as Kunjaban and Kauria *beel,* has only partly compensated for the loss of this important fishery. This is especially so as these *beel* are all open-access and therefore fished by large numbers of local people as well as the Hindu fishermen.

Chitrapara *beel*, located inside the Satla-Bagda Project just south of Gachapara also used to be fished by the *gain* of Bagan Uttarpara but, since its' enclosure by the embankment, this has been abandoned.

Kauria, although located very close by, has quite a different history of waterbody exploitation. Kauria people have apparently always concentrated on local open-access *beel* and floodplains while their neighbours in Bagan Uttarpara had more well-established rights to specific *khal* and river fisheries. This may explain the initial impression during appraisals in the two villages that Kauria fishermen were the "poor relations" of those in Bagan Uttarpara. From their patterns of waterbody exploitation it looks as if they probably once were, but since Bagan Uttarpara fishermen have lost access to the rich fishing grounds on the Ghagar River, fishing incomes in the two villages are now very similar.

Changes in the patterns of waterbody exploitation in Uttarpara and Bagan Uttarpara are shown in Figure 14 while changes in fishing grounds for Kauria are shown separately in Figure 15.

3.7 Occupations and incomes

Poysa and Chandtrisira

For the Muslim fishermen of Poysa, the shift into fisheries as a major occupation is not yet complete. As shown in Table 22 and Figure 16, fishing and fish labour account for almost 66% of income for the community as a whole, with the balance derived from agriculture.

Comparison of the income flows for the community with the seasonal patterns of fishing effort shown in Figure 11 is instructive. The period of most effort, fishing on the *khal* during the flood season from *ashar* to *ashwin* (June to October), is the period of **lowest** fishing income. The data for the month of *ashwin* are distorted by the considerable outlay

Figure 14
Uttarpara and Bagan Uttarpara
Principal waterbodies fished: past and present

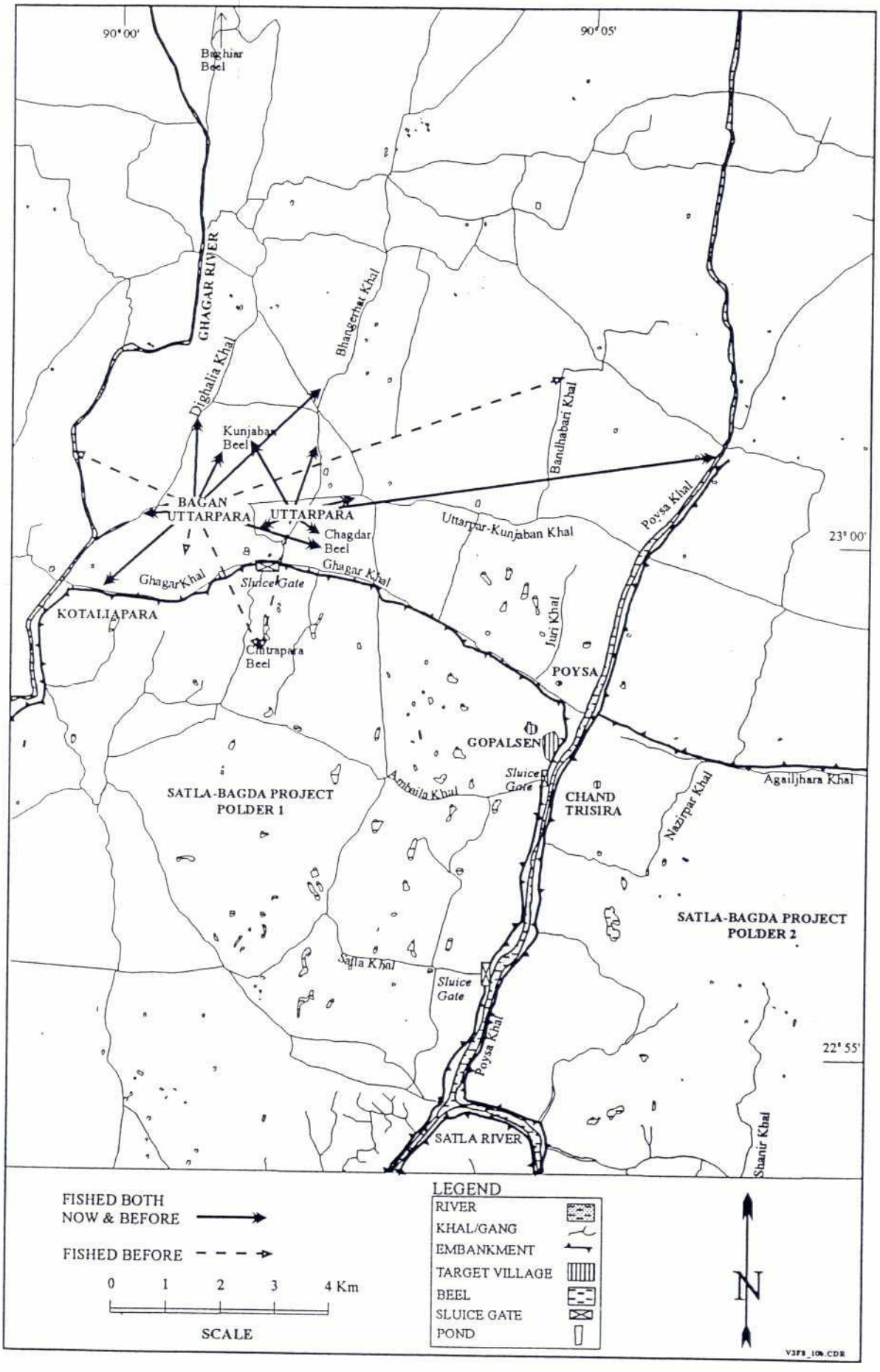
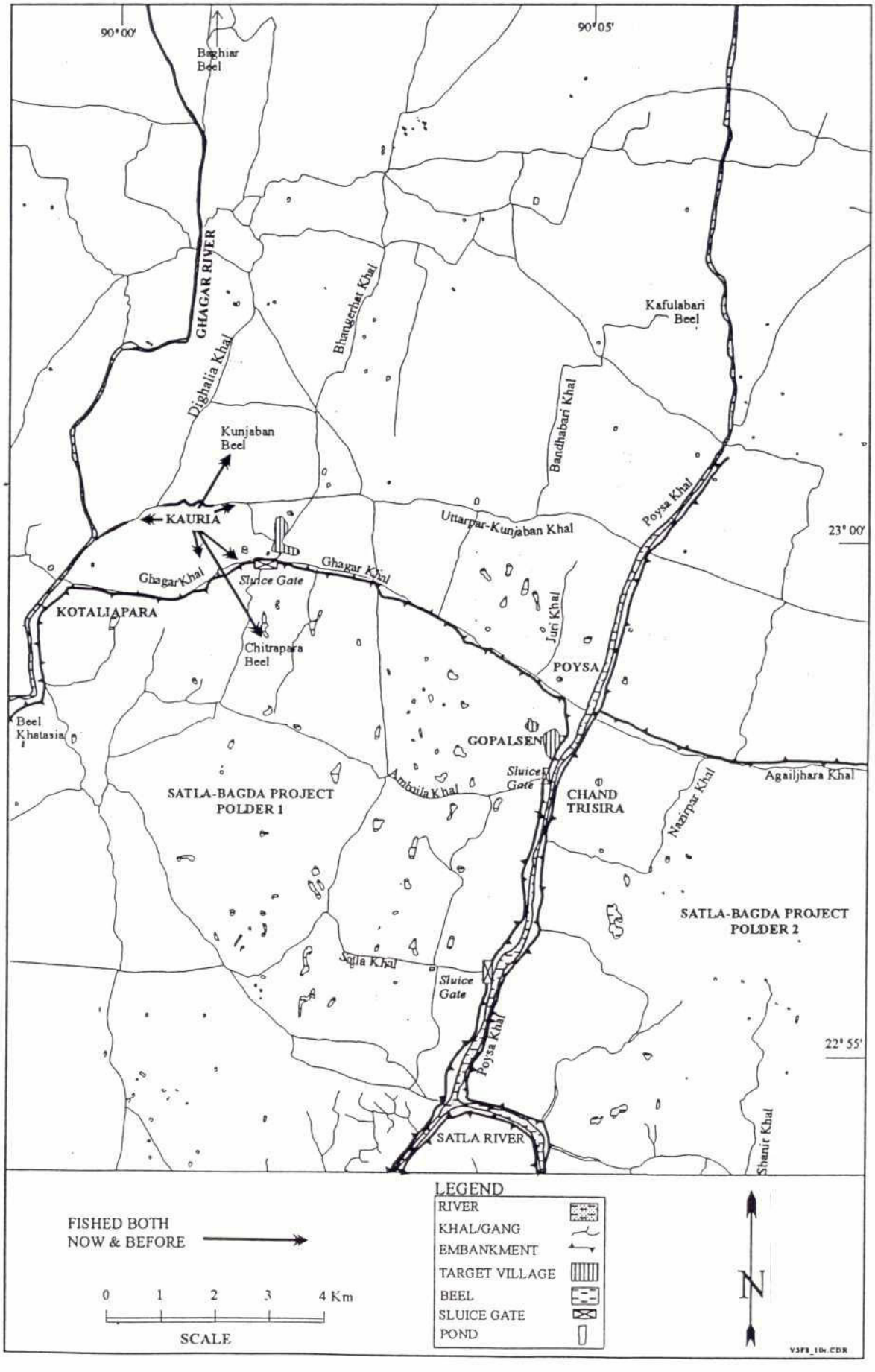


Figure 15
Kauria
Principal waterbodies fished: past and present



by one wealthier household in the village on fingerlings for stocking a leased-in pond. General income levels are similar to the subsequent month of *kartik* (October/November). During the period from *augrahayan* to *joisthya* (November to June), there is little correspondence between fishing effort and fishing income, due to the concentration of fish resources in *khal*, *kua*, and *katha*.

Fish trading plays a minor role in Poysa - 1.5% of annual income - but it is curious that it is not more important. Poysa *hat*, located about half a kilometre from the fishing village, is an important regional fish trading centre and more involvement would seem to be a logical strategy for people involved in fishing. But local fish trading networks are very much concentrated on moving fish **out** of the area towards urban centres and these channels are tightly controlled by powerful *arotdar* who seem to have their "own people" in place to handle the trade.

Income flows in Chandtrisira, shown in Table 23 and Figure 17 are strongly affected by the fish culture activities of the five households in the HFC 1 category, which generate almost 50% of their income. The result is that the relative incomes between different fishing categories is almost the exact opposite of that seen in most other fishing communities; those most dependent on fisheries-related income have the **highest** income. The fluctuations in fish related income through the year are explained by the involvement of many Chandtrisira villagers in both fish trading and the leasing-in and harvesting of submersible ponds. All these activities entail outlays of money which cause income fluctuations independent of patterns of fishing effort. For example, the major dip in fisheries earnings seen in *baishak* (April/May) is due to loans taken for fish trading activities.

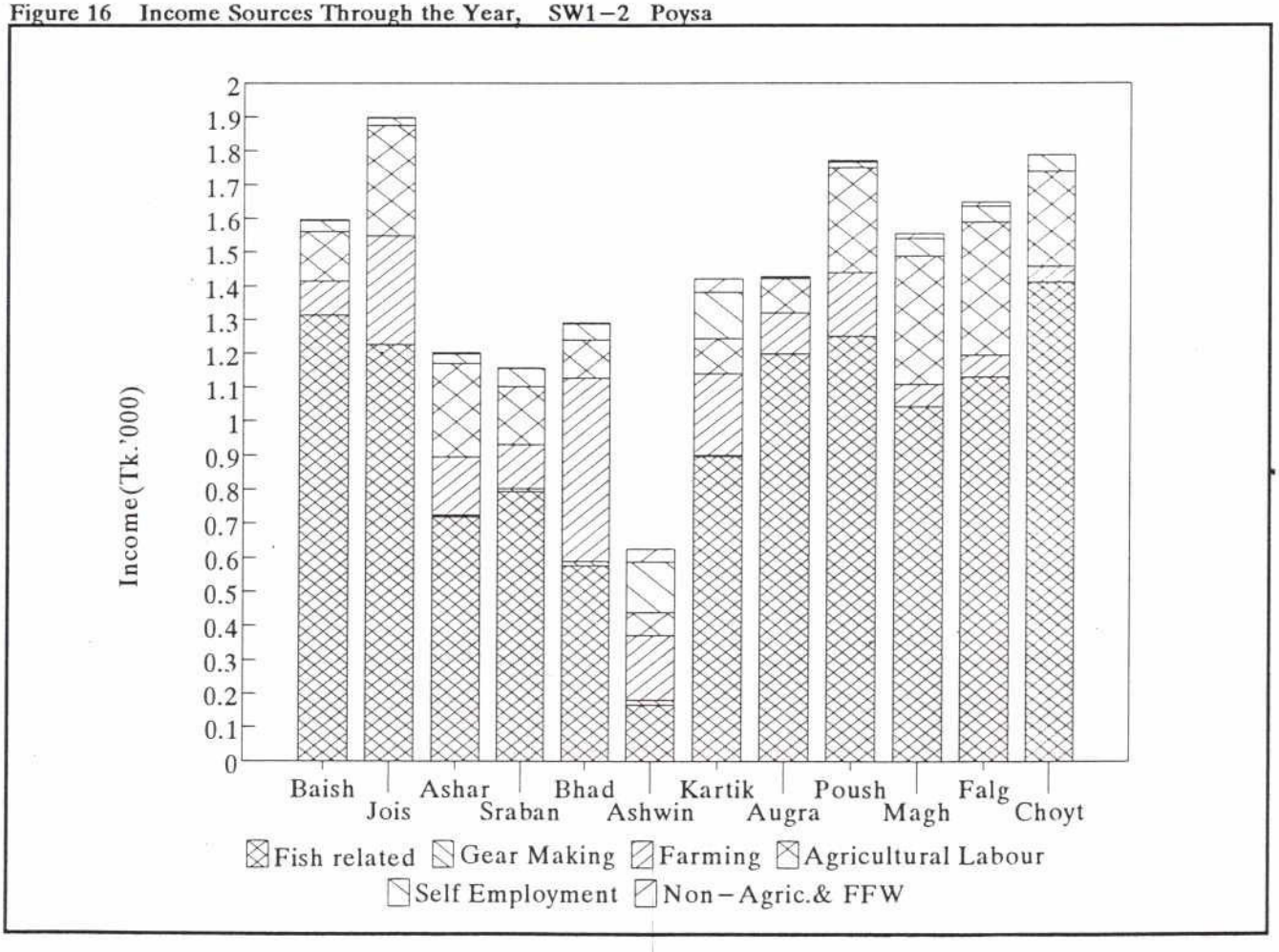
For those able to gain access to ponds, either through ownership or leasing arrangements, fish culture obviously offers potentially rich rewards. Chandtrisira is located inside Polder 2 of Satla-Bagda Project and the area surrounding the village has many ponds which are being increasingly intensively cultured. For fishing households which are able to establish themselves as fish culture specialists, the shift from dependence on capture fisheries to the management of ponds is generally advantageous. In Chandtrisira, this shift does not appear to be linked with ownership of ponds. The average area of pond or ditch owned by the Fishing Category 1 households most involved in fish culture is only nine decimals. Most culture activities are therefore carried out in leased-in ponds. The main constraint on involvement in fish culture is the availability of credit; this is resolved by the close ties between Chandtrisira fishermen and the local marketing network.

Table 22 Income Sources Through the Year, by Fishing Category, SW1–2 Poysa

UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOIS	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	3,250	3,250	(50)	310	360	–	–	–	–	3,150	3,150	3,250	16,670	61.9
	Fishing Labour	–	–	500	200	60	–	–	3,300	3,000	–	–	–	7,060	26.2
	Fish Trading	60	–	–	–	–	360	340	–	–	330	310	60	1,460	5.4
	Farming	20	–	40	–	100	90	30	–	–	20	–	24	324	1.2
	Self Employment	–	–	–	–	–	700	700	–	–	–	–	–	1,400	5.2
	Total	3,330	3,250	490	510	520	1,150	1,070	3,300	3,000	3,500	3,460	3,334	26,914	100
HFC2	Fishing	579	619	653	726	479	316	1,021	711	853	642	342	734	7,673	57.2
	Gear Making	–	–	10	14	23	23	5	–	–	–	–	–	74	0.6
	Farming	100	305	137	120	162	170	39	92	21	51	54	33	1,284	9.6
	Agricultural Labour	159	476	392	236	151	89	120	161	431	546	560	365	3,686	27.5
	Self Employment	48	28	36	73	65	24	5	5	5	75	69	73	506	3.8
	Non–Agric.& FFW	5	4	5	5	5	61	61	6	6	20	20	–	200	1.5
	Total	891	1,432	1,233	1,174	885	683	1,251	975	1,316	1,334	1,045	1,205	13,423	100
HFC3	Fishing	1,883	1,333	1,211	1,306	1,066	(550)	1,016	800	900	–	1,566	1,883	12,415	57.1
	Farming	187	700	407	293	2,286	370	1,153	345	961	168	167	120	7,156	32.9
	Agricultural Labour	247	133	150	117	100	50	160	–	200	187	200	267	1,810	8.3
	Self Employment	17	23	33	40	37	33	40	3	77	20	17	17	357	1.6
	Total	2,334	2,189	1,801	1,756	3,489	(97)	2,369	1,148	2,138	375	1,950	2,287	21,738	100
Com–	Fishing	1,302	1,227	627	756	564	101	834	598	706	981	1,075	1,400	10,171	58.5
munity	Fishing Labour	–	–	91	36	11	–	–	600	545	–	–	–	1,284	7.4
	Fish Trading	11	–	–	–	–	65	62	–	–	60	56	11	265	1.5
	Gear Making	–	–	6	9	14	14	3	–	–	–	–	–	47	0.3
	Farming	101	321	169	129	537	192	240	121	188	67	65	47	2,177	12.5
	Agricultural Labour	146	327	277	171	114	66	105	102	311	381	393	281	2,675	15.4
	Self Employment	33	22	29	54	48	148	138	4	17	52	47	49	641	3.7
	Non–Agric.& FFW	3	2	3	3	3	39	39	4	4	13	13	–	127	0.7
	Total	1,596	1,899	1,202	1,158	1,291	625	1,421	1,429	1,771	1,554	1,649	1,788	17,387	100

Figure 16 Income Sources Through the Year, SW1–2 Poysa

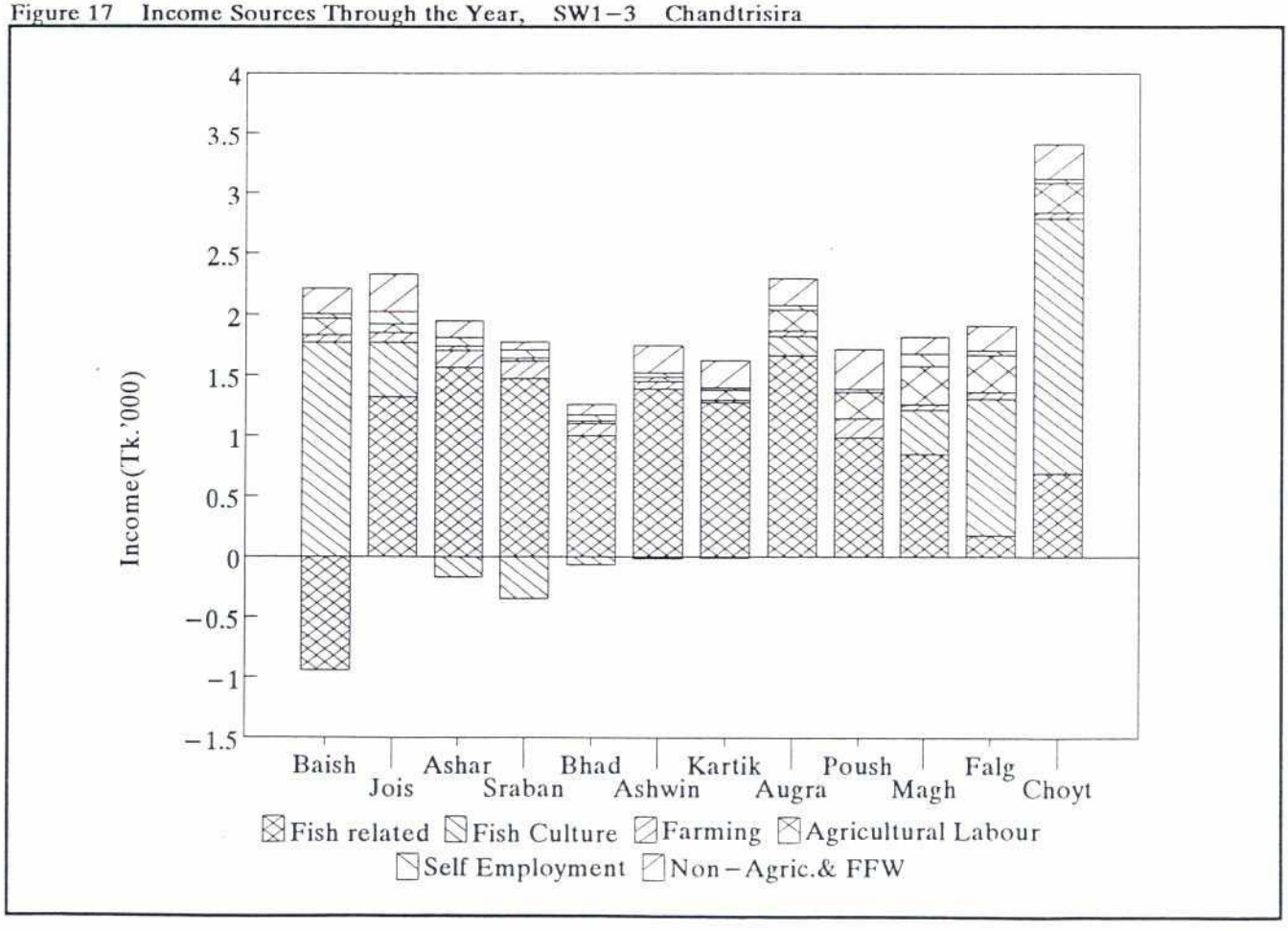


Source : FAP17 Socio–Economic Monitoring

Table 23 Income Sources Through the Year, by Fishing Category, SW1–3 Chandtrisira UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	385	608	345	600	(70)	2,040	1,298	3,145	1,584	1,300	850	435	12,519	36.9
	Fish Trading	(5,350)	1,650	2,500	1,375	856	75	88	75	–	200	325	300	2,094	6.2
	Fish Culture	4,645	1,579	(646)	(1,120)	(181)	–	–	548	–	1,175	3,675	6,730	16,404	48.3
	Farming	40	123	73	49	14	126	15	23	25	49	116	77	728	2.1
	Agricultural Labour	60	–	–	–	–	–	–	–	–	263	270	213	805	2.4
	Self Employment	18	15	33	50	25	10	10	48	18	23	20	20	288	0.8
	Non–Agric.& FFW	–	420	250	–	–	–	88	188	188	–	–	–	1,133	3.3
	Total	(202)	4,395	2,555	954	644	2,251	1,499	4,027	1,815	3,010	5,256	7,775	33,971	100
HFC2	Fishing	589	773	905	1,112	957	946	1,149	763	622	309	(493)	527	8,157	47.9
	Fishing Labour	102	102	–	–	–	80	90	78	48	195	160	120	975	5.7
	Fish Trading	103	143	100	70	24	–	–	100	–	128	73	83	822	4.8
	Fish Culture	623	(24)	26	(30)	(20)	(25)	(20)	(4)	(4)	29	76	184	810	4.8
	Farming	68	71	179	198	148	42	25	59	235	38	32	44	1,138	6.7
	Agricultural Labour	182	108	54	41	32	48	129	270	337	372	354	279	2,206	12.9
	Self Employment	48	150	92	84	72	51	24	32	38	149	42	47	828	4.9
	Non–Agric.& FFW	252	233	–	–	–	246	225	144	304	103	233	361	2,099	12.3
	Total	1,967	1,556	1,356	1,475	1,213	1,388	1,622	1,442	1,580	1,323	477	1,645	17,035	100
HFC3	Fishing	–	–	1,390	2,170	2,330	1,755	1,180	1,850	1,450	–	–	–	12,125	48.4
	Farming	100	–	–	–	–	–	–	–	–	120	–	–	220	0.9
	Agricultural Labour	45	–	–	–	–	–	–	–	–	–	–	45	90	0.4
	Non–Agric.& FFW	770	620	1,120	1,120	1,420	1,120	910	1,250	1,220	1,170	970	920	12,610	50.3
	Total	915	620	2,510	3,290	3,750	2,875	2,090	3,100	2,670	1,290	970	965	25,045	100
Com–	Fishing	494	679	769	1,024	736	1,315	1,194	1,528	953	582	(69)	469	9,673	43.0
munity	Fishing Labour	66	66	–	–	–	52	58	50	31	126	104	78	631	2.8
	Fish Trading	(1,507)	578	800	450	267	22	26	87	–	141	143	142	1,147	5.1
	Fish Culture	1,769	449	(173)	(349)	(66)	(16)	(13)	158	(3)	364	1,130	2,098	5,349	23.8
	Farming	62	82	137	142	100	64	20	45	159	46	55	51	963	4.3
	Agricultural Labour	138	70	35	27	21	31	83	175	218	318	308	246	1,669	7.4
	Self Employment	36	101	69	69	54	36	19	34	30	103	33	36	620	2.8
	Non–Agric.& FFW	208	310	139	66	84	225	225	222	324	135	208	287	2,433	10.8
	Total	1,266	2,335	1,776	1,429	1,196	1,729	1,612	2,299	1,712	1,815	1,912	3,407	22,485	100

Figure 17 Income Sources Through the Year, SW1–3 Chandtrisira



Source : FAP17 Socio–Economic Monitoring

Uttarpara, Bagan Uttarpara and Kauria

Uttarpara has the lowest levels of fishing income of any of the five fishing communities studied in and around Satla-Bagda. As seen in Table 24 and Figure 18, they are far more dependent on other sources of income. Gear making is an important component for many households.

Bagan Uttarpara fishermen are more dependent on fishing, although several of the households also own land. The *gain* in the village say that they have tended to get **more** involved in farming over the past years as their security of access to local waterbodies is threatened by competition with new Muslim fishermen. Agriculture-related activities only ever provide a maximum of just over 31% of monthly income (during *poush* (December/ January). Fish trading makes a significant contribution to incomes, accounting for 7.5% overall.

Table 25 and Figure 19 show the breakdown of earnings from different sources for Bagan Uttarpara. Once again, by comparison with Figure 12, it can be seen that fisheries earnings are not very well correlated with levels of fishing effort. Incomes from fishing rise steadily from *kartik* to *poush* (October to January) when the harvesting of *katha* in the *khal* is underway. As the fish resource is highly concentrated during this period, the returns on fishing are far higher but the areas where fishing can be carried out are smaller. The period of peak effort, during the drawdown from *ashwin* to *kartik* (September to November), sees a steep rise in returns to fishing.

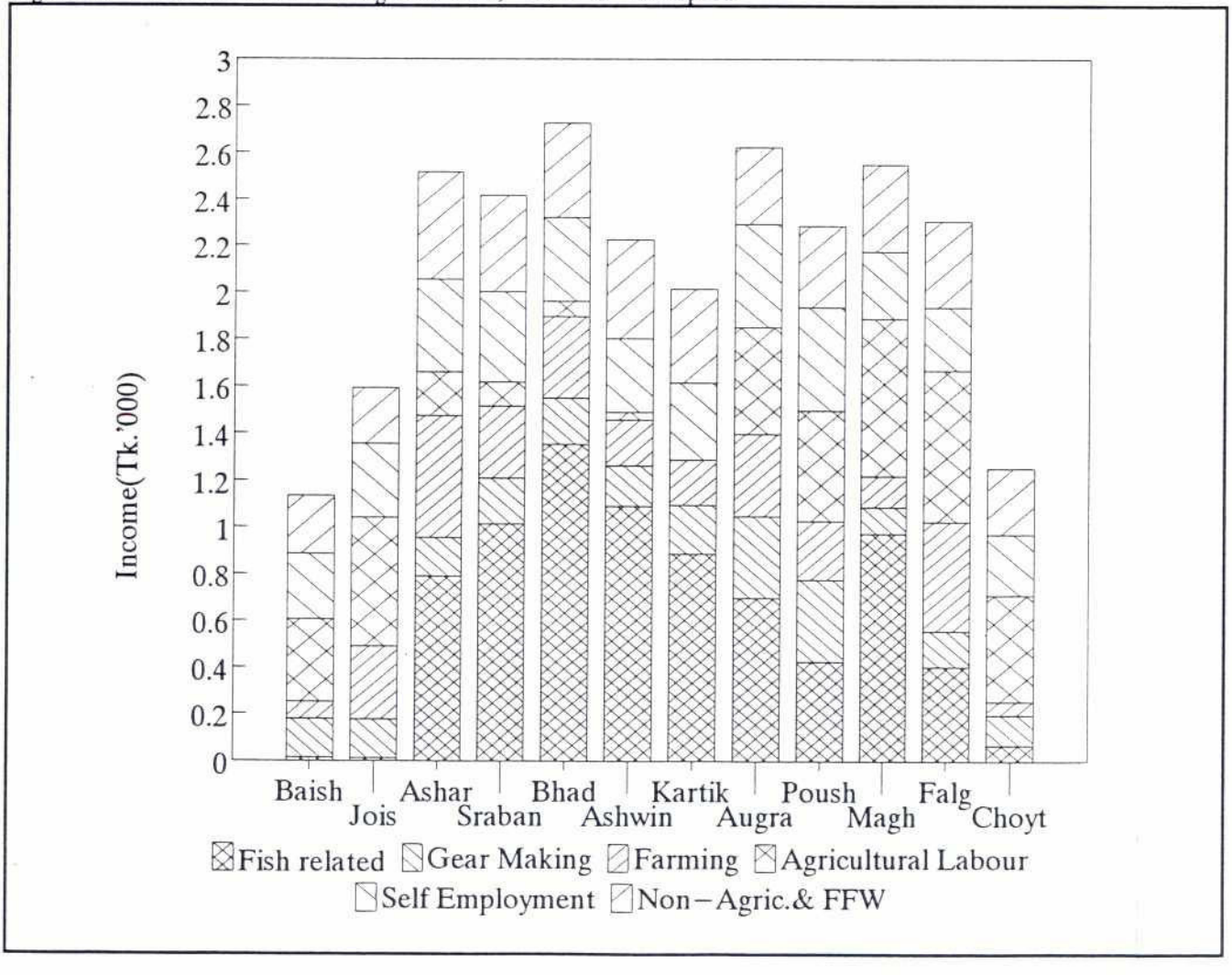
Fisheries dependence is highest in Kauria, illustrated in Table 26 and Figure 20. In contrast to the other communities, effort and incomes seem to be relatively well-correlated. This reflects the fact that Kauria fishermen are more floodplain and *beel* dependent than other fishing communities. The residual waterbodies to which they have access during the dry season from *augrahayan* (November/December) on are not particularly productive after *magh* (January/February) and incomes drop off considerably. Farming activities for some households provide relief but farming and agricultural labour together provide only about 15% of village income, while fishing and fish labour account for over 77%.

Table 24 Income Sources Through the Year, by Fishing Category, SW2–2 Uttarpara

UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	22	–	3,315	3,540	5,590	3,115	2,915	2,049	1,636	1,000	488	18	23688	84.8
	Farming	55	23	–	13	75	20	26	200	–	357	161	75	1005	3.6
	Agricultural Labour	355	275	255	150	–	–	–	245	240	580	720	385	3205	11.5
	Non–Agric.& FFW	–	–	–	–	–	30	–	–	–	–	–	–	30	0.1
	Total	432	298	3,570	3,703	5,665	3,165	2,941	2,494	1,876	1,937	1,369	478	27928	100
HFC2	Fishing	–	–	248	471	444	653	451	141	164	716	376	70	3734	14.8
	Fish Culture	13	13	–	–	–	–	–	264	–	250	6	6	552	2.2
	Gear Making	200	200	200	238	238	213	253	425	425	138	188	156	2871	11.4
	Farming	74	375	630	368	408	233	231	382	304	87	534	56	3681	14.6
	Agricultural Labour	355	614	173	93	80	38	–	501	519	688	628	469	4154	16.5
	Self Employment	339	380	479	468	435	381	397	535	537	349	328	318	4,945	19.7
	Non–Agric.& FFW	303	288	563	505	493	510	485	400	425	456	449	344	5,219	20.7
	Total	1,284	1,870	2,293	2,143	2,098	2,028	1,817	2,648	2,374	2,684	2,509	1,419	25,156	100
Com–	Fishing	4	–	789	1,013	1,352	1,087	886	478	424	766	396	61	7,256	28.3
munity	Fish Culture	10	10	–	–	–	–	–	218	–	206	5	5	454	1.8
	Gear Making	165	165	165	196	196	175	208	350	350	113	154	129	2,365	9.2
	Farming	71	313	519	305	349	195	194	350	251	134	468	59	3,209	12.5
	Agricultural Labour	355	554	187	103	66	31	–	456	470	669	644	454	3,987	15.5
	Self Employment	279	313	394	385	358	314	327	441	442	287	270	261	4,072	15.9
	Non–Agric.& FFW	249	237	463	416	406	425	399	329	350	376	370	283	4,303	16.8
	Total	1,133	1,592	2,517	2,418	2,727	2,227	2,014	2,622	2,287	2,551	2,307	1,252	25,646	100

Figure 18 Income Sources Through the Year, SW2–2 Uttarpara

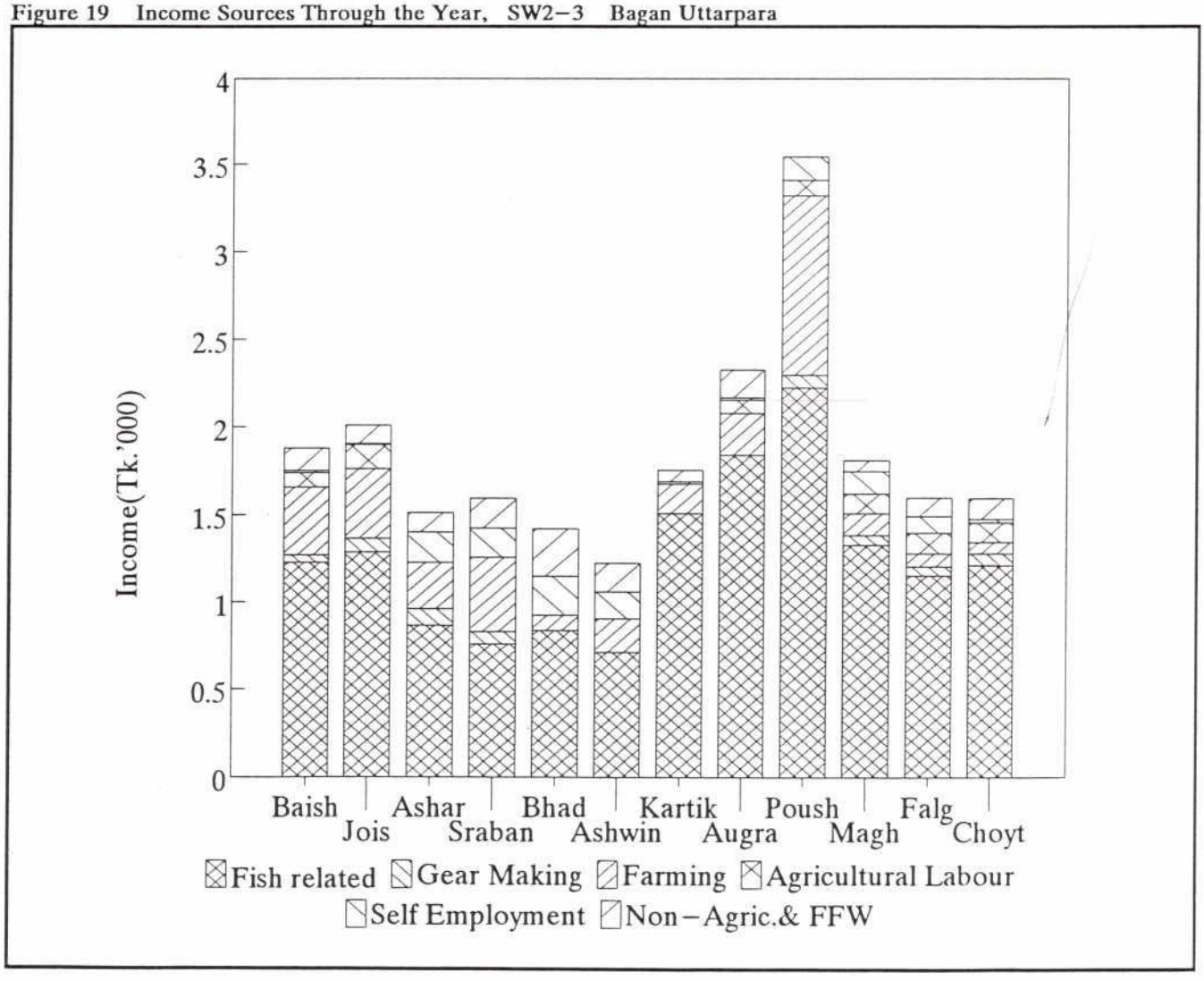


Source : FAP17 Socio–Economic Monitoring

Table 25 Income Sources Through the Year, by Fishing Category, SW2–3 Bagan Uttarpara UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	846	1,446	1,464	754	–	2,910	3,492	3,204	2,622	856	846	846	19,286	94.5
	Fishing Labour	–	–	–	–	–	–	–	–	–	374	374	374	1,122	5.5
	Total	846	1,446	1,464	754	0	2,910	3,492	3,204	2,622	1,230	1,220	1,220	20,408	100
HFC2	Fishing	444	552	493	572	740	233	996	1,413	1,669	603	433	322	8,472	37.9
	Fishing Labour	683	596	269	106	33	260	320	67	243	558	517	769	4,420	19.8
	Fish Trading	117	131	72	79	106	102	87	289	290	172	197	117	1,758	7.9
	Gear Making	47	80	100	78	–	–	–	–	78	56	56	74	568	2.5
	Farming	407	419	278	449	93	202	180	251	1,076	132	78	68	3,633	16.3
	Agricultural Labour	89	147	–	–	–	–	–	81	96	121	124	117	774	3.5
	Self Employment	11	6	185	176	237	166	12	12	141	131	100	22	1,199	5.4
	Non–Agric.& FFW	133	111	116	178	287	171	67	167	–	67	111	124	1,531	6.8
	Total	1,931	2,042	1,513	1,638	1,496	1,134	1,662	2,280	3,593	1,840	1,616	1,613	22,355	100
Com–	Fishing	465	597	541	581	703	367	1,121	1,503	1,717	616	454	348	9,012	40.5
munity	Fishing Labour	649	566	256	100	32	247	304	63	231	549	510	749	4,255	19.1
	Fish Trading	111	124	69	75	100	97	82	274	275	164	187	111	1,670	7.5
	Gear Making	44	76	95	74	–	–	–	–	74	53	53	71	539	2.4
	Farming	387	398	264	426	89	192	171	239	1,022	125	75	65	3,452	15.5
	Agricultural Labour	84	139	–	–	–	–	–	77	91	115	118	111	736	3.3
	Self Employment	11	5	176	168	225	157	12	12	134	125	95	21	1,139	5.1
	Non–Agric.& FFW	127	106	110	169	272	163	63	158	–	63	106	118	1,454	6.5
	Total	1,878	2,011	1,511	1,593	1,421	1,223	1,753	2,326	3,544	1,810	1,598	1,594	22,257	100

Figure 19 Income Sources Through the Year, SW2–3 Bagan Uttarpara



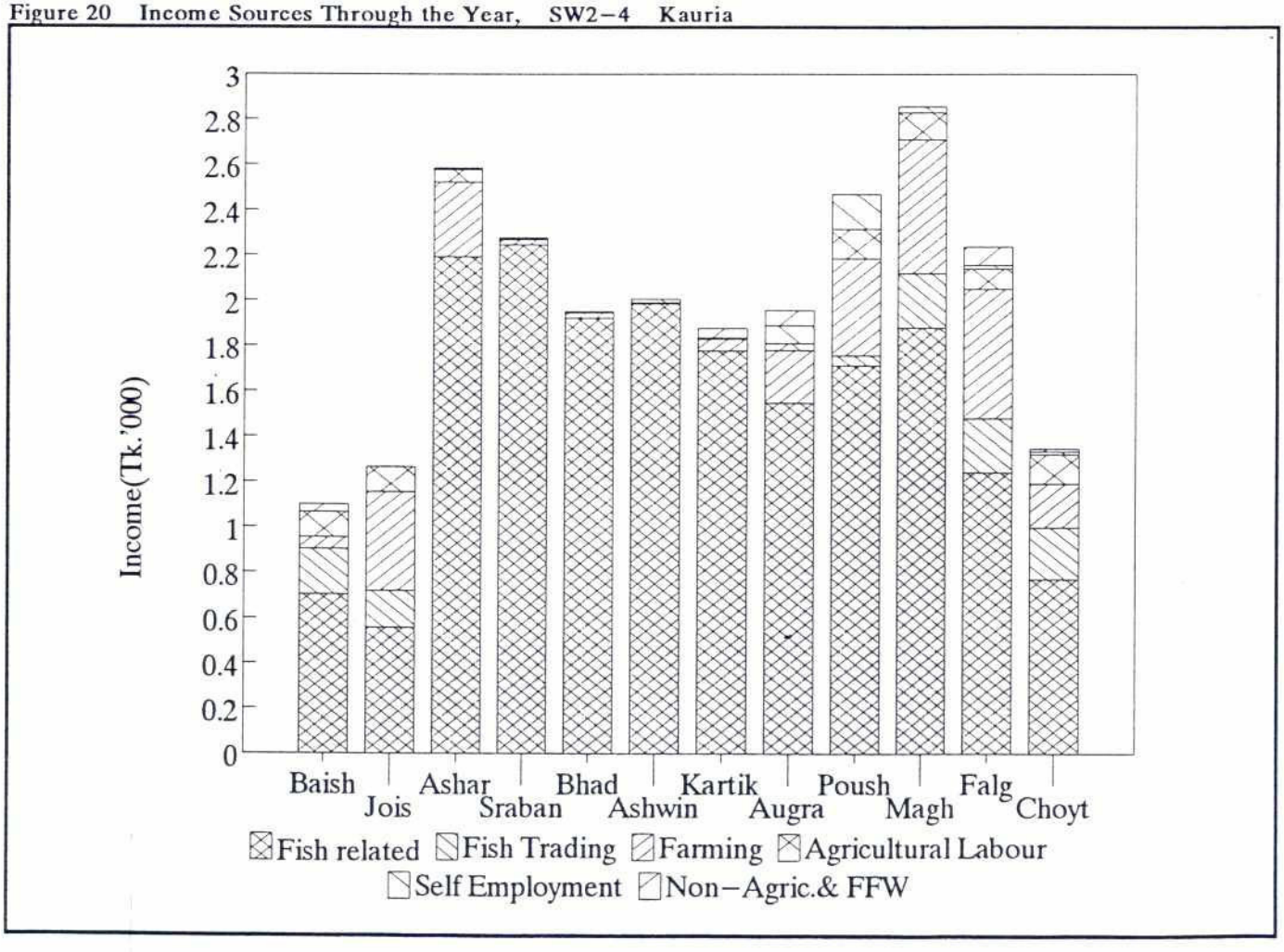
Source : FAP17 Socio–Economic Monitoring

Table 26 Income Sources Through the Year, by Fishing Category, SW2–4 Kauria

UNIT: TK.

FISH CAT.	ACTIVITY	BAISH	JOISTH	ASHAR	SRABAN	BHAD	ASHWIN	KARTIK	AUGRA	POUSH	MAGH	FALG	CHOYT	TOTAL	%
HFC1	Fishing	–	–	1,400	1,700	1,400	3,175	2,400	–	2,175	475	575	–	13,300	68.4
	Fishing Labour	–	–	–	–	–	–	–	–	–	1,100	1,080	1,320	3,500	18.0
	Farming	45	24	40	20	20	–	–	–	–	58	48	16	271	1.4
	Agricultural Labour	420	420	–	–	–	–	–	–	250	390	480	420	2,380	12.2
	Total	465	444	1,440	1,720	1,420	3,175	2,400	0	2,425	2,023	2,183	1,756	19,451	100
HFC2	Fishing	531	396	2,163	2,262	1,938	1,863	1,648	1,765	1,731	1,560	905	513	17,275	69.7
	Fishing Labour	50	50	228	253	265	169	144	120	210	379	245	120	2,231	9.0
	Fish Trading	268	219	–	–	–	–	–	–	–	323	319	308	1,435	5.8
	Farming	48	190	196	9	28	9	73	231	406	616	586	78	2,468	10.0
	Agricultural Labour	88	91	75	–	–	–	–	42	144	108	53	115	715	2.9
	Self Employment	–	–	–	5	5	18	6	108	208	13	–	–	361	1.5
	Non–Agric.& FFW	47	–	–	–	–	–	56	88	–	–	109	16	316	1.3
	Total	1,032	946	2,662	2,529	2,236	2,059	1,927	2,354	2,699	2,999	2,217	1,150	24,801	100
HFC3	Fishing	1,750	1,450	1,800	1,350	960	960	1,300	990	340	1,800	1,400	1,050	15,150	66.5
	Fish Trading	–	–	–	–	–	–	–	–	280	–	–	–	280	1.2
	Farming	90	1,850	1,150	100	–	–	–	410	800	850	860	870	6,980	30.6
	Self Employment	–	–	50	16	16	20	–	–	–	100	100	80	382	1.7
	Total	1,840	3,300	3,000	1,466	976	980	1,300	1,400	1,420	2,750	2,360	2,000	22,792	100
Com–	Fishing	668	521	2,025	2,059	1,727	1,859	1,672	1,457	1,558	1,484	948	543	16,521	69.1
munity	Fishing Labour	37	37	168	186	195	124	106	88	155	395	294	227	2,013	8.4
	Fish Trading	197	161	–	–	–	–	–	–	44	238	235	227	1,102	4.6
	Farming	54	435	330	24	22	6	53	235	426	594	573	196	2,949	12.3
	Agricultural Labour	109	111	55	–	–	–	–	31	133	120	89	129	777	3.2
	Self Employment	–	–	8	6	6	16	4	79	153	25	16	13	326	1.4
	Non–Agric.& FFW	35	–	–	–	–	–	41	64	–	–	81	12	233	1.0
	Total	1,100	1,265	2,586	2,275	1,950	2,005	1,876	1,954	2,469	2,856	2,236	1,347	23,921	100

Figure 20 Income Sources Through the Year, SW2–4 Kauria



Source : FAP17 Socio–Economic Monitoring

4. CONCLUSIONS AND THE IMPLICATIONS FOR FUTURE FLOOD CONTROL SCHEMES

The Satla-Bagda Project is one of the few flood control schemes studied by FAP 17 where clear impacts on the fisheries resource have been measured. Catch assessment surveys of areas inside and outside Polder 1 of the project indicate that the per hectare production of fish is significantly lower inside and that the catch composition is different. The area and depth of flooding have apparently changed due to the exclusion of waters from the *khal* outside the embankment. Water regulators are opened only to drain water out of the project area and any flooding which occurs inside the scheme is now the result of rainfall.

In many other areas of the country, rainfall flooding seems to be sufficient to sustain a sizeable resource of floodplain and *beel* resident fish. However, in Satla-Bagda the reduced depth and duration of inundation have turned fisheries into a relatively minor resource inside the scheme area.

Trends in the socio-economics of fisheries exploitation

The lower levels of fish production are reflected in relatively limited fishing effort among people living inside Polder 1 and low levels of activity by professional fishermen. Several *khal* inside the scheme where local Muslim fishermen used to fish have now been abandoned in favour of more productive fisheries outside the scheme or involvement in fish culture.

Significantly, the only floodplain area inside the Satla-Bagda Project which is still exploited by fishermen from outside on a regular basis is Chitrapara *beel* and floodplain where drainage congestion is a major problem and depth and duration of flooding are therefore similar to their pre-project condition.

In areas outside the Satla-Bagda Polder, levels of fishing activity are far higher. There may always have been some differences in levels of fisheries exploitation but the significant difference seen between the two main villages, Gopalsen and Gachapara, seems to be at least partially due to the decline of the open-water fisheries resource since the construction of the embankment.

Throughout the region, fishing is becoming generally **more** attractive as a source of income. Many landless and small farming households are moving into fisheries as it provides a viable alternative to the seasonal migration to urban areas, small trading activities or rickshaw pulling which otherwise act as stop-gaps during the flooding season. The demand for fish is

steady and the marketing network around Satla-Bagda is highly-developed, encouraging fishing activity as a source of income.

The rapid development of fish culture in the area has given rise to an entirely new set of specialised fisheries activities. The harvesting and management of cultured ponds is becoming an increasingly important component of fisheries. Local flood control works have certainly encouraged this although probably the most important factor driving the intensification of fish culture practices is the availability of credit through the fish marketing system. Where the excavation of fully protected ponds is not feasible, submersible ponds are also increasingly popular. These are managed with varying degrees of intensity and are currently regarded as offering better returns than *boro* rice cultivation.

Both Hindu *namasudra* fishing communities, who have been fishing for generations, and Muslim fishermen who have only entered fisheries more recently are specialising in the management and harvesting of both these types of ponds. The intensity of management which they are able to apply depends primarily on credit availability. The community most involved in fish marketing, Chandtrisira, is also the one most involved in fish culture. Other communities with more tenuous links to the marketing network tend to work more on very extensively managed submersible ponds.

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

Changes in fisheries in this area have the potential for affecting a broader spectrum of people than is the case in most other parts of the country. The lack of access controls on fishing mean that the resource is exploited by a relatively higher proportion of people from all socio-economic strata. In Gachapara, fishing accounts for almost 7% of overall income. It plays a role for all socio-economic groups but is particularly important for landless households for whom it provides 10% of income annually. During the period from *bhadra* (August/ September) to *ashwin* (September/October) fishing is particularly important as little agricultural work is available.

Income levels for landless households in the village inside the Satla-Bagda Project are generally lower than outside and during the months of flooding, more households turn to seasonal migration or trading and small-scale transport. Medium landowners make almost as much as the landless from fishing and fish culture, although this income is highly concentrated during late drawdown and early dry season, when *kua* fishing peaks, and in *choytra* (March/ April), when cultured ponds are harvested. The reduction of the floodplain fishery due to flood control has had a significant role to play in this change.

Agricultural labour is not the dominant factor in determining seasonal fluctuations in income in either community. Levels of income from agricultural labour are lower **inside** the Satla-Bagda Scheme than outside although their relative contribution to household incomes is similar. On the other hand, small landholders seem to have benefitted considerably from improved agricultural opportunities inside the scheme. However, for **both** socio-economic groups, self-employment activities are far more important than either fishing or agriculture and they play a more important role in stabilising incomes through the year.

Implications for the Flood Action Plan

Future flood control measures in the South-West Region would have to take account of the widespread involvement in fisheries of many of the population. The open-access nature of most *beel* and floodplain fisheries in the area means that seasonal fisheries are an important fallback measure for rural households. Reduction of access to these fisheries during the late flooding season could be expected to increase seasonal out-migration of labour, which is already a feature of the area.

The complete protection of the area inside the Satla-Bagda Scheme has resulted in a significant loss to local fisheries. Professional fishermen exploiting local *khal* have moved off to concentrate on other locations and what fishing does take place is dominated by landowners. Landless households do fish during the flood season but levels of effort are lower.

The reduction in floodplain fisheries will cause greater levels of effort to be applied on the *khal* where most fishing activity by professional fishermen is already concentrated. At present, many "subsistence" gears used on *khal* are not heavily regulated by leaseholders, but in the face of increased fishing pressure, regulation can be expected to increase. At present, the only conflicts over access to the resource occur on *khal* and the severity of these conflicts will intensify.

Purely in terms of production, some of the losses to fisheries are being mitigated by the extensive development of pond fisheries. However, the expansion of fish culture is not apparently linked to flood control. In the outside village of Gachapara, pond culture is,if anything, more common although it tends to be carried out in more marginal waterbodies such as homestead borrow-pits. This has provided considerable work opportunities for fishing households and for Muslim labourers who have taken up fishing professionally.

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	-	All	-	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	-	All	-	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	-	All	-	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	-	All	-	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	-	All	-	People who transport fish from district wholesale markets to higher level markets. Limited to the carriers.

mahajan	-	All	-	A very generic but very important term. Most commonly used for moneylenders, but in fact 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	-	All	-	A generic term for fish traders. Occasionally used for Muslims involved in fisheries activities of any kind; trading, fish culture and fishing.
paikar	-	All	-	Fish trader, usually a wholesaler.

Terms used to describe different types of waterbody

		Regions where term used		
beel	-	All	-	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	-	All	-	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	-	All	-	River. Colloquial word for *nadi*. Tends 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	-	All	-	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	-	All	-	River.
pukur	-	All	-	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.
tala	-	All	-	Bottom land. Used for the bottom of any waterbody 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	-	All	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	-	All	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	-	All	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	-	All	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.