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Slaves of Water: Indigenous Knowledge of Fisheries on the Floodplain of Bangladesh

Ph.D. Thesis

Mahbub Alam

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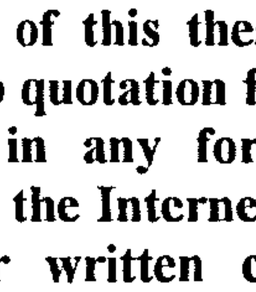

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy to the Department of Anthropology, University of Durham, Durham,U.K.
2001

- 8 MAR 2002

Declaration

This thesis has been composed by myself and it has not been submitted in any previous application for a degree. I executed the work reported upon within and all other work used is acknowledged at the relevant places in the text.

Acknowledgement

My largest debt is to Professor Paul Sillitoe who opened my eyes to the value of research into natural resources and indigenous knowledge and instructed me in the various techniques necessary for anthropological fieldwork. He has my sincere thanks for the support that he gave me when problems arose during both my fieldwork and in the writing-up stage of my findings. It was a pleasure to work with him. I wish to thank also his wife, Jackie, for the kindness she showed me during my stay in Durham.

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Abstract

Development practitioners and scientists typically focus on natural resources without taking into consideration the thoughts of local people or how they identify and address problems relating to their livelihoods. Consequently, scientific studies have failed to capitalise on the rich indigenous knowledge of local people. The indigenous knowledge of traditional Hindu fishermen on the Bangladesh floodplain, investigated in this thesis, is an example of how the anthropological approach, currently gaining recognition in development, can provide a better understanding of local people's knowledge and livelihood strategies and contextualise development interventions. The interactions of an anthropologist with other scientists in a multi-disciplinary research team serve to highlight the differences in approach; the scientists more often ignore what local people have to say about their own lives, whereas anthropologists are keen to explore what people think. The fishermen of Charan in Tangail district of Bangladesh have a vast knowledge of their local aquatic environment, down to a detailed understanding of the characteristics and habits of aquatic plants and other aquatic creatures. Fish constitute not only a major part of the diet, but represent an integral part of everyday life for the fishermen. People identify and classify fish in different ways. The local people's knowledge of water-bodies, and of the fish that inhabit them, contrasts with scientific classifications and illustrates how scientists can be misguided in their assumptions about people's tastes and practices. The various fishing methods of Hindu fishermen are not only technical issues but are also evidence of ritual dimensions which help keep their fisheries sustainable, in contrast to newcomer Muslim part-time fishers, whose practices have proved devastating for local fish resources. Complex rules govern Hindu fishermen's access to large local waterbodies known as *beel* and their description here provides insight into the political economy of the exploitation of natural resources. This complex political situation needs to be taken into account by scientists and development practitioners when trying to implement technical interventions. The Charan case clearly shows how state rules and politics at different administrative levels influence leasing procedures. Different interest groups such as fish businessmen, politicians, bureaucrats, landowners and thugs are manipulating

the lease procedure to their own advantage in order to deprive the Hindu fishermen of their rights. The kinship relations of the Hindu fishermen evidence their strong social organisation, which sustains their fishing activities; the ways in which fishermen relate to one another dictates who can fish with whom, thereby influencing fishing group formation. The indigenous knowledge of Charan fishermen shows that people's knowledge of natural resources cannot be isolated from their cultural heritage and practices, which fisheries scientists and policy makers need to understand, and hence cannot be treated separately in any development intervention.

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Chapter 1

Introduction

Bangladesh is a small country, located in the delta of one of the largest river systems in the world. Most of the population resides in the countryside. Islam is the dominant religion and Hindu the second religion. Bengali people throughout history have fought to survive the animosity of both nature and humans. They have experienced two colonial eras, which have inspired the nation to rely on its fighting spirit. The forces of nature are often hostile to the population. People die and resources are destroyed every year in flood and cyclone disasters.

The Podma, Meghna and Bramha Putra are the largest rivers flowing through Bangladesh. The country has abundant rainfall, which varies from 140 to 400 cm during the monsoon (Rahman 1989). The land is fertile due to constant sediments being deposited by the floodwater. Water is Bangladesh's main natural resource. In fact, Bangladesh occupies an extensive floodplain, which is an area of relatively low lying land, seasonally inundated by overspill from adjacent rivers and natural lakes. Animal dung and rotting vegetation accumulate in the dry season. When flooding occurs all these are mixed with the riverborne silts which are beneficial to the rapid growth of plants, insects and other aquatic creatures.

Like other exploited floodplain fisheries in the world, Bangladesh's inland fisheries production strongly depends on flood sequences (Graff et al. 1999).

The inundated countryside connects all aquatic areas into one production system from the month of July to October which contributes to the expansion in both numbers and biomass of fish. The larvae and juvenile fish migrate for food and reproduction in the vast expanse of the flood (Welcome 1988). The floodplains extend over 4.3 million hectares of water bodies, such as rivers, estuaries, *baors*, *beel* and *haors* as well as flooded lands. About 5.5 million hectares of rice fields, which are inundated during the monsoon to a depth of 30 cm or more, become part of the aquatic production system (Ahmed 1997). According to Boyce (1991) 60 per cent of the fresh water species in Bangladesh are floodplain dependent. The subsistence and income of the rural poor both rely heavily upon free access to waters and their aquatic life. In 1988-89, the annual fish harvest was estimated at 424,000 mt which is 50 per cent of the national production. The subsistence fishing produced 186,000 mt of fish (Rahman 1989). About 10.8 million households in the floodplains take part in the fishing (World Bank 1991; DOF 1983-91).

1.1 Fieldwork Location

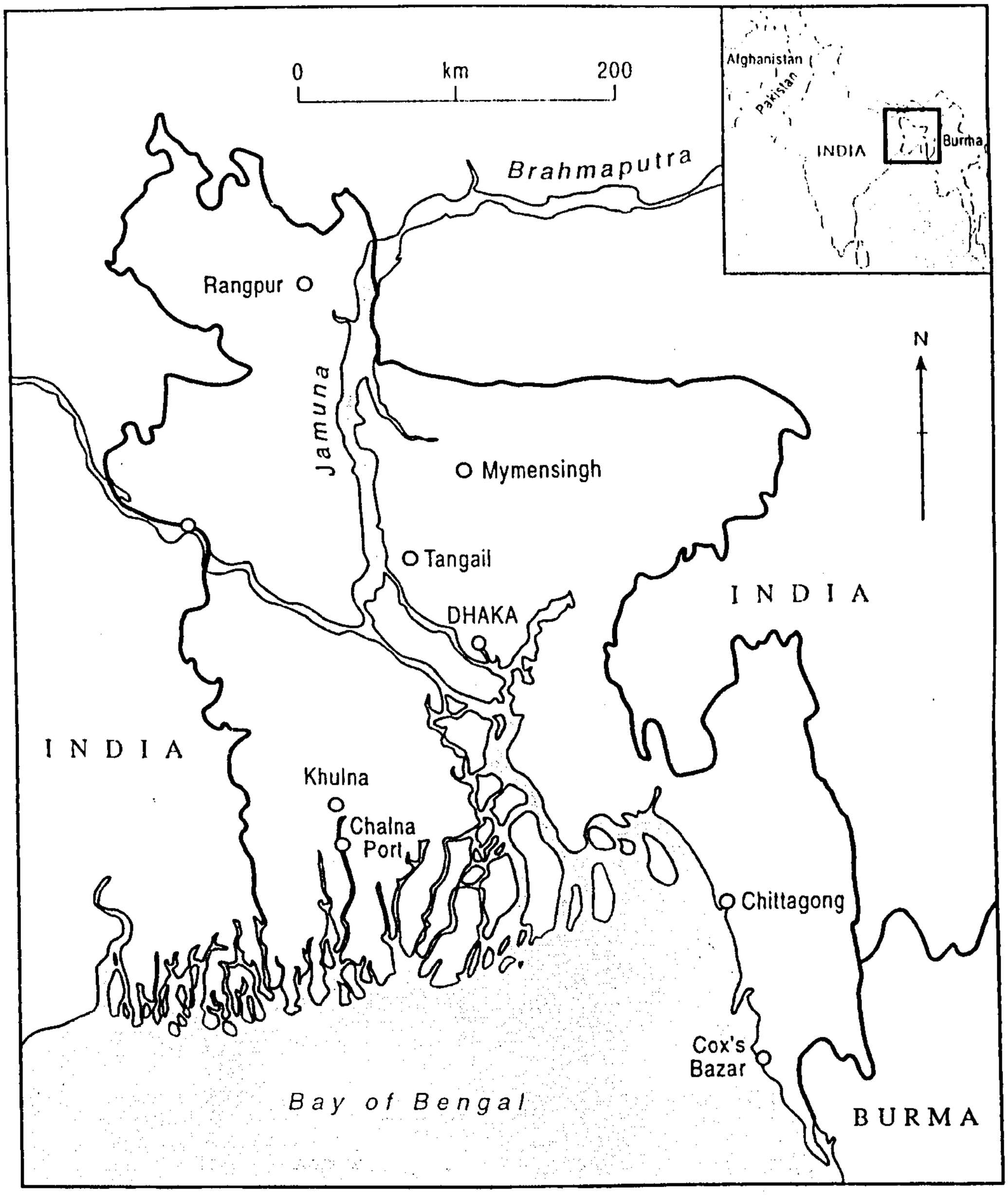
Charan is a village in Tangail district, situated in Kalihati Thana, an administrative unit beside the 'mighty' river Jamuna. It is six km away from the *thana* headquarters. It is part of Kokdohra Union Parishad, the smallest administrative and local government of the country.

When Charan people describe the origin of their village they recount what their forefathers told them. Elderly people say that from Shiraj ganj (a neighbouring

district of Tangail on the opposite bank of Jamuna) to Morichapahar (a place on the Modhupur track) everything was under water. In their childhood, while digging some wells in the village, people found large pieces of wood (30-40 hands long) which they think were the bottom of boats sunk a few hundred years ago. They say that Charan did not exist at that time. The surrounding area reveals the origin of Charan. People think that when a river dies it leaves its mark on the dried course. They explain that their nearest river, the Bongshi, has a reduced course, which was once part of the Bramha Putra river. Besides the Bonshi river there is a *beel* 'lake' (see chapter 3) called Poila. The river Shapai passes through it. Next to this river there are two *beel* called Laksmi Prashad and Alamkha. Charan *beel* is situated beside the village of Charan. The existence of so many small rivers and *beel* 'lakes' suggests that this area was under water. All the villages here are silted on *Char* land 'sandbanks' which emerged from the water. The southern part of the Charan village was erected on a 'sandbank' which emerged first and is called Agcharan 'first charan', and the later part to emerge is known as Pach Charan 'later charan'. The villagers think that the word Charan derives from charland, but according to some Charan refers to grazing ground.

1.2 The People's History

At the beginning of the twentieth century there were few Muslims in Agcharan, most of whom resided in Pach Charan. The majority of the people were from different Hindu castes and the *jele* caste 'fishermen' were the largest occupational group among them. The names of *Para* 'smaller locations in the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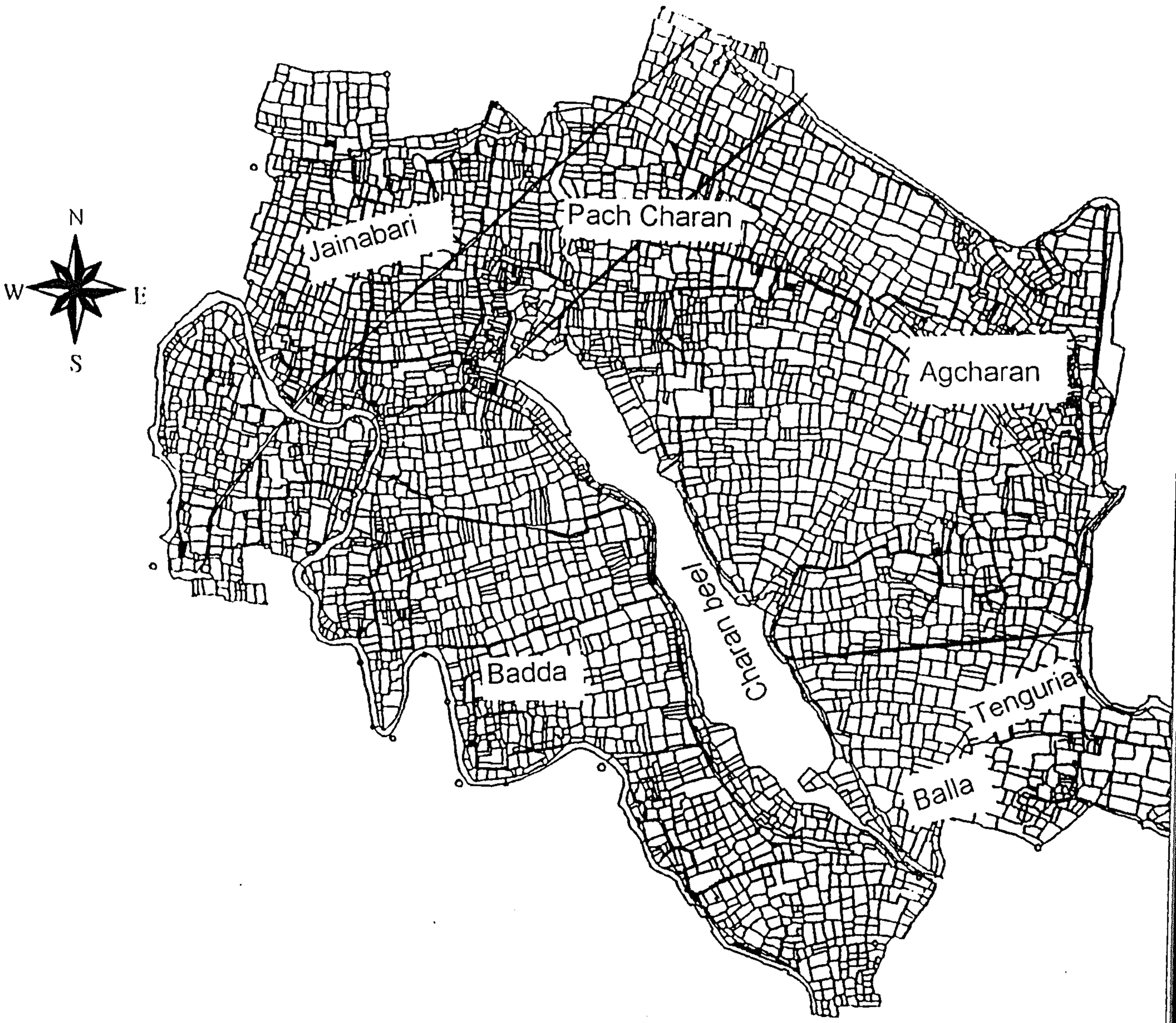
The village of Charan and surrounding



1.75 miles

village' such as Kali bari, Chapila Para and Mali Para provide evidence of Hindu's dominance in the past. Several Brahmin families were in control of the village but they started to leave after partition in 1947 to escape the communal riots. Before this time, no Muslims had large areas of land in the village.

There are two versions of the people's history in the Charan locale. One is that of the dominant Muslim inhabitants of Charan, while the other reflects the opinion of the Hindu minority in the village. In the Muslim's version a great warrior came from Afghanistan at the end of the 17th century. His name was Gaznavi, and he was fighting for the Mughal emperor (Latif 1983). Gaznavi's grandson, Chour Khan, came to Pachran in the middle of the last century and claimed that to be the Zaminder of this region. Most of the Muslims in Charan descended from his lineage. All of them proudly claim to belong to the Khan *bongsho* 'lineage'. According to the Hindu view most of the Muslims in this region were converted from the lower caste Hindus. Most of the Khan were concentrated in Pach Charan and after the partition of the country they invaded the surrounding Hindus' land, drove away most of the Hindus and occupied their houses and rice paddies. They occupied Hindu *bari* 'smallest homesteads' but have not managed to change their names from those used by the former Hindu owners who were victimised by the Khan invaders.

There is no trace of Hindus today in Pach Charan. Some *mali* 'gardener', *chutar* 'carpenter', and *kaiborto das* 'fishermen' live in Agcharan. All are considered as

belonging to lower castes. Several *mali* 'gardeners' have changed their occupation and become fishermen and claim themselves to be *kaibborto das* This conversion of caste title is not possible according to the laws of Hinduism.

1.3 The Hindu Fishermen

According to higher caste Hindus, fishing is the work of untouchable people. The local people call fishermen *gabar*. The literal meaning of this word is 'worker' but it is an insult when used colloquially. Many Muslims dared not undertake this occupation in the past, but this changed, when many Muslims had to fish for their survival.

According to Panna (1985):

> । যারা মাছ ধরে তাদের সাধারণত জেলে নামে অভিহিত করা হয়। এরা ধীবর, কৈবর্ত ইত্যাদি নামেও
> c পরিচিত। (p-45).

This means that generally, those who fish are called *jele*. They are also known as *dhibor*, *kaiborto* etc. There are four groups among traditional fishermen in Bangladesh. They are called *malo, koiborto* or *jolodas, nomoshudro* (Pokrant et al. 1997) and *maimol*[1]. Apart from the later group, the others are of a different Hindu *jat* 'caste'. According to the *rigved* (in sanskrit, *veda*) there were 18 lower

---

[1] Pokrant(1992) tried to trace the origin of the *Kaiborto*. According to him *kaiborto* are the one of the Bengal's largest castes and he thinks they are descendents of the animist hunter-gatherers who became Hindu in later years. This is an assumption of the writer and it does not reflect the real development of the *kaiborto*. Sarkar (1973) mentions that *Kaiborto* were sailors. According to him there are two types of *kaiborto*, one is halo when the other is *jolo* Das. The name *kaiborto* is also mentioned in Hindu classical myths. The Bengali word for kaiborto is *Jolo das* which is not mentioned in Pokrant's text. All traditional Hindu fishermen are called *kaiborto*. When he mentioned that the *malo* derives from *malla* it is also a wrong asumption. Actually, the *malo* is a fragment of the *Kaiboborto*. Their name comes from the word *mollo bormon*, which indicates clearly that malo is a shortened version of their clan name *mollobormon*. In the Bengali myth, Monosha Mongol, there is a section on the acts of the *malo* and they were presented as the fishermen.

caste occupational groups among the Hindus in the 11th century and *das* was one of them (Chacroborty 1963:45). There are two types among the *das*, one of which is called *halik* or *halodas* 'farmer' and the other is called *jalik* or *jalodas* 'fisher'. Fishermen in Charan are called *koiborto* or *jolodas*. There is a disagreement about this assumption. Some fishermen claim they were *halodas* several decades ago and later they have converted into *Jalo das*. Elderly people among the fishermen totally deny this argument and express no doubt about being *jalo das*.

The word *koiborto* derives from Sanskrit (Sarkar 1958). In Sanskrit *koiborto* is called *kohi borto te* which means 'sheltering in water'. In Bengali the word *jolo das* has a similar meaning. The word *jol* is 'water' and *das* is 'slave', thus 'slave of the water'. An elderly fisherman called Bancha Ram Das said that the name *jolo das* relates to their origin. According to him, Alambayon Muni, a *khatrio*[2] is their ancestor. The story is as follows: Once Porshu Ram (a character in classical myth) came out armed with an axe in order to remove all *Khatrio* from the universe because they killed his brothers. He killed all *khotrio* except Alambayon Muni. Alambayon Muni took shelter in the water and survived. After that he was called *kohi bortote* 'sheltering in water' and continued to live as a fisherman, and became the ancestor of fishermen. As he declined to fight against Porshuram he

[2] According to the Hindu cosmology the society is divided into four castes, as these are *Brahmin*, *khotrio*, *baishaya* and *shudro*. *Khotrio* is the second caste according to the hierarchy.

had lost his caste status. This short story relates how the fishermen became outcastes.

The fishermen have been declining in numbers since members of their society migrated to India and their social organisation is weaker compared with that of past times. For instance, before the partition of 1947, Muslims used to honour fishermen although they were not of the higher Hindu castes. This has gradually changed with the migration of Hindus and Muslims now being in control. At present, more than forty households of fishermen live in Charan. Most families dwell in Chapila *para*. Six households have moved out to the bank of the river Shapai, which is at the eastern end of the village.

A fishing co-operative was formed among the Hindu fishermen in 1973. The secretary and president of the co-operative negotiate the fishermen's access to the water bodies. They also try to settle disputes and conflicts among the fishermen. The fishermen follow rituals related to fishing, so the leaders of the co-operative arrange Gonga and Monosha *puja* every year to ensure their safety while fishing. These leaders also help to arrange marriages. They maintain their alliance with the other Hindu *jolo das* in neighbouring communities. On several occasions fishermen have visited India to find suitable brides or grooms for their sons and daughters.

1.4 The *Beel* Community

The *beel* 'lake' is central to the livelihood strategies of the people living around it. The community depends on this common resource from past to present times. In spite of there having been many changes, the *beel* remains at the centre of the community. Shared socio-cultural expectations structure access to the natural resources available to the community. The *beel* 'lake' features in the lives of all those residing in the community around it. The interrelationship between the *beel* and the people living around it is outlined as follows.

1.4.1 The *Beel*

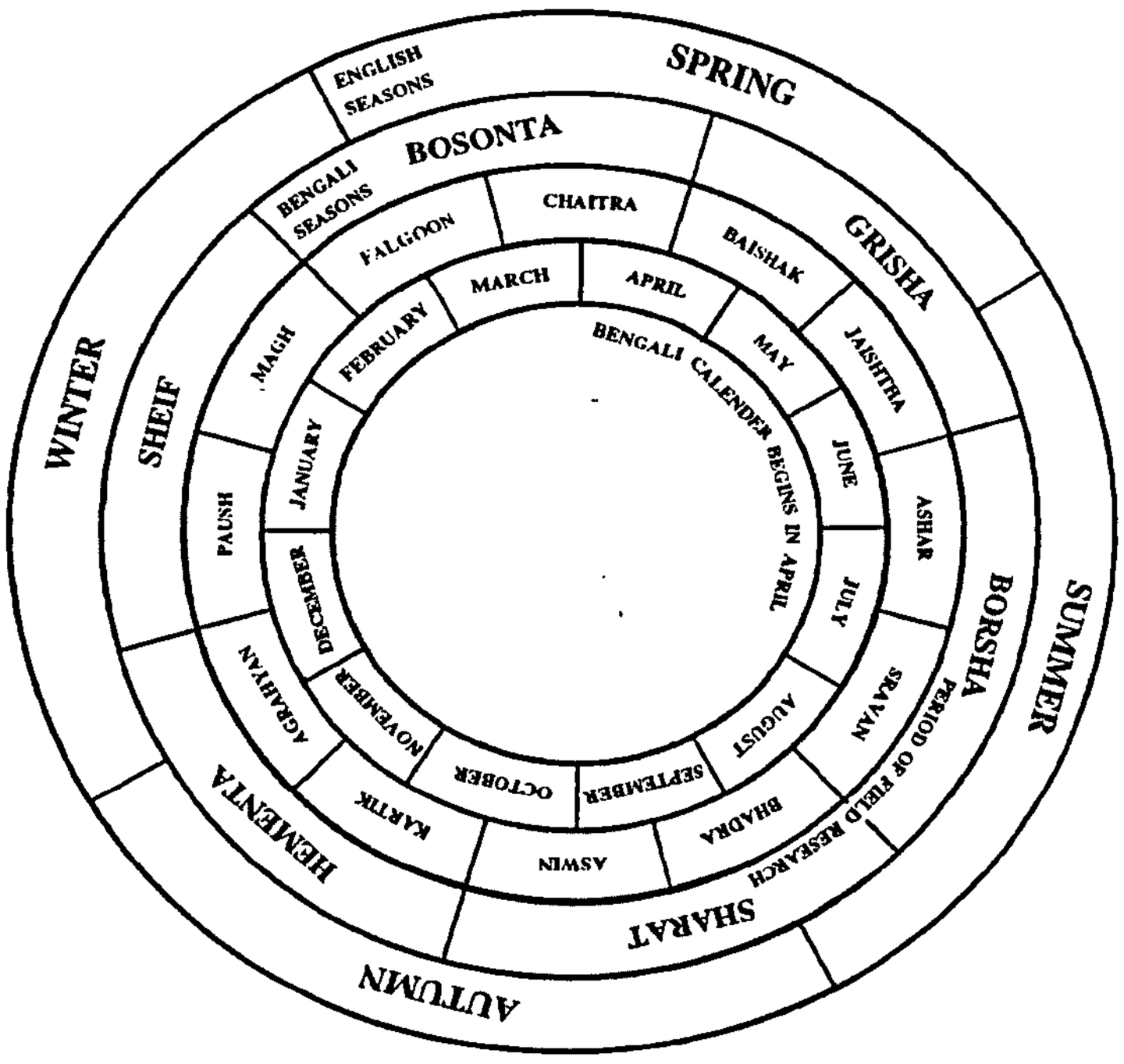
The *beel* is a large natural body of water, which forms a lake (Bengalis conceive of rivers as stretched out water bodies). Some former land is seasonally submerged when the *beel* is flooded, whereas the rest of the land is always under water. There are three *beel* in the fieldwork region. Charan *beel* is the largest, compared to the neighbouring *beel* of Laksmi Prasad and Alam Kha. Charan *beel* which is a well-known natural resource and considered to be beautiful is situated not only adjacent to the village of that name but also between Badda, Kuturia, Jaina Bari, Utrail Alam, Tenguria and Bolla. People of these villages have been farming the seasonally exposed land for the last two hundred years.

The community around Charan *beel* is varied, and the people exploit the *beel* resources in a many ways as farmers, fishermen, landowners, sharecroppers, landless labourers, weavers, potters, rickshaw pullers, store keepers, etc.

1.4.2 Influence of the *Beel* on Agricultural Activities

People grow crops in and around the *beel*. The *beel* provides water for irrigation of the rice paddies. Annual flooding, as mentioned above, helps to maintain the fertility of the land by depositing silt. The water level varies seasonally in the *beel* so farmers organize their cropping practices according to this fluctuation. Landowners are in the employ of governmental services so they engage little in agriculture, relying on sharecroppers.

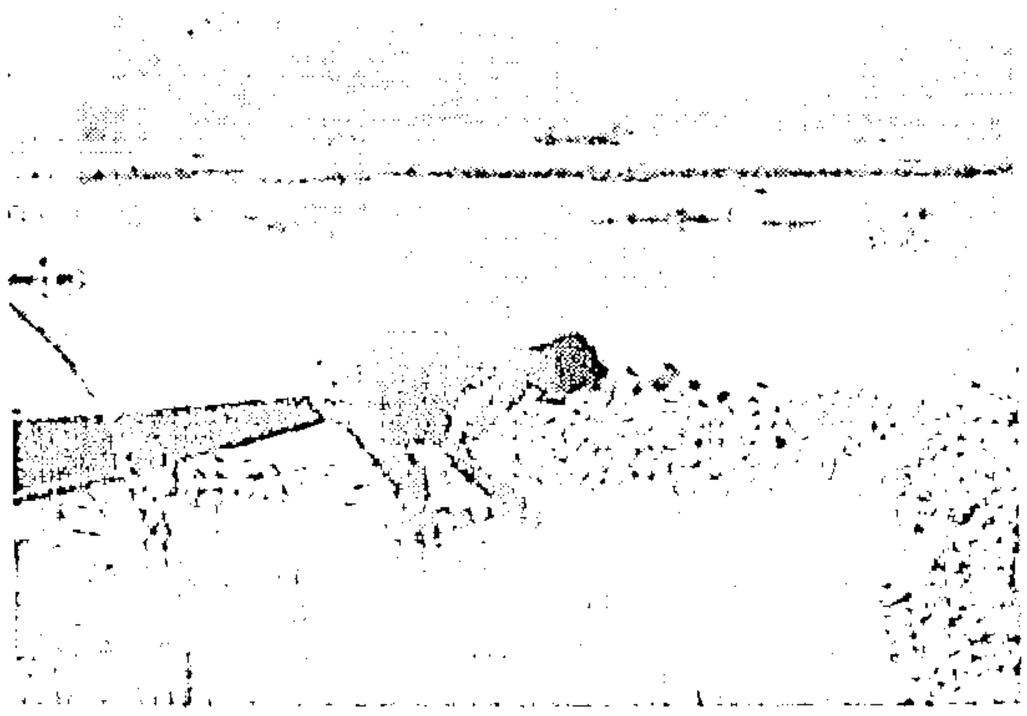
Figure:1.2 Bengali Calendar



In the Bengali month of Ashar when the monsoon rains come the *beel* increases in size. Land at different heights experiences different flood depths. The deepest flooded land is at the edge of the *beel* before expansion called *biler parer jomi*. The soil here is always moist and is cultivated in the *Boro* dry season when

exposed, without need for irrigation. This keeps production costs down. During flooding this land receives a considerable deposition of sediment, which promotes its fertility. The next deepest inundated land is called *bait*, here people cultivate two crops a year, such as mustard, HYV paddies, *Chamara* rice and other local rice cultivars. The next category of land is *atarupare* which means wheat flour, the soil here blowing like flour in the wind. Farmers cultivate three crops a year here: jute, mustard and rice. However, the highest land, the *vita bari* (highland homestead), is rarely flooded. The soil here is sandy and infertile. People cultivate small vegetable gardens here around their homesteads.

Photograph: 1.1 Transplantation of *boro* paddy at the edge of the *beel*



Farmers look forward to the *beel* water receding in the month of Kartic, for then the soil is wet and well suited to mustard cultivation, being full of *ras* 'sap'. Later, when they cultivate HYV paddies farmers depend less on the *beel*, pumping ground water for irrigation. One of the most important rice cultivars grown during the flood season with the rising flood water, is called *chamara*. This is a deep water rice cultivar, and tallest of all paddies, for which Bangladesh is famous. It is

a popular rice as people like the taste and it also provides a good environment for fish. A folk rhyme on *chamara* runs:

ইষ্টির মাইঝে মামারা যদি থাকে নানী
ধানের মাইঝে চামারা যদি থাকে পানি

This means, 'your maternal uncle[3] is a considerate relative if your grandmother is still alive/ *chamara* is the best of all paddies if there is deep water'. After the *chamara* harvest, when the water recedes in the month of Kartic, farmers cultivate mustard. Farmers in *Charan* region grow less chamara now because of the unpredictability of the floods, as sudden rises in the water level impede the growth and cultivation of the crop.

The pesticides and insecticides used by farmers in HYV cultivation are entering the *beel* and damaging fish resources, and destroying fish eggs. So, while the introduction of new technologies increases production, scientific interventions are also damaging natural resources.

1.4.3 Usefulness of the *beel* as the Fishing Source

The fishermen of Agcharan, through their co-operative have leased access to part of the *beel* from the government. The *beel* contains fish, but fishermen can no longer rely on the *beel* for their entire livelihood because of declining fish stocks. It expands in the monsoon and shrinks throughout out the rest of the year. The availability of fish varies; they are more plentiful during the rainy

[3] In the Bengali society maternal uncle is considered as the closest kin. Relation between the uncle and nephew is supposed to be full of affection.

season. During the summer when the *beel* shrinks fishermen turn to other work such as weaving and pulling rickshaws. The other uses of the *beel* resources include that of the potters of Badda who use clay from the edge of the *beel* to produce pots. The women in every household keep poultry, including ducks, that have free access to food from the *beel*, (on snails, worms and aquatic insects). A familiar sight is of groups of ducks leaving the village early in the morning and returning home in the evening. Sometimes aquatic plants are fed to domestic animals.

The river Langulia, and three large canals bring water into Charan *beel* from the Jamuna river in the rainy season. There are some narrow canals linked to the *beel* which bring in flood water. The flood brings fish to the *beel* in the month of Ashar (fry hatched in the Jamuna). Other fish hatch in the *beel* from eggs spawned the previous year. The breeding period of fish starts with the flood and they start to jump up in the water at this time. Many people not only the fishermen, fish at this time of abundance. However, they use fishing gear different to that of regular fishermen. Other people than fishermen are happy, as they feel festive at the start of the rainy season with the arrival of *naya pani* 'new water', the bringer of life. They celebrate with a festival called *bawa* (fish catching day). People from distant parts come to the festival. It is held in the month of Poush when the fish have grown larger. A big crowd, mainly men, come to fish in

the *beel* with a range of gear. On the way to the *beel* people dance, sing and blow buffalo horns.

Some full-time fishermen exploit the *beel*. They sell fish to the community and supply it to distant markets. Previously, they used nets which helped conserve the *beel*'s fish stocks. But present day changes in fishing methods have led to over fishing and have drastically reduced fish stocks. After liberation, in 1971, some Muslims started fishing. When they could find no other work they changed their minds about fishing being the work of poor Hindus. Many low-income Muslims fish during lean times in agriculture. A struggle broke out in the community as they started forcefully to encroach on the *beel* and became the largest population group (Olomola 1998). Muslims began monopolising the *beel* which was, previously, the resource of the traditional Hindu fishermen[4]. The newcomers had no fishing traditons. They use gear banned by the government and have seriously depleted fish stocks in the *beel*. People can remember when fish from Charan *beel* went in lorry loads to distant markets. When Fisheries Department officials come and, ostensibly, ask the community not to fish with banned nets and catch fry, they are prepared, people say, to take bribes to ignore their illegal use from fishermen using banned fishing nets. These newcomers are using illegal fine mesh nets and, also, close the gateways to the

[4] Olomola (1998), Kuperan and Sutinen (1998) found the similar constraints on local in fishermen in Malaysia and Nigeria which indicates a most common feature in world fisheries.

beel so upsetting fish migrations. If any Hindu fisherman's boat crosses their nets Muslims beat them with sticks. Many fights have occurred on the *beel*.

An influential Muslim man from Pach Charan village called M-J has, furthermore, taken away, by force, the traditional fishermen's government lease to fish in the *beel*. Toufiqe (1997) examined the causes behind the failure of the fishermen to establish property rights over fishing grounds in the inland fisheries of Bangladesh and concluded that property rights are, eventually, transferred to socially powerful agents, called the leasees, who are not members of the fishing community.

The fishermen received a small amount of money from him at the time when he was a member of the former ruling party (Bangladesh Nationalist Party or BNP). He is reported to have bribed the government officials to keep them quiet about sub-leasing the *beel,* as it is illegal according to the law. He collects rent from all fishermen who fish on the Pach Charan part of the *beel*. No one, not even the state itself, is providing support to the traditional fishermen's legal claim on the *beel*. The fishermen are powerless, as the local authorities can be bribed. If the fishermen refuse to grant the sub-lease those who back M-J will use the *beel* without paying any money to the fisherman's co-operative. It is better for them to get some money than nothing. After the change in government in 1996 some young *mastan* 'thugs', supporters of the present ruling party Awamelegue have replaced M-J. According to the fishermen M-J was better than these 'musclemen' as he did show some respect to the elderly fishermen. These

'musclemen' do not hesitate to insult any elderly fishermen who fail to meet their extra demand for rent. M-J at least allowed the fishermen to control half of the *beel* through their co-operative, but these *mastan* have invaded the whole *beel*.

1.4.4 Other Resources from the *beel*

The *beel* has other resources that help the poor survive. Many poor families, who have come to the Charan region from distant parts of the district, are the families of day labourers who have no land and no regular income. Their children collect wild foods from around the *beel*. They collect and eat the foliage of *shapla* 'lotus' and the roots of *shaluk* and *ghetu*, all water plants which are a poor substitute for rice. When no other food is available the poor resort to them (Stokoe 2000).

In Badda village, there is a small occupational group of potters called *kumar* who sell their wares in different parts of the district. They depend on the *beel* for their clay. This clay is under water during the rainy season. It is soft when wet but hard when dry. There are stacks of clay to be seen around the *beel*, which has been dug out by potters at the beginning of Ashar. There is a place on the edge of Charan *beel* known as *Kumargati* 'the hole dug by potters' where they have been removing clay for generations. They have a special boat for carrying the clay to their homesteads where they store it. No other clay will suffice for their purposes. Traditionally, they have access everywhere to collect the clay. No one objects to them removing it from the edge of the *beel*.

Chapter 2

Indigenous Knowledge and Ethnoscience: Bangladeshi Perspectives

2.1 Introduction

This thesis is an ethnographic study of indigenous knowledge of fisheries on the Bangladesh floodplain, and discusses Indigenous knowledge in the context of development. In this chapter attempts will be made to introduce theoretical issues to contextualize it. Indigenous knowledge will be defined and different approaches to this subject will be examined. The debate on indigenous versus scientific knowledge will be discussed and the relationship between indigenous knowledge and natural resources research will be described. This is followed by a discussion on ethnoscience and the problem of classification. Finally, the research undertaken into indigenous knowledge in Bangladesh will be discussed.

The introduction of the participatory perspective at the 'grass roots' level is a significant shift from the 'top-down' intervention in development, which occurred two to three decades ago. The western scientific paradigm of progress and modernisation was challenged, as there was a 're-evaluation of knowledge' in relation to the social process of rural development (Chambers 1983, 1997). Local people's knowledge was 're-evaluated' as it was recognised as containing important 'indigenous skills'. As a result, people were situated as a part of the 'complex interaction between science, the state and the market' (Fisher and Arce 2000). This change, also, encouraged

anthropologists to become involved in indigenous knowledge research in development where it was a 'possible antidote' to the failure of the said 'top down' development intervention (Pottier 2000). Sillitoe (1998*a*: 203) is of the opinion that anthropology should furnish its 'disciplinary credibility' to this development approach. He suggests that local knowledge and perspectives should be included in the development process, and that anthropology should become more than just an 'intellectual pursuit'.

2.2 Indigenous Knowledge

How is indigenous knowledge perceived in anthropology? First of all, to define knowledge, we need to explore epistemology. In epistemology the 'importance of causal processes in accounting for our knowledge of things is recognised' (Routledge 1998). The 'perception, memory and reasoning' are thought to be innate, as ways of gaining knowledge by life experiences. People observe events and then obtain knowledge about them, via complex causal processes.

Foucault (1972) focussed on the problem of power and knowledge as, seemingly being in an inseparable relationship. He was concerned with the culture of the West and the way that it influences how people think and, also, the way institutions both perpetuate and inhibit ideas. How people acquire knowledge is important for social anthropologists, to understand other cultures and how they give expression to the world view of 'distant others' (Fisher and Arce 2000). It challenges stereotypes, assumptions and 'parochial views' that concern social organisation. Furthermore:

> ... people create, transmit and reproduce knowledge in many different – and inter-linked – places. ...These are just some 'other' places where knowledge is socially assembled. This emphasis on 'knowledge places' suggests that knowledge emerges through

> human social organisation enveloped within existing social conventions and social locations (Fisher and Arce 2000:1).

In such a context how can we define indigenous knowledge? Brush and Stabinsky (1996:4-5) offered two definitions of indigenous knowledge. The first one they think is "the systematic information that remains in the informal sector, usually, unwritten and preserved in oral tradition rather than texts. ...Indigenous knowledge is culture–specific..." (p-4). On the other hand, a narrower definition refers to "the knowledge systems of indigenous people and minority cultures" (p-4). In contrast, Warren, Slikkerveer and Brokensha (1995:xv) think indigenous knowledge is "the local knowledge that is unique to a given culture or society—contrasted with the international knowledge systems which is generated through the global network of universities and research institutes". Sillitoe (2000*a*) is sceptical about this definition as he thinks, "it is the image that apparently comes to the minds of some anthropologists too, to judge from their negative reactions to the term indigenous knowledge!" [1] (2000*a*: 3)

Local knowledge is defined by its development context. Sillitoe (1998*a*) is of the opinion that:

> "local knowledge in development contexts may relate to knowledge held collectively by a population, informing interpretation of the world. It may encompass any domain, particularly in development currently that pertaining to natural resource management. It is considered to be socio-cultural tradition, culturally relative understanding inculcated into individuals from birth, structuring how they interface with their environments". (p-204)

There are various terms used for 'indigenous knowledge', such as 'local knowledge', 'traditional knowledge', 'indigenous knowledge systems',

[1] It is about timeless traditional cultures - which anthropologist now question.

'indigenous technical knowledge', and 'rural people's knowledge'. The reasons for this variety of terms relates to the 'technical and consultancy leanings' and disciplinary backgrounds of the different authors. These variations in terminology reflect different research interests, 'theoretical stances, and practical applications' (Fisher and Arce 2000). It is also, thought that 'local knowledge' research features sometimes as part of participatory research (Antweiler 2000). On the other hand, the historical roots of the term 'indigenous' is closely related to the expansion of Europe—it has been used to refer to specific groups of people defined by the criteria of ancestry and history, collective cultural configuration and geographical location vis-à-vis the modern. Since the 1980s, however, the term has evolved beyond its specific empirical reference (Purcell 1998). Combined with the term 'knowledge', it has come to signify a philosophical and ideological position—a perspective that rests on the recognition of the role of knowledge in the power relations constituted by the expansion of Europe. In this sense, indigenous or local knowledge consists of factual knowledge, skills and capabilities, most of which have some empirical grounding, which is culturally situated and may be best understood as a 'social product' (Antweiler 1998).

Views of 'indigenous knowledge' depend on which cultural group one comes from, with 'indigenous' acquiring the sense of 'not mainstream', or even 'minority'. Alternatively, in some cases indigenous knowledge may be "a widely shared majority knowledge simply suppressed, not even noticed, or disregarded...by academic or political categorizers" (Clammer 2000: 1). There are also types of knowledge which cannot be transformed into language at all

(Marchand 2000). Sillitoe (1996) elaborates this thought according to the Wola society of PNG, as he thinks the taxonomic schemes of people reflect partially their perception of the natural world. They carry environmental knowledge, and transfer it between generations, which is difficult for an outsider to understand. This is because:

> It is not codified but defuse and communicated piecemeal in everyday life. It is to a considerable extent knowledge gained through experience, passed on equally by example as by word, transmitted as, and when, daily events require. These people, like the heirs of other non-literate traditions, are not familiar with trying to express all that they know in words. They live rather than reflect on their environmental knowledge. It has a marked practical aspect to it. (p-9)

It can be explained through the experience of net use of the Charan fishermen. The way the fishermen use their gear has to be observed personally, how they do it, because they cannot put the explanation into words (see Chapter 4). For instance, the use of *jhakijal* 'net' requires great skill, as the fisherman has to put part of the net on his elbow, attach some of the ropes with his fingers, and even hold a rope in his mouth before throwing it in such a way that his body produces the momentum to spread the net. It is a complex process, which can be learnt only by using a net oneself. When fishermen demonstrate it appears easy, because of their expertise but it is not a thing they can describe, adequately, in words.

However, Antweiler (2000) argues that indigenous knowledge connotes notions of statism, age, aboriginality, etc., which he thinks are problematic. The second problem he identifies is the ownership of local knowledge. Creaves (1996) concerned about the intellectual property rights of Indigenous people, writes that Indigenous cultural knowledge has always been an 'open treasure

box for the unfettered appropriation of items of value to Western civilization' (Ibid: 25-26). There is an urge to protect the rights of Indigenous people to their knowledge by introducing Western intellectual property laws to defend it internationally (Ruppert 1996).

There is, also, a denial that 'indigenous' conveys any bounded or 'culturally specific set of coherently ordered' ideas (Campbell: 2000: p-1). Another debate is one on global versus local knowledge. Opole (2000) describes two sets of parallel worlds: one which was thought to be intellectually occupied by indigenous or ethnic peoples, and the other inhabited by modern or Western humankind.

At the present time in academia these are some of the issues surrounding the definition of indigenous knowledge. In practically oriented research, there is a debate about scientific versus indigenous knowledge.

2.3 Knowledge: Indigenous and Scientific

This section introduces different arguments regarding the debate on indigenous versus scientific knowledge. The object is to see if it is possible to draw such a distinction.

In Opole's (2000) opinion it is to consider modern scientific and social knowledge as separate spheres of knowledge. Indigenous knowledge tends to be privatised, and can be so specialised as to benefit only a few selected individuals at the expense of society at large. What can indigenous knowledge

research offer? According to Pottier (2000):

> ...assumptions built into the concept of 'local knowledge' also resulted in the acceptance of a broad juxtaposition between 'local knowledge' (presumed closed, unreflective, concrete) and 'modern knowledge/science', characterised as abstract, reflective, true, and imbued with universal reasoning....The dichotomy convinced developers it was legitimate to look for and extract 'elements' from local knowledge for use in science. If local knowledge had anything useful to offer, so the reasoning went, it was because science could make use of it. (p-1)

Local knowledge is more than technical or environmental knowledge. Furthermore, different assumptions and methods shape the anthropological approaches to local knowledge. Especially relevant to development measures is knowledge of process (Antweiler 2000).

Sillitoe (1998*a*:205) argues that the reasons for distinguishing local and western knowledge require some anthropological illustration. He explains that when the "conflation of other's knowledge traditions into a local meta category" differs from the western scientific thought, is not supportable as it overlooks variations within single traditions and similarities between different indigenous and scientific perspectives. He thinks it fails on three grounds. These are: "substantive, because of similarities in essentials and content of these different knowledge systems; epistemological because of certain similarities in the method used to investigate reality; and contextual, because science is no less culturally located than other knowledge traditions." (Agrawal 1995). Furthermore, Sillitoe (1998*b*) criticises scientists for seeking to obtain information relating to their specialisms as independent technical facts, ignoring cultural context. He warns about the dangers of treating customary practices as culturally disembodied technical knowledge. According to him, overall understanding of environmental interactions and development

opportunities, within socio-cultural context, is important. He thinks:

> ....according to the anthropological dictum of holism, the discipline having learnt long ago that it is not possible to predict beforehand which cultural domains might relate intimately with other, what we need constantly to maintain a broad view, often the last expected practices impinging on one another. All manner of other cultural activities may influence production activities, from special arrangements to religious observance. (Ibid:223)

In addition, it is also pointed out that science is viewed by many indigenous people as a 'dominant ideology' which has 'blanketed their cultures with a claim to universality, progress, and power' (Sable 2000:1). Furthermore, in anthropology, the distinction between science and indigenous knowledge is dubious as local knowledge is not 'static and uncontestable', but rather 'the multifarious outcome of an ever-evolving syncretic process' (p-1). Sillitoe is sceptical about the use of 'two-column tables listing comparable traits and contrasting between indigenous knowledge and science' (Sillitoe 2000*b*:2).

Sillitoe (2000*a*) calls for the involvement of more enlightened scientists who are interested in indigenous knowledge which can inform and supplement their own work. On the other hand, it is, also, common in development contexts, for indigenous knowledge possessed by those who are subject to development is distinguished from science which is thought to inform development interventions. He thinks this 'stark polar discrimination' of scientific and indigenous knowledge, which characterise current development literature, is 'inadequate' and 'misleading'. According to him the relationship between indigenous and scientific is more complex, as these are not two 'tenuously connected knowledge traditions separated by a cultural-epistemological gulf, but rather a spectrum of relations' (ibid:2). On the other hand, Campbell (2000)

thinks that the primitive versus the scientific, and the traditional versus the modern are clear oppositions with 'divergent trajectories'.

However, Campbell (2000) believes the term 'indigenous' has to convey something of the hybridity between local and introduced technologies and understandings, rather than an 'uncontaminated, original authenticity'. This has led Sillitoe to convey a message to anthropology to alter its position as he thinks that anthropological knowledge sits uneasily between the scientific and indigenous perspectives and it challenges any attempt to dispose of our notions of what is scientific and indigenous, or the global and local. 'It will be necessary first to demolish the discipline of anthropology and reveal its ethnographic heritage as misconstrued' (1998*a*: 204).

2.4 Indigenous Knowledge and development

In this section, accounts of different Indigenous knowledge research experiences in relation to anthropology and development are introduced.

Local knowledge is used and idealised by development experts as well as their critics. However, it does not necessarily present itself as a comprehensive knowledge system and activities based on local knowledge for development are not necessarily sustainable or socially just (Antweiler 1998).

For instance, in analysing the management of soils and germ plasm by a small group of maize farmers in Chipass, Mexico, Bellon (1995) finds that sustainable and unsustainable management can coexist in the same agro-

ecosystem. This has given rise to a lively debate concerning the concepts of 'sustainable knowledge' and 'hybridity'—employing perspectives and insights obtained from local, indigenous knowledge alongside global, scientific techniques, to better understand and form guidelines for sustainable development (Forsyth 1996). In a similar vein, Murdoch (1997:1) argues that,

> Problem solving in local contexts might be better achieved if scientists were more attuned to local forms of knowledge—the extension of science into the field should therefore be considered as a collective process involving both local and scientific actors working in concert.

That such an approach provides more useful and richer insights into development questions is evidenced in studies that have used such hybridity. The study by Forsyth (1996), examining the value of indigenous knowledge in testing theories of environmental degradation, finds that upland farmers (seen as lacking awareness of environmental degradation by lowland communities) deliberately avoid erosion by increasing frequency of cultivation on flatter land rather than steeper slopes, despite land shortage. He concludes that the problem of erosion is overstated. This does not indicate that their local knowledge is useful over large areas, but instead shows the adaptability of local communities and their awareness of environmental risk. Thus,

> Developing effective management techniques depends on differentiating more clearly between locally-based knowledge about environmental processes; politically constructed statements about the environmental impacts of other groups and falsifiable scientific assertions. (p-1)

Similarly, Phillips-Howard and Lyon (1994) in their work, challenge the oft-held view that agricultural intensification is a threat to soil fertility in Africa. They find that despite intensification, soil fertility has been sustained through indigenous practices, such as mixing ash, organic and non-organic fertiliser, careful soil

conditioning, switching to less-demanding crops and crop rotation etc. This suggests a need for a broader, more relative concept of soil fertility and recognition of the farmers' viewpoint and cultural ideas about soil fertility management.

Though useful and highly valuable in offering more intensive and effective ways of addressing of development questions, the use of local knowledge, as has been pointed out by Antweiler (1998), 'should not be restricted only to the extraction of information or applied simply as a counter-model to Western science' (p-1) because 'local knowledge' is mostly of a 'theoretical and political dilemma' when it is less of a technological one. It is argued that applied anthropologists should pay much greater attention to facilitating indigenous autonomy (Purcell 1998). In an informative paper on the experience of disability planning in South Asia, Miles (1996) argues that today's value of culture should be taken into consideration rather than trying to impose western social science welfare ideologies on them, as a means of solving welfare problems.

This stance is supported by Posey (2000:1) who wants a dialogue between those who would study and those who hold indigenous knowledge. He thinks those who study indigenous knowledge should develop a research method which respects the 'cosmic connectedness that permeates traditional knowledge and resource management systems'.

Therefore, the aim of this research is to bridge 'the gap between our

scientifically founded technology and local awareness and practices' (Sillitoe et al. 2000:24). Indigenous knowledge research should be used as a two-way link between the local peoples' perceptions and aspirations and scientific technocrats' research agendas. Although there is no doubt that scientific tradition has something to contribute to the development process, indigenous knowledge needs to be conveyed to natural scientists in such a way that they can appreciate its relevance. It is also necessary to warn the scientist that the notion of technology transfer remains, not as a top-down imposition but a search for jointly negotiated advances.

2.5 Indigenous Knowledge Research in the Natural Resources

Indigenous knowledge research enables one to understand peoples' exploitation of natural resources. According to Sillitoe (1998*a*) the history of indigenous knowledge enquiries stretch back to the beginning of anthropology but in relation to development and natural resources it has a more recent history. Sillitoe (ibid) wishes to bring together both academic and development approaches. In academia, the study of indigenous knowledge issues related to natural resources falls into two categories 1. Ethnoscience and 2. Human ecology. It is necessary here to discuss, in detail, some of the theoretical issues in ethnoscience that are relevant to this present study. Ethnoscience refers to local knowledge systems which is related to biological phenomena and comprises a few subfields like ethnobotany, ethnozoology etc. Human ecology, focus as on human beings in relation to their environments as occupying habitat niches, like other animals, which they are adapted to exploit (ibid).

In the last two decades, another trend has related local knowledge to natural resource development. This also falls in two categories: farming systems research and Participatory development. The farming system research tradition in development is carried on by multi-disciplinary teams, which are involved in documenting and analysing environmental, socio-economic, agronomic systems as comprising the basis of farm-household's livelihood. Sillitoe revealed the drawbacks to this approach from the anthropological point of view; one being the 'ludicrously short' time-frames in which it was thought research could be conducted to achieve understanding of highly complex socio-cultural systems. He considered that this contributed to the perceived failure of farming systems research to address development issues effectively. Another contributory factor he identified, was the inability "to focus tightly on identified researchable constraints within the system, and promote meaningful problem-centred, system-focused inter disciplinary co-operation, instead of implying that researchers had to encompass the entire system" (p-210).

Participatory approaches involve rural people participating in decision making, to plan and justify development proposals which ultimately, will benefit their community[2]. It uses methods like participatory mapping, featuring diagrams and calendars drawn on the ground using twigs, beans, and stones. Sillitoe points out that this approach, from the anthropological point of view, is not neutral but culturally relative, and subject to manipulation and, therefore, fails to access local knowledge with the care demanded by anthropological

[2] Campbell and Salargama (2000) described significance of the participatory approach in fisheries' research.

experience, e.g. the short time frame for PRA activities of the national natural resource scientists of the DFID project in Charan produced results which unfortunately, were inaccurate and misleading. The scientists used to come in a group from the University or Research Institute with a big pile of papers and other material required, mostly, for a day trip. They worked on seasonal crop calendars, daily activities, homestead production, wealth ranking, fishing activities etc (see Chapter 3). Although they were supposed to stay overnight, many of them tried to finish their work just before the dusk, as they were in a hurry to go back home. One scientist, who always used to finish a PRA session as quickly as possible, manipulated the results of his work. He did not invite any of the participants to draw maps nor write anything or did he record any of the participants' words as he relied on his own judgement. The said scientist used to ask questions, but, mainly, he put forward at great length, the information gleaned from other regions of the country which he considered, without any justification, could, or should, be applied to the Charan situation. As the scientist was in control of the whole session, people just replied to lengthy questions possibly not understood, with a single word like 'yes', without having the chance to explain their own experiences and state opinions. For instance he asked the women of the fishermen village:

> Q. What do you do with the garbage and ash that you throw into the pit around your homestead? Don't you put it on the bed of the pond before you cultivate fish?

This was a leading question which, when put, silenced everyone, as the women are not involved in fish cultivation. When the scientist started insisting on an answer then one of the women said 'yes' in a low voice, just to avoid further questioning, as they thought they were being interrogated. The

scientist did not take time to display this positive answer on the poster that was hanging in front of the people. This information (i.e. the 'yes' response) is included in his report. Later, it was found that no one in the locale followed this procedure when they cultivated fish, as fish culture is a newly introduced practice in this area. Actually, the scientist used to conduct PRA for his organisation in different parts of the country. So he has some ideas and pre-conceived notions which he applies everywhere he goes, without trying to get to know the local reality (see chapter 3).

The manipulation of the results was done also by the local aquatic resource scientists. One of the scientists came to the village to measure the water depth and to note on which plots the water remains in each month. It is termed '*beel* parameter', and mapped the fluctuation of the water in different months in and around the *beel*. The scientist used to do this task with the help of local enumerators, and required them to identify the edge of the plots where adjacent to the *beel* water. Unfortunately there was a gap in the scientist's visits as he failed to return to the village in a month later, so two months passed by without the depth being recorded. Later, it was discovered that he had included some plots on the map on his own without asking anyone to verify the water borders of the month when he did not come to the village. This inaccurate map was accepted and presented as an evidence of water fluctuation all the year round.

These criticisms justify the anthropological approach of participant observation to explore Indigenous knowledge in this study of natural resources, mainly

fisheries. One of the main aims of the present study is to show how an anthropological approach provides a fuller understanding of local knowledge than do other approaches (see chapter-3).

2.6 Ethnoscience

Ethnoscience deals with people's understanding of nature—the way they perceive, classify and name things around them in their world. The development of ethnobiology, as a discipline is described, and how it seeks to understand the way people classify and interpret their biological world. In an attempt to clarify the way ethnoscience deals with problems of classification and related issues, this study explores Charan people's knowledge of their environment and resources such as fish and aquatic plants (see chapter 4, 5 and 6).[3]

What is ethnobiology? Berlin (1992) considers ethnobiology as a discipline which combines the work of the anthropologist with the biologist. Most ethnobiologists agree that it comprises the study of the complex set of relationships of plants and animals to present and past human societies. Hunn (1999:5) is of the opinion that ethnobiological research, since the late 1960s, has tended strongly toward the conclusion that folk biological knowledge is, in large measure, empirically sound, by showing that "indigenous understanding of biological reality are compatible with those of western biological science". The history of ethnobiology, as Sillitoe (1983:1,2) mentions, stretches back over fifty years. Two distinctive approaches were developed in this field during

[3] Deloria (1992) warns, "One of the difficulties today in speaking about tribal knowledge is the tendency to suggest that when traditional teachings correspond to the findings or present beliefs of western science, then traditional wisdom is validated" (Deloria 1992:15).

this period. One of these tends to concentrate on the use of natural resources, whereas the other emphasizes their 'autochthonous-classification'. The former is a functional approach, as it is focusing on 'practical issues relating to the current existence of cultures and provisioning of their members' (ibid). It places emphasis on plant use, consumption, dietary contribution etc. A functinal or utilitarian approach, is evident in Rappaport's (1968) and Diamond's (1972) work which places emphasis on the connections between people's life-styles and their environment.

Berlin (1992), described how this neo-Malinowskian thought was opposed by Lévi-Strauss (1972), who argued that the people's thoughts about their environment were because of 'intellectual need' rather than 'pragmatic need'. For Lévi-Strauss 'classifying has a value of its own'. Berlin describes this alternative position to the utilitarian view:

> the striking similarities in both structure and content of the system of biological classification in traditional societies from many distinct parts of the world are most plausibly accounted for on the basis of human beings' inescapable and largely unconscious appreciation of the inherent structure of biological reality. (p.8)

A debate has emerged in ethnobiology between utilitarian and intellectualist view. It goes back to the debate on cultural particularism and relativism versus cross-cultural generalisation and comparison. Ellen (1983*a*: 93) considers this debate a 'caricature' and, thinks it has been 'sustained through ideological mystification and polemic'. Berlin's notion about relativism is that it 'is an exercise in vacuous futility', because cultures are different in innumerable ways. Berlin and Conklin operate within the cultural linguistic paradigm of cognitive anthropology.

However, it was the approach of Sillitoe (1983) which I found relevant in the present study, when he attempts to redress the imbalance and demonstrate the integration of the functional and cognitive approach as he thinks they can benefit each other. This notion was evident in Conklin's (1954) work. Sillitoe, describing the main purpose of his approach, is that it concentrates on 'what people think of their flora, to virtual exclusion of how they use it and how it otherwise figures in their lives' (1983: 2).

Another debate in ethnobotany, outlined by Ellen (1996:457), warns against being narrow-minded regarding ethnobotanical knowledge. It is possible to miss the relevance of indigenous knowledge when it is not situated within 'a broad culturally-contextualised approach' (ibid). According to him, a reason why ethnobotany lacks a unifying theory is because of the differences between biological ethnobotany and anthropological ethnobotany. Biological ethnobotany operates within a 'bio-economic paradigm' which is a study of plants used by indigenous people. It tends to identify plants with local names and lists uses. This approach is related to 'new applied botanical and phytochemical possibilities' (ibid). Anthropological ethnobotany operates within a 'cultural-linguistic paradigm', which relates plant knowledge, indigenous rules and categories. It directly explores the 'relations between plants and humans, placing plants in their total cultural context', according to Ellen, Conklin and Berlin and other anthropologists who follow this approach. Ellen identifies the main weakness of biological ethnobotany as taking the knowledge embodied in fixed folk traditions and seeing if it is valuable to global science. He is sceptical about the approach that treats knowledge as information. Knowledge varies

between individuals and populations. The fisheries scientists echoed the same lack of appreciation of the actual situation in the case of the Charan fisheries. Their interest lay in obtaining information regarding the fish growth, water quality, nutritional value and fish disease. The place of the fish in people's everyday lives, or the way they think about the fish were not addressed or given any importance in their enquiry. They hold the opinion that people prefer big fish and so they were worried about the inappropriate fish culture in Charan, and so ignored people's preferences for fish consumption. The Charan people's preferences are always on small fish as they think these are more tasty (this issue is elaborated in the Chapter 5, 9).

Why do people classify things in their environments? This is one of the questions that ethnobiology has been trying to answer. Berlin (1992:8) claims that human beings everywhere are compelled, in the same way, towards the 'conceptual recognition of the biological diversity of their natural environments' (p-8). Furthermore, social organisation, rituals, religious beliefs and notions of beauty are involved in peoples' method of classification. According to Berlin (1992:9) when human beings classify they discern rather than constructing order.

> "The world of nature cannot be viewed as a continuum from which pieces may be selected ad libitum and organised into biological categories...groups of plants and animal presents themselves to the human observer as a series of discontinuities whose structure and content are seen by all human beings in essentially the same ways, perceptual givens that are largely immune from the variable cultural determinants found in other areas of human experience". (p-9)

However, some classifications are more general than others. The more general systems are largely unconscious because they reflect perceptual groupings that

suggest themselves to the human observer. Therefore, Berlin believes that there are some common characteristics of the human unconscious, which lead all of us over the world to classify our environments similarly. In contrast Ellen and Sillitoe are of the opinion that it is necessary to take a more relativistic stance about people classifying the world around them.

Ellen (1993*a*: 3, 40-41, 149) thinks that one of the main role of theories, concerning classifications, is that they are adaptive and act as dynamic devices of practical value to their users. These will reflect interaction between culture, psychology and discontinuities in the real world.

According to Ellen, various parts of the environment are named (see chapter 4), classified and recalled by people because these are economically and culturally significant. They are related, significantly to animals and plants, minerals and places which are important to them. He also thinks that we name those things which we have the most need to communicate about, or which can 'serve as props in the process of communication and expression'. Things to which we accord value are named.

From his discussions, it is emerges that he believes the system of classification is not the invention of individuals but that "Classifications are part of the belief systems and as such are the productions of interactions, accretions, elaboration and condensation. (p-140)

Ellen and Sillitoe discuss confusions in classifications. Ellen questioned whether: "Identification and representation of the environment and its flora and fauna is contested—why and on what basis should the ethnographer accept one person's answer against that of an other? Why do some informants discuss the correct answer of others?" (ibid) In his experience of Wola society in Papua New Guinea, Sillitoe explained that:

> The disagreements are not result of linguistic confusions, with informants using words from different dialects for the same plant...Nobody ever intimated that the naming of cultivars or crops varieties in different situations according to cultural dictates....In everyday contexts for instance they did not regularly differ on principle to score points off one another, they did not compete to demonstrate superior knowledge or establish some public image. ...the propensity of individuals to differ reflects their acephalous social order, their refusal to acknowledge any authority, even in giving names...(Sillitoe: 1983: p-7)

This discussion of people's disagreements will be useful when exploring the same problem in Charan (see section 4.2.2). The people disagree regarding the naming of different locations in the water bodies. They also pronounce the same name in a different way, as it the characteristic of their dialect. Some of the natural resource scientists were confused, as they wanted to standardise the name that people use for different locations. It is not possible to standardise other people's knowledge, particularly when the research is on indigenous knowledge.

2.7 Perspectives of Banglali indigenous Knowledge

In this section, illustrations will be given of indigenous knowledge research in Bangladesh and a account will be given of the society, culture and belief system of the fishermen, which comprises their identity. Some evidence of indigenous knowledge research in the past is presented in order to illustrate

how it failed to show respect for the Indigenous people and their culture.

2.7.1 Bangladesh: society and culture

Bangla is the name of the language of *bangali* 'Bengali' people. It is one of the Indian subcontinent's most ancient languages. The language varies in different parts of the region, as people speak different dialects. The written tradition of the *bangla* language is ancient. Although Bangladesh is economically a poor country, its folk or oral tradition and cultural heritage is rich (Khan 1987; Siddiqqi 1997). Rural people have folk beliefs which inform their everyday life, influencing all their livelihood practices.

The majority of the Bangladesh population is rural. The society is largely agrarian. Throughout the country, farmers have small pieces of land where they grow three crops a year. The rural society is heterogeneous and consists of *boro grihostho* 'big farmers', *choto grihostho* 'small farmers', *borgadar* or *bhagi* 'sharecroppers', and *dinmojur* or *kamala* 'day labourers'. Most of the farmers are Muslim by religion.

Hinduism is the second religion of the country and social stratification among the Hindus is more complex than among the Muslims, Hindu society is stratified by caste, which is evident in rural communities. A number of lower castes, or occupational groups, such as *mali* 'gardener', *sutar* or *shutrodhor* 'carpenter', *bainna* 'gold smith' etc. are seen in every community. There are many members of the fishers' caste to be found almost everywhere in the country. The fishermen are termed *jele* and different sub-castes exist amongst

them are called *koiborto* or *jolo das*, *Rajbonshi, malo* (Pokrant et al. 1997). There are some occupational groups also evident amongst the Muslims. These are known as *behara* 'career of sedan-chair', *kulu* 'who grind the mustard seed', *barui* 'growers of betel leaf' and so on. However, all 'lower' caste Hindu occupational groups, including fishermen, have a low status in the society. They are considered 'untouchable', according to Hindu cosmology which determines the ideology of the caste system (Davis 1983[4]; Srinivas 1976)

Each of the 'lower' Hindu castes is termed *jati*. The meaning of *jati* is 'nation', and when used by lower caste people it strongly distinguishes them from other castes (ibid). It is also, a sign of their awareness of their identity (Davis 1983). These 'lower caste' people worship gods and goddesses common to all Hindus. On the other hand, each caste has its own god or goddess from which they think their members are descended. For instance, *bisho korma* (lit. working through the whole universe), is the god of all craftsmen (e.g. carpenters and gold-smiths). According to a Hindu text, *bishoyo korma* was the *deb shilpi* 'master artist' amongst the gods (Sarkar 1958). He decorated the heavens. He is the *adi guru* 'oldest teacher' of all arts. The knowledge of art is inherited from him by all the craftsmen.

All fishing castes worship two goddesses known as *Ganga* and *Monosha*. Charan fishermen worship both of these goddesses. The word *Ganga* refers to the river Ganges and to the Hindu deity. The fishermen think all water that

[4] According to Davis, Durmount considered the caste system as a 'pan-Indian phenomenon' which is relying on the concepts of 'purity and pollution'.

flows in this world derives from *Ganga*. It is the main source of water, which is why the fishermen use the word *Ganga* occasionally to refer to water. The fishermen worship Ganga when they are fishing as they think she is the owner of the water world and *Ganga* will protect them from fear or danger. It is, also, evident that some poor Muslims who rely on fishing contribute small amounts of money to the worshippers. *Monosha* is the snake Goddess. They worship Monosha as they have fear snakes in the water. Both *Monosha* and *Ganga* have ancient myths related to them, which are transmitted through the oral tradition. The Monosha myth is portrayed through folk performances in the community during the monsoon. Not only the fishermen, but many Muslims also take part in this event. Ganga is worshipped throughout India as it is part of classical Indian mythology, but Monosha is only evident in greater Bengal, including west Bengal and some parts of Bihar in India (Smith 1980). Why the Manasha cult is important for the fishermen is explained in the Padma Puran or Manasha Mangal which is a very popular myth of mediaeval Bengal. It exists in various poetry forms written by many authors in different parts of Bengal. These versions vary from place to place. A prose translation of an example of this poetry is given below; following the Bengali text, so as to make the meaning clear.

> 'হেথা হৈতে পদ্মাবতী চলিলা সত্বরে / নেতা সঙ্গে নিয়া প্রবেশিলা চম্পক-নগরে / চন্দ্রধর-অপমান অন্তরেতে উঠে / নদী তীরে গিয়া দেবী বসিল কপটে / নদী-মধ্যে জাল বায় ধীবরের গণ / মৎস্য না পাইয়া হৈল চিন্তাযুক্ত মন / সবে বলে হায় হায় আজি কি হইল / কর্মদোষে জালে আজি মৎস্য না মিলিল/ কি দিয়া পোষিব আজি পুত্র পরিজন / কি কারণে হৈল আজি বিধি-বিড়ম্বন / এত বলি ধীবরেরা হাহাকার করে / তীরে থাকি পদ্মাবতী কহেন সবারে / শুন হে ধীবরগণ আমার বচন / পার করি দেও যাই চম্পক ভুবন / মোর আশীর্বাদে মৎস্য অবশ্য পাইবে / কদাচ আমার বাক্য অন্যথা না হবে / জালু মালু দুই ভাই ধীবর প্রধান / বলে মাগো নায়ে উঠ করিও না আন..'(Chowdhury: 1911:113)

Pamabati (another name of Manasha) went to the riverbank and took her seat, as she was wanting to cross the river to go to the Champok Nagari 'the town of Champak'.

The dhibor* 'fishermen' were trying to catch fish in the river with their nets. They were very anxious, as there were no fish in their nets, which meant that there would be no food for them that day. They were blaming this on fate and tried to search for the reason for their bad luck. Then Pamabati called to the fishermen and told them to help her to cross the river in their boat. She said this would help the fishermen catch many fish in their nets Jalu and Malu, two brothers who were leaders of the fishermen, invited Manasha to ride in their boat. Padmabati responded to the fishermen's invitation and crossed the river in their boat. After that the fishermen started to catch plenty of fish in their nets. Later they discovered two *shuborono ghot* 'golden pot' in their net. They asked Manasha to explain the mystery behind these two pots. Padmabati told the fishermen that, as she, and nature, are kind to the fishermen they would receive all of their blessings in these two pots. Then Jalu and Malu, the two brothers, started to worship Padma by putting her *ghot*, which is called *Ghot Puja*, in front of them. After this incident all fishermen started to worship Manasha in order to overcome danger and catch as many fish as possible.

The relevance of these rituals in the fishermen's livelihood process were not understood by the scientists[5]. During the whole research period in the field and even during the writing-up phase of the thesis in England, the Fisheries and Agricultural scientists of the DFID Project asked the same question again and again concerning the relevance of rituals in exploring indigenous knowledge of natural resources. They were completely unaware of how religion and the local belief system influence the practices of the fishermen (the relation between fishing practices and the fishermen's belief system are described in the Chapter 5). My work made them uneasy, as they thought it

[5] In many societies empirical knowledge is intertwined with ritualism and spiritual beliefs (Teiwaki 1988)

would be too ethnographic and might fail to focus on technical dimension of the natural resources.

In the 'hill tracts' and other remote parts of the country there are over 30 groups of aboriginal people (Bangladesh Bureau of Statistics 1999) who have their own belief systems, languages and cultural heritages.

2.7.2 Past research on indigenous knowledge

In Bangladesh, there has been little ethnographic research, particularly on fisheries. Anthropologists have only recently become involved in exploring farmers' and fishermen's, as well as other Indigenous people's knowledge (Sillitoe 2000*b*; Ahmed 2000; Stokoe 2000). Most research on indigenous knowledge in Bangladesh has been undertaken by scientists who share many misconceptions regarding it (see Chapter 3). Sillitoe (2000*b*: 6) characterises contributions:

> a widespread assumption among scientists and many others is that indigenous knowledge research comprises investigation into local technologies, and associated knowledge of natural resources and their management. (p-6)

Mallick (2000: 42) searched the available literature to report on indigenous knowledge research in Bangladesh during the recent past. He found a number of references relating to how people select crops, preserve seed, manage soil fertility, control pests, rear live stock etc. with regard to their knowledge of agriculture. He paid attention, also, to the literature relating to fisheries, mentioning that 'small-scale production depends mainly on local fishing gear and associated craft'. This statement is evidence of narrowing down the meaning of indigenous knowledge only to local technology.

Some of the work on fisheries has been misled by scientific notions. For instance, Islam et al. (2000) inquired into fish species classification using PRA methods proposing a scheme which neatly fits the fish taxonomy of the fisheries experts (See Chapter-5).

Tsai and Ali (1997) contributed information on fishing gear. They collected vernacular names for each type of gear and then described and ordered them. Their description and classifications of this gear failed to represent the users' knowledge of their fishing culture (see Chapter 6).

Similarly, the work of Ali (1997) which concerns 'fish, water and people', nevertheless, pays little attention to the people. In an effort to cover a large part of the Bangladesh floodplain fisheries, he obtained a large amount of information, mainly collected through 'Flood Action Programme'[6]. The study was driven by scientific concerns and revealed confusion about the local terms used for water bodies (see Chapter 4). The stance taken by the author is clear when he is sceptical about people's views. He blames them for not introducing proper scientific measurements, when the local managerial system for the fisheries bans certain fishing gear, or catching certain fish, in the certain periods of the year.

> "Efforts at management of the open water fisheries resources have been confined to enforcement of some rules and regulations, such as ban on the catch of certain species and certain sizes....certain types of fishing gear...Such rules and regulations were, however, framed on the basis of popular belief, rather than scientific studies to determine the appropriateness of the rules. The implementation of these are erratic..." (preface)

This arrogance and intolerance, evident, in many writings, reflects the scientists' opinion that local people's knowledge as irrelevant. They think that

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[6] It is a controversial flood programme (Paul 1984). According to Paul (1995:299) "The world bank has recently prepared a flood action plan (FAP) to solve the flood problems of Bangladesh. The FAP proposed constructions of embankments on both sides of all major rivers. There is however, strong opposition in the country to the 'structural solution' to its flood problems".

the result of their scientific knowledge is the universal and they expect everyone to follow it (see chapter 3). This attitude ignores what explanations the people, directly involved, can offer. This was evident from my own experience, during fieldwork in Charan (see Chapter 3). Even if scientists are polite and approach people sympathetically, nevertheless, it is difficult for them to stop themselves imposing their own ideas, or trying to guess things according to their own rationality, as they are ethnocentric. The soil scientist on the DFID Land Water Interface project once asked me why the farmers of Charan grow rice, when their soil is more suitable for growing potatoes. According to him, the farmers seemed foolish for growing rice instead of potatoes. The farmers are very much aware of the suitability of their soil for tuber cultivation. About twenty years earlier the area was famous for *misti alu* 'sweet potato' growing, but the farmers stopped cultivating this crop as rice became increasingly scarce in the country, due to rapid population growth. Rice is the main food for the *bangali* 'Bengali' people. In rural regions only rice is considered as a 'proper meal'. For instance, if someone just eats other food than rice, people often say that he is fasting. Although rice yield is low in Charan, it is their main subsistence food, not the potato. In this way, we see that the whole issue turns on people's traditional sustenance preferences, structured in accordance with their culture, which cannot be changed quickly, even when outsiders (e.g. scientists), point out the 'benefit' of changing to more productive crops.

The present study aims to put the local people's knowledge into a proper perspective by exploring its rationality.

Chapter 3

Methodology

3.1 Introduction

In this section, I shall review three methodological issues relevant to any research on indigenous knowledge in development. Firstly, I shall explain my position within the context of Bengali society. Various questions in relation to this need to be addressed: being a member of this society is it easy for me to have access to farmers' and fishermens' knowledge? How can I justify studying in a rural place exploring and examining the knowledge of local people? Secondly, I shall relate the process I followed in conducting fieldwork and how I negotiated the problems encountered. Thirdly, I shall describe my experience as a member of a multidisciplinary research team on a development funded project.

Participant observation is my way of gaining knowledge, relevant to the study of the Charan people. Malinowski (1922:25) suggests that an ethnographer should 'grasp the native point of view, his relation to life, to realise vision of his own world' through participant observation. Tedlock (1991) stated that 'there has been an expectation that participant observation would lead to human understanding through a field worker's learning to think, see, feel, and sometimes even behave as a native...enter into another person's world through communication'. He mentions that, in the beginning of 1970, there has been a shift in anthropological methodology from participant observation to the

observation of participation. Ethnographers attempt to emotionally engaged participants and observers of the lives of others in participant observation. In the observation of participation the 'ethnographer both experience and observe their own and others' co-participation within the ethnographic encounter' (p-69). It represents the idea of reflexivity, which was put forward in anthropology by many anthropologists. According to Escobar (1993) the nature and politics of representation and textuality gives rise to reflexive anthropology. Furthermore, in such a situation it is necessary to justify the position of an ethnographer when ethnography moves from its conventional single-site location. In recent times, the emergence of 'multi-sited ethnography' that is located within the new sphere of interdisciplinary work, including science technology studies and cultural studies, is getting attention (Marcus 1995).

3.2 The Ethnographer's position

Bengali Society depends heavily on agriculture. Although it sounds simplistic Bangladesh is basically a big village. This was even truer about two hundred years ago when the agricultural based society was more homogenous. Agriculture continues to form a basis for Bengali identity. When the British colonial Government introduced *chirsthayi bondobosto* 'permanent settlement' in 1793, a class emerged in society that was largely alienated from this common bond. It leads to the creation of the Jamider 'large land owners' whose life style was feudal in character. By the seventeenth century this newly emerged alienated class was imitating the elite of the west (Chowdhury 1980, 1982), and

supported British rule. They were formally educated and were widely referred as *babu* or *bhodro lok* 'gentleman' (Arora 1997). This newly formed class was cynical about the rural people's thoughts, actions and behaviour. They thought that rural people are *murkho* 'illiterate or ignorant'. According to their view, they were not just backward but were 'an obstacle to progress'. They were superior in their attitudes and treatment of the rural people.

Farmers are called *Chashi* in Bengali. Any conduct considered misguided according their values system is referred to as *Chashi* behaviour, hence the saying *Chashar moto babohar korona* 'don't behave like a farmer'. The word *chasha* symbolises those who are divorced from so-called 'gentlemen's culture'. It is a derogatory term. Most educated people continue this tradition to this day, although they are descended from the rural agricultural background they despise.

Although I was working in my own culture with this historical background how could I relate to common rural people and to earn their trust since they have strong apprehensions about so-called educated people like me. It was difficult to establish genuine communication with them. On going into the field, I was aware of this problem and the need to find ways around it. I was careful at all times to abstain from any kind of *bhodrolok* 'gentleman' behaviour. I began to find myself in an increasingly difficult position, as an outsider associating with the poor. This is not the way in which the educated should behave.

Despite its picturesque surroundings, Tangail is not a quiet place. It has a bad reputation, as it is known as the *tirthobhumi* (place of pilgrimage) of *mastan*[1] 'thugs'. These young people are supported by different political parties. There are many *mastan* in the village of Pach Charan who claim to belong to the ruling party. Tangail is also well known for many development projects carried out by NGOs and government. The *mastan* collect *chanda* 'rent' from these organisations, including the NGOs. They use this money to buy a drug called *phencidil*, to which they are addicted. Tangail is infamous for this *chanda* and *phencidil* culture. Some *mastan* often visited our field house. Some of them asked for large amounts of money since they think all foreign projects have a lot of money. I had to cope with this and was tried hard to make them understand about the objectives of the project. Some of my local friends and the caretaker of the field house helped sort out these problems, as some district level politicians are their close relatives.

Towards the end of my fieldwork, some *mastan* 'thugs' also occupied the *beel*. They beat and harassed the fishermen for money. This was also threatening to me, since I was involved with the fishermen. One night some muscle men intentionally flashed their torches on my face while I was returning from a fisherman's house. They were curious all the time about whether I was reporting anything about their behaviour. There is much of *khas* (government land) common land within the *beel* which the rich farmers in the village have occupied.

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[1] This word derives from the *sufi* tradition. Great *sufi* mediators who do not fear any one except Allah are called *mastan.* Nowadays, this term is used to refer to those who act as if fearless bubbles.

These influential people were also very curious about my work. The fishermen told me about these *khas* lands, which worried them. One elderly rich man was particularly rude to me whenever we met.

I first went to the village of Charan in March 1997; an agronomist from the Bangladesh Rice Research Institute picked me up in a vehicle from Dhaka. He was the research site co-ordinator for a Department for International Development funded project under the Renewable Natural Resources programme. Through him, I was able to keep in contact with my supervisor and other project personnel in the UK. In the beginning I was unsure about the work I would have to carry out, other than the broad objective of exploring indigenous knowledge through participant observation. I was accommodated in a field house, rented by the project, along with a cook and a caretaker. The scientist left me in the village after introducing me to the landlord and other people he knew in the village. Although I am Bengali, the area was new to me. At that time my objective was to cope with my new situation and get some general idea about the locale.

3.3 Conducting Fieldwork

First, I made the acquaintance of Sintu Mia, caretaker of the field house. He is a well-known person in the village and has a reputation as an honest and good man among the villagers. His father was a farmer and he was involved in agriculture before joining this project. He accompanied me to look at the area

around the *beel*, not only Charan, but also other neighbouring villages. We met people and he introduced me to them, they were very curious about me. Every one in the village had heard about the project and the field house had already got the name 'Agriculture Office'. It was located at the main entrance to Charan village and villagers passing through came to see me as they thought that I was the person in charge of the 'Agriculture Office'. I was explaining to everyone about my role and identity and the sort of work I was to conduct. People kept asking me about the objective of the project. Some of them came from distant places in order to ask me whether the project was going to in build any embankment or road on the *beel*. A few people came to me for advice about problems in growing crops. An elderly retired person asked me to examine the soil on his land. Fishermen were coming to ask if the project had any plan to acquire the *beel* in order to introduce commercial stocking. Their fear of losing the *beel* was very clear in their faces. On several occasions I visited their houses to explain that I was interested in learning about their livelihood strategies.

I used to join fishermen when they were fishing in the *beel,* and follow farmers while working in their fields. I had to judge whether they were willing to talk. I was asking them what activities they were conducting and why. In this way I tried to begin a conversation and start collecting information about people's agricultural practices and fishing activities. I was sending all the field information to my supervisor since the project was storing this in a database for analytical purposes (the software was called Nud*ist, a qualitative analysis software)

After a while, I concentrated on the study of fishermen and their practices following the aim of the project. They are under great stress as they are in the minority and it was too hard to earn their trust in order to explore their knowledge. It was extremely hard to get information about their access to water bodies and other social issues. My growing intimacy with two fisher-boys, who were studying in the local college, proved very useful. These boys started doing some work for the project on a part-time basis, which helped them to fund and continue their studies. They introduced me to other fishermen and created an environment of trust and frankness. Stories of the problems in their everyday lives, their sufferings and struggles, made me sympathetic and brought me close to them.

Whenever I went on the *beel* while they were fishing I tried to observe closely everything they did. I wanted to learn how they used their nets, how they chose places to fish and how they identified different aquatic environments. Fishermen work all day along. Sometimes they came to visit me in the field house at night. Sometimes, we used to eat food together. Conversations became open-ended and spontaneous. They were very interested to converse whenever I showed an interest their Hindu rituals. Persons like Bancha Ram Das, Nil Kamal Das, Khushi Mohon Das, Nirmol Das and Indro Mohon provided me with much information. We came to refer to each other as *dada* 'brother'. These people forget their poverty and hard life whenever they started talking about their myths

and rituals. Sometimes, their women folk also took part in these discussions. It was clear that people were much more interested in talking about their beliefs and sharing their wider cultural experiences than their fishing technology.

There were some problems in understanding the thoughts and ideas of villagers. People of Charan are not 'straight forward' in the expression of their knowledge. It does not form a conscious, separate category—it is very much a part of everyday lived existence. Much of the expression and practice is context-driven. This applies to all rural Bengalis. Different people in different places, sometimes within the same locale, pronounce on the same thing in different ways and it has been difficult for me to write them up in a standard Ethnographic form. I did not wish to 'standardise' farmers' or fishermens' knowledge. There is a saying in Bengali *ek desher buli arek desher gali* which means 'good saying of one place sounds like abuse in an another'. Moreover, in rural areas people use language rich in metaphors and symbols. It became clear to me that the meaning of expressions was never fixed and surely determined—it all depended on the particular moment of conversation. Particular incidents during the day would influence the mood and expression. It was hard for me to be consistent about certain things as the scientists expected, when people themselves were not consistent.

3.4 Multidisciplinary Research

Anthropologists by definition always respect an insider's view of their society[2]. This attitude should be obligatory for all who aspire to work on indigenous knowledge. If an anthropologist works alone he can react flexibly, as demands dictate[3]. But when working on indigenous knowledge issues as part of a multidisciplinary team there is less scope for this as one has to comply with the team's expectations. Furthermore, natural resource scientists bring quite different work practices to the same place, which may compromise the ethnographic endeavour. Many scientists treat local people as their subordinates. Bangladeshi anthropologists may experience the same treatment as they attempt to participate as far as possible in the every day life of the people. Many natural resource researchers also think that no one except them has the right to explore natural science. They may fear that the emphasis on indigenous knowledge threatens their 'expert' status. At times, they forget that they are working in a multidisciplinary team where everyone's view should be given equal emphasis. It is in this sharing of ideas that a team spirit develops among all the members. Many scientists act as if they are superior, which is displayed in their attitudes within the team. Anthropology in Bangladesh is not a long established discipline. The first anthropology department in the country was only established in 1985 at Jahangirnagar University. As a result persons from other disciplines have no clear idea about the work of an anthropologist and the

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[2]According to Schiffauer (1996) 'inside' and 'outside' are culturally marked in different ways.

[3] Kapferer (1988) warned about the arrogance of positivism in social science which he thinks is reflected in the value of an ego-centred personal experience fetishized in anthropology as the technique of 'participant observation'.

majority share some misconceptions about the subject. National natural resource scientists can experience some problems in understanding, and accommodating to, the anthropological approach. What follows is a personal account of my problems when working as an ethnographer in a multidisciplinary team comprising many natural resource scientists, employed to enquire into local farmers' and fishermens' indigenous knowledge.

My objective as an anthropologist was to involve myself as much as I could in rural life, to master the dialect and understand the local people's attitudes. I was polite and showed respect when approaching informants, and was careful not to offend in my work. But my scientist colleagues' approach was quite different. They had a university education. Villagers, mostly poor farmers and fishermen, are easily intimidated by highly educated people. Common villagers readily address them as 'sir' or *shab*. This acts as a barrier against obtaining local knowledge. If an informant feels social pressure on his shoulders then dialogue becomes awkward and difficult. Few of the scientists attempted to overcome this obstacle; instead they basked in their status. Their attitude reflected their assumption that they had come to the field in order to 'rescue' people. They subscribed to the idea that people, such as themselves, from the 'higher echelons' of society inevitably teach and instruct the lower orders. There is no idea in their minds that they may learn something from the villagers (Sillitoe 1998*a*). They believe that their scientific knowledge can solve the livelihood problems of the poor. Their sense of superiority as scientists is embedded deep

in the hierarchical fabric of Bengali society, inextricably linked with their higher social status. Even those few who were verbally polite clearly expressed their assumption of higher social status in their body language and attitude.

In Bengali we have different terms for person's of different ages and status. If someone is elder or should be respected we are supposed to address them as *apni* 'you', a person who is comparatively younger or is of an inferior status we may call him/her *tumi* 'you', and the most junior or inferior person we call *tui* 'you'. On many occasions I heard natural resource scientists working on the project calling poor and old farmers *tumi* or *tui*, which was inappropriate and damaging to the close relationships vital to my indigenous knowledge research. I heard them addressing their enumerators in the same way. These were local people employed by the project to assist in the collection of information. Some of them were also my valuable informants. One scientist even treated them as his *chakar* 'servants', using them to run his personal errands, which insulted them. He told some men to wash his vehicle, a symbol of his higher status, and to move it to a safer place for the night. Another time he instructed some enumerators to pluck green betel nut from a high tree early in the morning, which was very slippery at that time. Some of the enumerators were offended when treated in this way. I suspect he did this sort of thing out of ignorance, believing in his natural superiority as an academic. It was, however, totally inappropriate for a project that purported to promote a participatory approach to research.

My work was also affected by this sort of behaviour. While I was trying to develop a close rapport with people from which I could learn, they were undermining my efforts with their concern to demonstrate their social status when in the field. As I mentioned earlier, villagers frequently used to visit our field house. Some of the team's scientists complained about these visitors. They thought of the field house as their office, and, correspondingly, believed that we should control people's access there, just as minions only enter their university and institute offices when they are summoned them to undertake some menial task. They suggested a 'strong administration' system would be suitable for the field house. This shocked me. They did not realise the importance of the field house for my ethnographic research or its purpose as a place of informal 'work'. During their brief but numerous visits to the field they wished to consider it their office, a place of restricted access that would support their 'officer' status.

The natural resource scientists on the team also insisted on giving me advice about exploring indigenous knowledge. I listened to them, but rarely replied, for I was literally lost for words, amazed at their attitudes. Some of them were conducting various kinds of participatory rural appraisal activities but their approach was at best, 'hit and run'. They guessed about cropping calendars, daily activities and other matters rather than consulting people closely. This would have required considerably more work with low status villagers and would have been 'demeaning' to their status. Their attitude and approach to this kind of work was not genuine and I also found their methods very mechanised. A great

deal of their information did not correspond with my experiences in the area. I think that they based their research largely on preconceived scientific models about how the world is, or should be which they were imposing throughout rural Bangladesh without regard to local reality. Some of them were extremely deterministic. They did not spare the time to listen to what people had to say about their own lives. They acted as if they had already grasped the answers to local problems. Their approach, therefore, demonstrated that they had no respect for the manner in which local people lived their lives. Some of them even claimed to know all the anthropology necessary for indigenous knowledge research and tried to teach me how I should go about it.

In the meantime my supervisors in anthropology were advising me about how to conduct explorations in indigenous knowledge. Their instructions guided me in asking appropriate questions about how people perceive their environment, and not to assume prior understanding. For example, how local people identified different kinds of fish, how they determine their fishing practices, how they learn and make decisions about what to grow where and when and so on, thereby enquiring into a range of issues of interest to our natural scientist colleagues. I was able to explore people's thinking processes. The scientists found it difficult to appreciate the inherent flexibility necessary for indigenous knowledge research, and the need to remain as open-minded as possible. I think they found it a hopelessly unstructured method of research, unlikely to further the understanding of anything, and therefore deserving their disdain when compared

to their rigorous tried-and-tested methodologies The experiences of working as part of a multidisciplinary team were not all negative, however, for observing and listening to the natural resource researchers helped me to determine what sort of thing I should avoid. It helped me recognise the important differences between the work of the natural resource scientist and that of the indigenous researcher.

Whilst I was staying at the field house I had acquired several responsibilities for local project management, in addition to conducting my indigenous knowledge research. These activities helped me to build a good rapport with the villagers. The downside was that some of the natural resource scientists failed to appreciate the significance of my management functions in my relationship with villagers. Some of them even thought I was there just to assist them. They tried to dominate me like a villager; after all in their eyes I was demeaning myself by trying to work closely with villagers. This extended to intellectual domination. They gave me instructions about how to collect information on particular topics that they considered to be indigenous knowledge. For example, one of them told me to collect all the proverbs of Khana, a folk poet who had produced a large number of rhymes about agricultural practices more than a thousand years ago. I suspect this was intended to suggest that indigenous knowledge research concerns are similar to the collection of folk rhymes. However, though the farmers are fully aware of many of Khana's works, the local people's agricultural activities are so complex and changed that the rhymes do not reflect the present day situation. In fact a millennium separates her works from today. To the

scientist, however, indigenous knowledge amounts to little more than the proverbs of Khana, frozen in time. He failed to see local knowledge extending beyond these proverbs.

In the beginning I had several problems reconciling what farmers were saying with the 'superior' knowledge of scientists. The local farmers for example called all the HYV varieties IRRI (after the International Rice Research Institute in the Philippines). According to the crop scientists, this reflected the illiteracy and ignorance of the people. There are many HYV varieties bred by BRRI (Bangladesh Rice Research Institute) that the farmers regularly cultivate. I was in the same position as the farmers, since I was not aware either of the differences between the varieties. The natural scientists considered this ignorance inexcusable. I attempted to find out why farmers, apparently, did not have names for individual varieties. Some of them told me that when, during the Pakistan period, the IRRI varieties were first introduced the government appointed officers to oversee their adoption and introduced deep tube wells with paid staff to manage them. They provided the farmers with seeds of different varieties, but the farmers were unaware which variety they were receiving; they were not told 'this is BR6 seed' and 'that is BR13 seed'. All they heard repeatedly was the word IRRI for HYV paddies. People did not forget this name and, subsequently, when other HYV paddies were introduced, the local farmers also labelled them IRRI. Those who introduced the seed did not deem it necessary to inform farmers of varietal names. It is, therefore, no surprise that the farmers are

ignorant of their technical labels. Instead they have invented local names for some of these new varieties. In this way farmers identify HYV varieties among themselves. Their knowledge may not match that of the university-educated natural resource scientists but this does not imply that they are unaware of differences. The scientists may not recognise the local classification but this does not justify them considering the people's way of thinking foolish.

Another episode concerned the conduct of a detailed soil survey by soil scientists, with the help of village enumerators. One scientist tried to tell me about the different properties of soils and how they reflect the fertility of the land. He was using quite a lot of technical terms and was trying to teach them to me. He was checking the soil for plasticity, stickiness etc. I did not follow his words, however, for I had been exploring some local ideas about soils as well. People were telling me many things that I found did not fit in neatly with the soil scientists' ideas. One day an informant was telling me about the *ras* of the soil, the literal meaning of which is 'sap'. According to some farmers it comes with the floodwater. It is deposited on the surface and comes through from underground. The *ras* directly concerns the fertility of the land. Although some farmers have other ideas, the majority of them support this perception of *ras*. When I asked the soil scientist his opinion about *ras* he labelled it without hesitation 'soil moisture'. But the local people's understanding of *ras* is somewhat different; it is not simply just moisture.

Yet another episode concerned fishing technology. One day I found the scientist, who was working on aquatic resources, interviewing a fisherman about the use of different fishing gear. Recently, I had been researching the same thing. When he found the detailed descriptions I had about fishing gear and its usage, he said, somewhat dismissively "Oh you are doing *shahitaya* (literature work)". I guessed, from his statement, what his opinion about my contribution to the project, i.e. although our work was similar, my method could not produce anything more useful than bookish results of no practical use.

Influential villagers were not troubled by the visitors' presence. The poor, by contrast, were apprehensive and showed them great respect. Some of them feared the outsider scientists because they believed them to have power and influence. However, some expressed to me, privately, the opposite attitude. For example, several of my informants questioned the potential of the scientists' work to benefit them. Some of them became sceptical about the value of the work of the natural resource scientists. One day a farmer pointed out to me, while he was being interviewed, that the things that the soil scientists were doing with the enumerators were wrong. He said that when a farmer ploughs and plants the land, he is aware of the different kinds of soils in particular places across his field. But the scientists were collecting soil from only one part of his land, and would, therefore, gain an unrepresentative picture. In this regard, the farmer was more critically aware than the scientist. I was pleased that local people were watching everything so closely and appreciated the fact that they

could argue for the benefit of their indigenous knowledge. This sense of solidarity boosted my confidence in what I was doing.

In this section I have described my experiences in researching indigenous knowledge on a natural resources development project from a personal point of view. My interaction with the natural resource scientists working on the project affected me considerably. It confirmed the view that interdisciplinary teamwork is not easy. The attitude of my science colleagues towards myself and to indigenous knowledge helped me to focus on what I had to do and what I should avoid. Their slights sometimes troubled me. But the experience has also enabled me to have a better understanding of what indigenous knowledge comprises, its strength and the need to integrate it, effectively, into the development agenda. I shall attempt in the coming chapters to convey something of the richness of this knowledge.

Chapter 4

The Aquatic Environment

4.1 Introduction

An emphasis is placed on Bengali people's way of perceiving aquatic environment according to the experiences of Charan fishermen. It will focus on the way people classify and name different parts and locations inside the water bodies. The people's way of assessing the water quality and how it relates to the fish behaviour, also, is explored in this relationship. The aquatic plants, animals and insects that are available in the water bodies are classified and identified along with their characteristics identified according to the people's knowledge.

4.2 People's perception and classification of the aquatic environment

In Bengali language the word *jalmohal* refers to all water bodies and *paribesh* the environment. Ali (1997) mentions that this word is only applicable for the lease fisheries. The word *jal* refers to water and *mohal* or *mohol* to palace. In the broader sense *mohal* refers to a territory or piece of land controlled by someone. In some parts of Bangladesh people call the common ground *Khas mohal*. There is no doubt that this word started to be used during the Jamidar era in terms of tax collection, but to the common people all kinds of water bodies are considered as *Jal mohal*. According to the Land Management Manual (1991) the word *jal mohal* also refers to all kinds of water bodies. To relate this word only to lease fisheries is to narrow down the wide meaning of *jal mohal*. Another problem arises when authors confuse

the word *jalkar* with *jal mohal* in the same text. The exact meaning of *Jalkar* is water tax. This reflects the lack of scientific studies on fisheries where no regard was paid to local people's knowledge.

Other terms associated with water are: *gang* 'river', *beel* 'seasonal lake', *pushkuni* 'pond' and *doba* or *pagar* 'ditch'. Each water body has its own particular environment which relates to the *ovayash* 'behaviours' and *boro houn* 'growth' of fish. The aquatic environment changes with the seasons, which affect the level and flow of water. One important factor determining changes in water levels is the *joar* 'tide', which refers to the monsoon when the water not only floods the land surface but also sinks into the ground and rises up again elsewhere to add to the flooding. The people refer to this as *joar aicheye*. When the salt starts to melt they say it has *joar*; this pollution is not confined to the monsoon season. Incidentally the word, *joar* is also used for girls when they attain puberty. It also refers to the revival of sexual ability as in, *mora gange joar aiche* 'tide in the dead river'. If a frail old person incapable of having sex gets married to a young girl, the villagers use this saying.

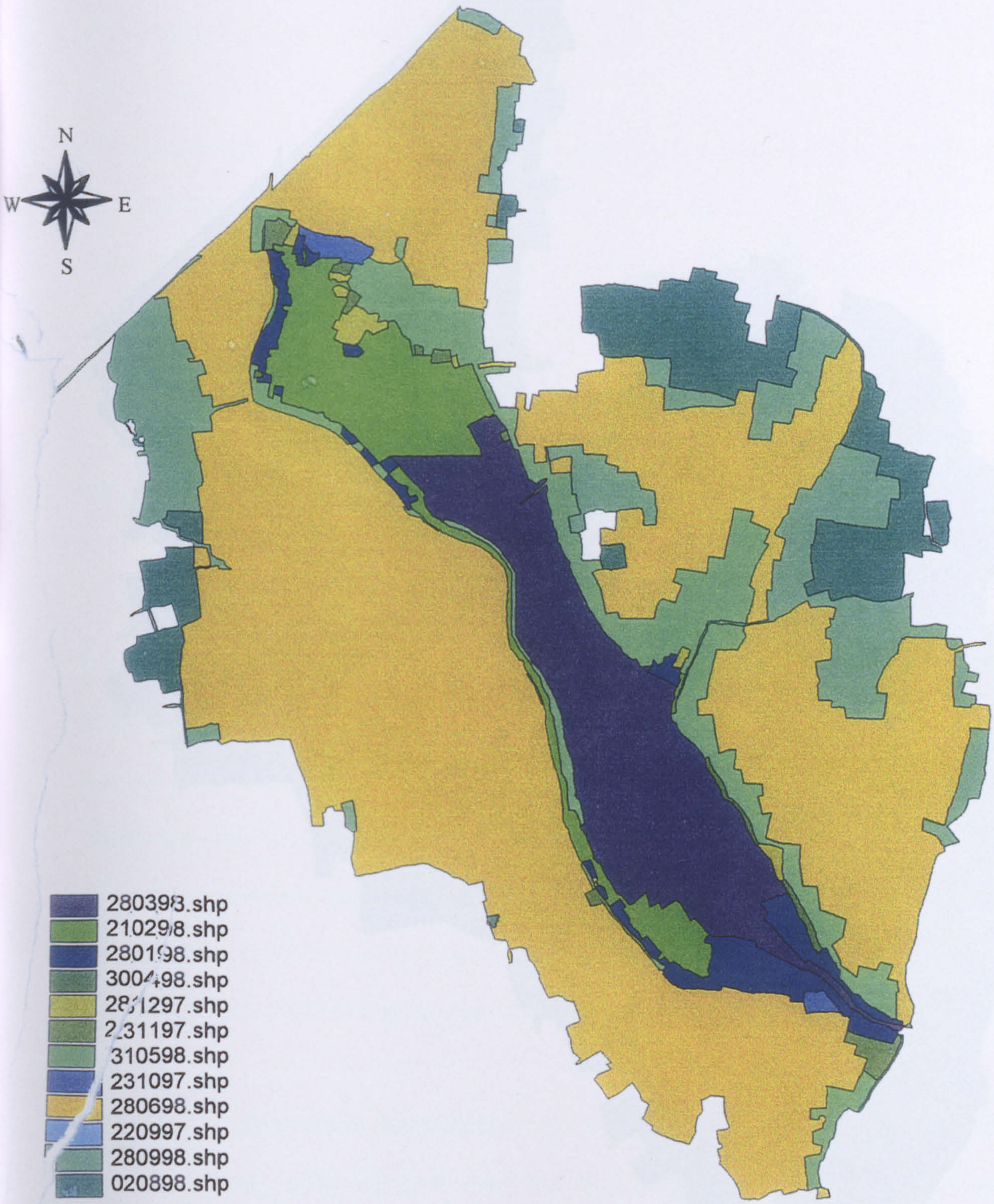
In *Jaistaya* and *Ashar,* the second and third months of the Bengali year, the flow of water increases rapidly. This is obvious with the Langulia river which is the main source of water for Charan *beel*. This river originates at the confluence of the Shapai and Bangshi rivers behind the villages of Tenguria and Balla. In the past the Langulia was considerably wider than it is now. There are a number of artificial channels and canals from the river into Charan *beel*. These tend to be narrow and

connected to ponds and ditches. The *beel* expands to cover all the *chawk* 'cultivated fields' at the height of the monsoon. The land begins to dry from Kartic. When the streams dry up totally, and water in the *beel* goes down rapidly. In the *uinna mash* 'dry season', when rich farmers are pumping water from the *beel*, it reaches its lowest level.

The variation in water levels has a direct effect on the fish, not only their *baicha thaka* 'survival' but also their *notun macher janam* 'reproduction'. The quality of water is important in this respect. At different times of the year the environment and vegetation in ditches, ponds, *beel* and rivers is affected either by drought, pollution or both. The vegetation, the food supply of the fish, only survives when it is in *saf pani* (lit. clean, or relatively pollution free, water). People refer to the *rang* 'colour' and *akrite* 'size' of weeds in identifying them. Villagers consider some of the weeds as vegetables and some are held to have medicinal properties. Several creatures of various sizes creatures also dwell in these water bodies. Insects, which provide food for fish, can be a hazard for people, as some of them have poisonous bites. The number of insects and their types are indicators of the water quality.

The people of Charan recognise several different locations within the *beel* and identify them according to the characteristics of their *gaheen* 'depth', continuity of water supply and availability of fish. The fishermen hold strong suspicions about some spots in the *beel* which are considered to be *voi-bipoder* 'dangerous' to them as *shaitan* or *shocks* 'devil beings' dwell there. The fishermen construct an artificial

Charan beel
Flood spread by date



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borogata 'big pit', some times called *jhata* or *katha*, in the river and *beel*, in order to provide a *nirapad* 'safe' environment for the fish during the dry season. These *Jhata* are furnished with tree branches and weeds.

People also dig ponds adjacent to their houses. Previously people did not cultivate fish in these ponds but nowadays they try to practice aquaculture and provide a suitable environment for fish for food and business. The environment of the pond, in relation to fish stocks, varies according to both the skills of the people and seasonal variations.

4.3 Water Bodies Classes

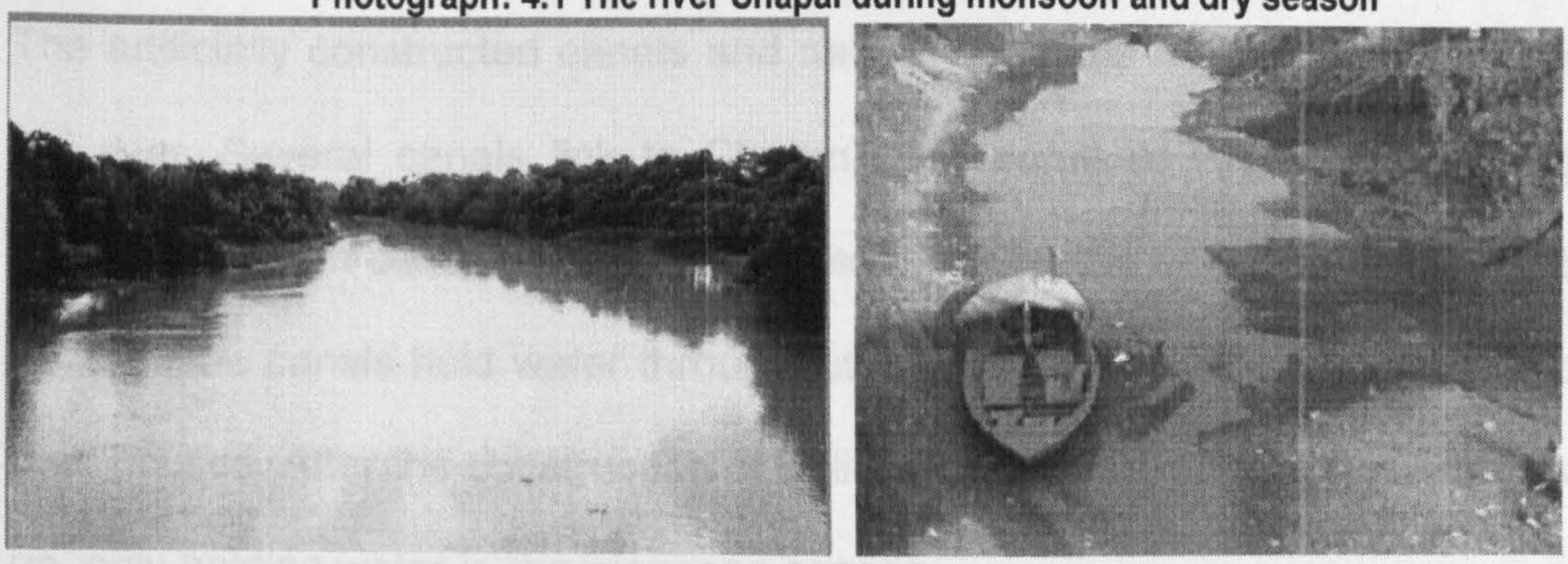
4.3.1 The River

The river experiences *joar-vata* 'rise and fall' due to the 'tidal' action of the monsoon flood. This affects the supply of food for the fish. The rise and fall of the river washes vast numbers of fish out of the *beel* and into the rivers. Experienced fishermen wait for this moment to harvest large quantities of quality fish. Smith (1981:1) describes a similar environment in the Amazon basin. The Amazon being the largest river in the world in terms of discharge and watershed area, the river passing through a wide range of vegetation harbours many varieties of fish.

In Charan, the monsoon flood in the month of *Jaistaya* not only brings a large volume of water to the Langulia river, but also large quantities of fry. The water

floods into all the water bodies: the canals, *beel*, pond and ditches. The people associate the supply of fish with the *Ashaira pani* 'the flood water which comes in the month of *Ashar*'. However, the monsoon flood restricts the growth of weeds on the *nader talai* 'river-bed'. There are *doho* 'pits produced naturally by whirl pool action', which provide some shelter for fish. The *doho* in the river at Charan is known as there are several whirlpools in the river Shapai and Langulia. These are *baualir doho* 'whirlpool of Bauali', *tenguriar doho* 'whirlpool of Tenguria', *chinatola doho* 'whirlpool of the offering place' *naya parar doho* 'whirlpool of Nayapara', *jalkhaika doho* 'whirlpool of drinkable water' *kalakupar doho* 'whirlpool of banana garden' and *bhanga barir doho* 'whirlpool of the eroded house'. There was a person named Bauali in the neighbouring village of Chatihati who had a piece of land on the northern part of Charan, which was eroded by the river, so it is called *baualir doho* and is one of the oldest whirlpools in the river Shapai. The *tenguriar doho* was named after village of Tenguaria. It was created after 1971 and is getting gradually larger every year. The *chinatala doho* is beside the neighbouring village of Pakutia. It is one of the oldest whirlpools. It is thought that once there was a *kali ghor* 'temple of kali' there where Hindus used to put their *chinni* 'offerings' to the goddess *kali*, so called *chinatoalr doho*. The *nayapara doho* name after the village of Nayapara. The whirlpool *jalkhaika doho* was named so because people used to drink water. The river eroded a banana garden and later a whirlpool was created there so it is called *Kalakupar doho*. In a similar way, the river eroded few houses near the neighbouring village of Balla which is why it is called *bhangabarir doho*.

Photograph: 4.1 The river Shapai during monsoon and dry season



From the month of *Ashin* the river starts to narrow, and returns to its original course. By the end of the month of *Ashin* the river is totally dry. According to people this did not happen in the past. All rivers used to hold some water and fish throughout the year, and had *saf pani* 'clean water' constantly along their 'root'. Total drying, of course, is disastrous for life depending on an environment. Now, when the monsoon replenishes the dry riverbed the water is *ghola* 'turbid' and, therefore, unsuitable for both waterweeds and creatures who rely on clear water for survival. The artificial embankments on the banks of the Jamuna river, erected by the Flood Protection Programmes have made the situation worse. Designed to restrict flooding in the monsoon season, they are broken down by people in the dry season as they cross the dry riverbeds in their buffalo carts. Another major problem with river courses is the growth of water hyacinth during the monsoon season. It not only grows rapidly closing up waterways but also, when it rots, it pollutes the water and damages fish life. When the water level falls the water is drained from the *beel* into the river.

4.3.2 Canals and Channels

The artificially constructed canals and natural channels are narrow compared with the river. Several canals link to Charan *beel*, some of which pass through the village. The main canal into the *beel* passes through the village of Tenguria. Before 1976 all the canals held water throughout the year and villagers kept boats beside their houses. After the construction of Kalihati-Bolla road most of these canals dried up, only holding water in the monsoon season.

Photograph: 4.2 fishing activity on the *kodailla* canal

If a small amount of water remains in the canals or channels then people pump it out for irrigation. When canals dry up, the soil remains slightly damp and farmers use the bed to grow *boro*, a local variety of rice. During the monsoon the channels and canals fill with both water and large numbers of fry, garbage, water hyacinth and silt.

Another canal, entering the *beel* the *kodailla khal* 'canal holding a spade' runs through the villlage of Jaina Bari. According to some local people, it was a river some decades earlier, but it has, subsequently, narrowed, and is reduced to having no water at all during the dry season. Like several other canals or channels, the

kodailla khal fills up the *beel* during the monsoon season, only to dry up when the monsoon ends.

The *srot* 'current' of the monsoon flood is so strong that no weeds can grow on the beds of the canals, although some plants grow along banks. The fish, therefore, are unable to establish permanent grounds in the canal. Fish that pass along with the current are caught by fishermen using nets such as *khara jal* and *chela jal* (see chapter 3).

4.3.3 The *Beel*

The *beel* is a natural depression in the floodplain. Like some oxbow lakes, it has deep depressions, which retain water throughout the year (Chowdhury and Yakupitiyage 2000). According to Rahman (1998:9) *beel* and *haor* are natural depressions which are mainly concentrated in the northern part of the country, in old Sylhet and Mymensing district (Tangail district is part of old Mymensing). The term *haor*, particularly, represents the large natural depressions in the Sylhet area which give the impression of inland sea during monsoon. The word *beel* used for natural depressions of smaller size and area in the other regions of the country. Khan (1997:156) thinks *haor* is generally a large depression between two or more rivers which is generally a bowl-shaped whereas a *beel* is a saucer-shaped depression. According to him each *haor* is consist of one or more *beel*. There are 1808 *beel* (927 permanent and 881 seasonal) comprising an area of 22614 hectares in greater Mymensing district (Rahman:ibid).

The Charan *beel* is connected to the adjacent rivers by the *khal*. Villagers believe that Charan *beel* was once part of the *Kalidaha shayar* '*kalidaha* ocean'[1] and that the Brahma Putra river used to flow through this area. The *beel* is a *shukainna dag* 'dried spot' on the river course.

The size of the *beel* varies from month to month and season to season. It expands during the *borsha mash* 'monsoon', when all *chawk* 'cultivated fields' are inundated by water. The water is deepest in the middle of the *beel* during the month of Kartic and at it lowest in the month of Chaitraya. The fish enter Charan *beel* by being swept through from the *doho* 'whirl pool on the river' when the water level rises high.

Photograph: 4.3 charan *beel*

[1]This is a mythical ocean mentioned in the Monosha Mangal -- a Bengal based myth. People believe that where they live was part of the Kalidaho Ocean and it is a common for them to refer to it regarding the origin of their landscape. For example, the folk song called *bondona* 'song of adoration' which is sung at the beginning of all folk performances, pays tribute to the *Kali daha* Ocean. It tells of the way in which people perceive of their landscape. The song is as follows:
pubete bandana kari puber dibakar
'To the east, I am singing in adoration about the sun in the east'
ekdike udayo bhanu choudike poshor
'which is rising through one direction and spreading light everywhere'
uttare bandona kari kailash shikhor tar pache bandona kari shib ar parbati
'to the north, I am singing in adoration about the mountain *Kailash* (the Himalayas) as well as *shiva* and *parboti* (durga)
dakhine bondona kari kalidaho shayor pakhi haye urre pare nahi balur char

The environment of the *beel* varies in accordance with the amount of water in it. According to some fishermen the best period for the growth of fish is during the months of Ashar and Sraban. At this time the *beel* is full of water and the surrounding land is also under water, thus extending the territory for the fish most of whom are able to swim over the paddy fields, and thus increase their food supply and so they grow rapidly. During the *uinna mash* 'dry season', the fish have a considerably restricted area in which to swim and find nourishment, they grow little at that time. Day and night also have their effect on the fish. The dormant fish with their restricted vision feed at night, making this the most favourable time for fishing in the *beel*. Catches are higher than during the day.

Photograph: 4.4 fishing activities in the *beel*

The months of Ashin and Kartic are the best times to fish in the *beel* when the water level is down and the fish are concentrated together. Ashar, on the other hand, is the low period when fish fry enter the *beel* with the new water and all the fish are

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'to the south, I am singing in adoration about the ocean Kalidaho , flying like a bird where only water, no sandy charland is found'.

widely scattered. There are few fish in the *beel* during the months of Chaitraya and Baishakh when the *beel* shrinks rapidly. This is a difficult time for the fishermen.

The people recognise a series of locations within the *beel* and give them names, which describes their characteristics in relation to water depth in the different months and seasons and their suitability for fishing[2]. Names of the locations can also describe incidents, which occurred at that spot at a certain time. Commencing from the southern part of the *beel* is the *khaiya jani*. This is under water during the monsoon. It is a *chawk* and farmers cultivate *boro* paddy here during the dry season. The next location is known as *dakhina gari* 'southern end'. Then comes the *baddar ghona* 'bend of Badda'. There is some disagreement about the next location. It is called *pulisher tec*. Some people explain that once police came to guard the *beel* here. Others believe that there is a narrow *nala* 'drain' at this location where a person in the police department placed a pump to provide irrigation for his land.

Intar ghona 'bend of the Inta' is the next location clockwise. It is named after the owner. Then comes the *Biramkhar ban* 'dam of Biram kha'. Next to it is the *uttara gari* 'northern end' of the *beel*. The *boro ghona* 'large bend' is the next location. Then comes the *jharna ghat* 'fountain spot', where underground water fountains up into the *beel*. Adjacent to the *jharna ghat* is *joga bait*, meaning lowest part of the land, which is a *chawk*. The bend in the *beel* here is called *jogar ghona*. The next location is the *Jaila ghat* 'approach for the fishermen' where the fishermen keep their boats. Then comes the *choto ghona* 'small bend'.

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[2] Sawada (1995) described about the understanding of traditional methods involved in locating fishing points by the fishermen in Toyoshima in Japan.

Names of Different Locations in the *Beel*

The middle of the *beel* is called *degari*. Other locations in the *beel* are called *miah ghona* 'bend of the miah'; *garu mara tec* 'where the cattle were killed'; *kuturiar ghona* 'bend of kuturia'; *nao tular ghona* 'where the boat was rescued'; *raj bari* 'the house of the king'—so called because the Jaminder's house was situated here; *ghora mara tec* 'where a horse was killed'; *kaita halot* 'where the drain was dug'; *taherer ghona* 'bend of Taher' and *baisher tec* 'place for the buffalo'.

Fishermen have different opinions regarding the environment, water depth, and characteristics at the different locations. Disagreements were evident, also, about the naming of the different locations (the reasons for the people's disagreements about the naming is discussed in Chapter 2). In these cases I have noted the name which was mentioned by the majority of the people. People had disagreements about same name that were pronounced in a different way by different persons. For example, *khoiyajani* is also called *khuiyajani* by some of the people. Many of the people have arguments regarding pronunciations and there is no way to standardise them as these words are part of their dialect.

Some of the people think the *joga baiter ghona* contains the deepest water in the *beel* and *miah barir ghona* is the second deepest. Most of the fish remain at these two *ghona*. The *kalar ghona* contains less water, comparatively, because it dries up earlier. Some fishermen believe that the fish that gather at the *dhakhina gari* 'southern end' of the *beel* are there because of the *panir thela* 'water pressure' at that spot. The

dakhinagari is full of *chapila* and *jhatka* fish. The *Uttara gari* 'northern end' of the *beel* has less pressure. Some people think *khoyajani* and the *dakhin chara* (another name for the *dakhina gari*) contain less water as these parts are elevated inside the *beel*. The *kalar ghona* contains even less water and dries up earlier. According to some fishermen, *uttara gari* is the deepest part of the *beel*. When the water starts to decline all the fish go towards the *uttara gari* because the *vata* 'down stream current' pulls them out of the *dakhina gari*. According to others the *taherer ghona* holds the highest amount of water, being the deepest part of the *beel*. In the *paschim alaka* 'western part' of the *beel* fish like *nura* and *feca* move around the different *ghona* 'bends'. The *uttar alaka* 'northern part' of the *beel* is full of fish e.g. *tatkuni, chapila*. The eastern part of the *beel* is a favourite place for the *pona* 'fry' of *nura feka* because of the availability of different types of food and water. Food and water quality differ around the *beel*. For example, fish like *nura-feca* prefer *sheola* 'mollusc' as their food and *ghola pani* 'turbid water', so they occupy the *ghona* 'bend' areas inside the *beel*.

Most fishermen agree that the deepest water is found at the *dagari* 'middle of the *beel*' and the shallowest is to be found in the *kalar ghona*. The *dagari i*s full of fish because they prefer the *gaveer pani* 'deep water'. Most fish are found around the *ghona* 'bend' areas particularly *Joga bait* because it is the biggest *ghona* 'bend'. When the *beel* dries up most fish take shelter in the *jogar ghona*. Many fish are available around the northern part of the *Jharner ghat* 'approach to the fountain' due to the holes inside the *beel* that provide fountains of underground water. Another

commonly expressed opinion is that many fish are available in the *nama* 'low' areas in the *beel*, the *Jaila gari* and the *Madhaya ghona*.

Fish like the *chanda, chata, kai, saitan and puti* move around in the lower depths. In the mid-depths of the *beel* all kinds of fish are available due to the fact that few people fish here. The fish find aquatic weeds in which to hide. The best time for successful fishing is at night, as mentioned above, as fish gather together at that time, when they come out of hiding. Fish like *puti*, *tengra* and *nura* and *faca* are available in the *taner jomi* (around the *chawk*). In the middle of the *beel* fish like *Chela* and *Chapila* move around. In the *tan* 'high' area water is *taltala* 'clean' and the middle of the *beel* the water is *ghola* 'tubid'. So, different fish prefer different territories. However, in the month of *Kartic* when the water goes down low the fish share the same area. The fish find shelter in the *tan jomi* require much food, not available in the low areas inside the *beel*, so, they come to the high land (in the *chawk*) water in search of food. Other *jalaj gach* 'aquatic plants' are found there and are the favourite food of these fish.

The *bora ghona* 'large bend' in the *beel* is also a good place to fish. In the *joga bait ghona*, are found *magur* and *shing* fish. Fish like *nura* and *faka* prefer to stay over the paddy land so long as it is flooded, as they are fond of clean water. The fish, which feed on the *jangla* 'weeds' in the paddy fields, are more delicious to eat than the same fish from the *beel*. The price is also different in the market.

The northern part of Charan *beel* also has many fish. The part called *ghora mara tec* 'where the horse died' is full of underwater vegetation food of fish. The fish like to stay close to where there is food. However, there are some exceptions. Some, like *tengra* and *shing,* prefer to stay most of the time inside the weeds and come out only when it is dark. Most fish go into the deep water to escape the sun, though fish such as *puti, boal, guja kata chapila* prefer to stay nearer the surface. Fish are caught in fishermen's nets as they go out from the *jangal* 'under water vegetation' in search of food when it starts to get dark. During the *Vata kale* 'time of the down waves' when the water starts to draw down and when there is no wind to be felt on the river and the water turns turbid, and then large numbers of *rui, Katal* fish are caught. In this *vata* period the river fills with fish as those are coming from the *beel agari* 'front part of the *beel*' meet with those down stream.

Baishakh and Jaistaya are considered the fish-less months. People start to experience lean times from the month of *Poush*. During this period fish take refuge in the *Katha*.

The *beel* has dried up totally four times. The bottom of the *beel* was seen for the first time more than fifty years ago. The same occurred fifteen years ago, and again, in 1995 and 1996 it dried up. This destroyed all the *bichan* 'seed or fry' of the fish.

Rich farmers attempt to irrigate their land during the dry season by setting up pumps to remove water from the *beel*. This is disastrous for the water level of the *beel*. As many as eleven pumps are set up at any one time. In the month of

Chaitraya water declines to its lowest level, to the *gira pariman* 'knee level' of people. The number of fish and other animals dependent on the *beel*'s water are reduced.

4.3.3.1 *Dushito Jaiga* 'spirit places'

Fishermen of Charan believe that there are some unseen beings in the water, which can harm the fishermen. On several occasions fishermens' boats have capsized and fishermen have drowned. The cause was attributed to these *shaitan* or *shoc* 'devils'. The places where these beings are said to exist are called *kharap* or *dushito jaiga.*

In *Charan beel* these places are *muktal, jaila ghat, hijal tala, kalar ghona, garu mara tec, joga bait* and *uttara gari.* They are considered not safe for the fishermen, especially at night. People avoid going on their own near to these places in the night. A few people have died at these spots in the last few years, attributed to the action of evil spirits.

Some fishermen do not dare to go to the *Jaila ghat* on their own even in the daylight. A few years ago three fishermen, who came to fish at Charan with the local people, were found dead there. According to the fishermen they were strangled. In another incident, a fisherman died in the *jaila ghat* area when his companion left him alone there in the night. They think he died from fright. Fishermen avoid the place at night for fear of possessed fish.

These restrictions were applied in the past. Some fishermen told tales about their experiences when disregarding their elders' advice. For example, the Hindu fisherman Ranjit Chandra Das related what happened when accompanied by other fishermen, he went to fish in a *jhata* near *Khaiajani* where a canal enters the *beel*. They knew that fishing at that spot was a bit risky, especially, as it was winter. Their aim was to catch some *boal* fish. After setting the net Ranjit dived into the water and saw the back of a very big fish. Returning to the boat, he queried what fish it was. Everyone said that *boal* fish are not supposed to grow so big. It must be a *maicha dew* 'demon fish'. They threw their *Jhaki* net in again, and another fishermen named Chittaya dived into the water and came up with a loud shout and died on the spot.

Another fishermen called Indromohan Das was also present. According to him the place where Chittaya died is full of *abarjana* (*abarjana* means garbage, but here it means a disturbance created by some other being). This place is besides the culvert on the way to Balla. According to him there are many *Shaitan* 'devil' there. When fishing there during one night, his nephew used a *khara* net. He became frightened by the big and fearsome *Shaitan* and *Pishach* which showed up. A few days later he left that place with his net. Nowadays no one goes to fish at that part by night and even in the daytime fishermen utter spells to get rid of the danger. They avoid this place when possible, even though the fish enter the *beel* here.

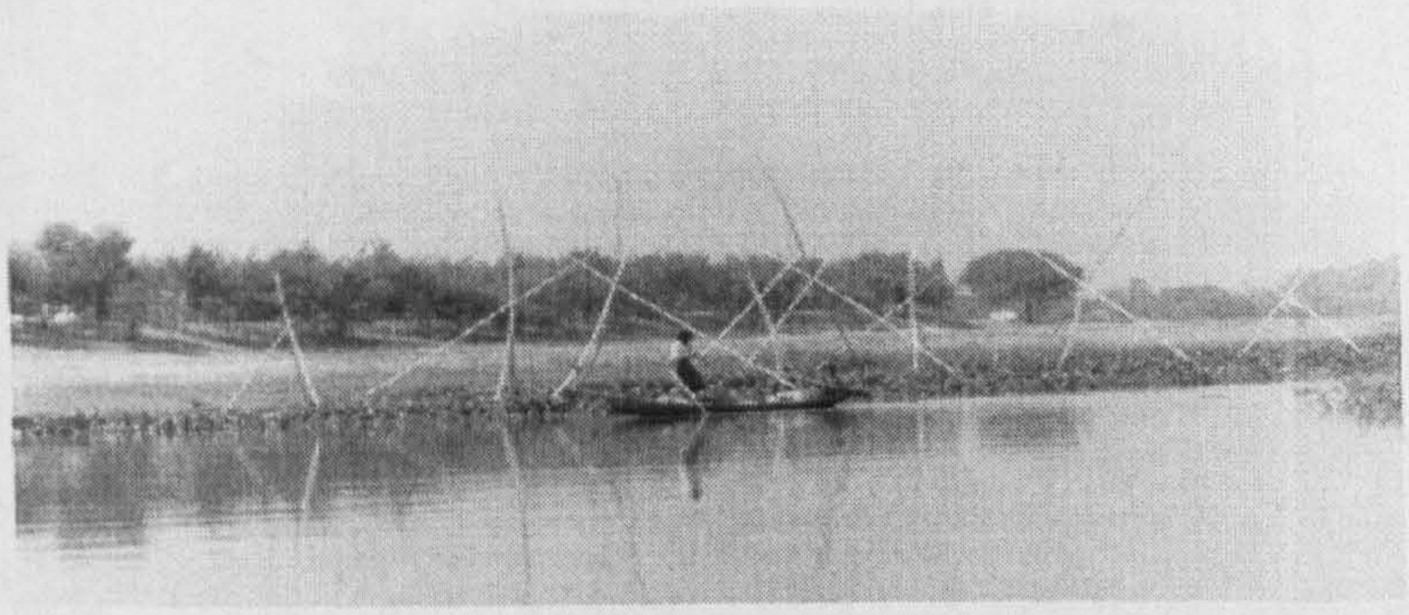
The Hindu fisherman perform a ritual on the very first day of their fishing during the monsoon in order to avoid this sort of danger. Before sailing their boat they put

some *laban-chini* 'salt and sugar' into the water which they offer to the *jaler debota ganga devi* 'water goddess Ganges'. They believe she is controlling everything in the *panir niche* 'water world' and if they can satisfy her they will be free from danger. Fishermen also worship *ganga devi* once a year.

4.3.3.2 *Jhata* or *Katha* 'refuges'

A *Jhata* is a shelter constructed for fish inside the *beel*. Most are sited in the *dhopa* 'comparatively deep' areas. There are also some *jhata* in the river. More than fifty years ago Hindu fishermen of Charan dug large holes on the bed of the *beel*. They dug these holes to provide shelter for the fish and allow them to grow bigger. They needed tree branches, *darri* 'rope', *gola* 'a large basket made of bamboo where farmers store their paddy' and *pana* 'water hyacinth' to construct *katha*. They begin to construct the *katha* in the month of Ashin. It takes the shape of a circle. They put a large number of tree branches in the hole. They put a certain number of bamboo poles, according to the size of the refuge, to support the tree branches. This provides support for the nets when fishermen come to fish in the location. The fishermen then put the *gola* 'baskets' at the bottom of the refuge, and, finally, cover the whole arrangement with water hyacinth and other aquatic weeds. They put many bamboo poles around and tie the water hyacinth in place with ropes. It requires more than fifteen hundred taka to prepare a *Katha*.

Photograph:4.5 *katha* 'refuge'



To catch fish in the *katha* is locally called '*katha mara*'. Fishermen use the *khuia jal* and *Jhaki jal* 'nets' to catch fish in the *Jhata* (see chapter 3). They do this in the month of Agrahayan. A *katha* is fished more than ten times in a season. Excessive fishing in a *katha* reduced catches, as the fish are disturbed too often and so tend to avoid these zones. All kinds of fishes are caught in *jhata* including big fish like *Boal, Shail, Nura, Feka* etc. Fishermen once caught many turtles in *Jhata* too but now they are very rare.

There are more than forty *Jhata* or *katha* inside Charan *beel*. The fishermen have formed two groups in order to fish in the *Jhata*. One of the groups has twelve members and the other one has fifteen members. The income produced is divided into two halves. One half of the catch goes to the *Jhata* owner and the other half is divided equally among the members of the fishing group. The owners of the net or boat do not receive more than other members of the group. Ownership of *Jhata* was determined in the past. Fishermen use them for generation after generation. The owner of the *Jhata* may not be the owner of the land and has no right to it when it is totally dry.

4.3.4 Ponds

The local name for a pond is *pushkuni*. A large one is called a *dighi*. They feature in the everyday life of rural people. Just twenty years ago they were the main source of drinking water in Charan. People bathe in them as well as wash domestic animals in them. They keep domesticated ducks on them. If the ponds are under fish cultivation then people have less access to them. The cow dung and fertiliser put into the ponds creates a good environment for fish but not for people.

Photograph: 4.6 View of a fish pond

Ponds do not occur naturally. People mound soil in order to make *vita* 'platforms' on which to build houses. They excavate large amounts of soil. The resulting holes become ponds. This is why at least one small pond is seen beside every house in rural areas. People plant trees around the ponds to keep the water cool during the hot season. During the Jamindari 'era of feudal lords' it was a tradition for them to excavate *dighi* for the wellbeing of their tenants. There are many myths that describe the history of *dighi*. There are small ditch-like ponds in Charan, which were

connected with canals ten years ago, but people fill them in up to make their homesteads attractive.

Photograph: 4.7 fishing in the pond

In Charan, there were no attempts at fish cultivation in the pond until five or six years ago. Fish grew and multiplied without human intervention. Recently, ponds have totally dried up in the dry season. They have lost all the fish in them. Rivers and *beel* have suffered similarly. Local people blame the sandy soil for ponds drying up, as it dries out rapidly after the monsoon. There is a lack of underground water to hold up the water table.

Until recent years some ponds were affected by the *barasar pani* 'flood water', when fish like *puti* and *khalisha* would enter with the floodwater. There were, also, some *jeol* fish 'which could survive for a while after being removed from their usual home

in *doba* 'ditches'. However, a few years ago, the villagers built a road inside the village which now prevents flood water entering the ponds.

There are three layers in the ponds: the bottom directly in touch with the soil, the middle, and the surface. Different fish move around in different layers. Fish *like rui, katla, grass carp, mrigel, silver, karpio* and *puti* are cultivated in ponds. Of these fish, only silver and grass carp grow quickly. During the catching period pond owners rent out nets, and hire in fishermen who can handle *khuia jal.*

When a pond is newly dug it is necessary to put *chun* 'lime' into it. This protects the fish from diseases. At the beginning the pond should be totally dry. In the months of Falgun and Chaitraya ponds become totally dry in this region. Then a certain amount of *gobor* 'cow dung' is put on the bottom, and ploughed in, mixing the cow dung with the soil. A pond should not contain too much clay for fish cultivation because it harms the water. If there is a good balance between clay and sand, the fish grow quickly. Fish grow slowly if they are put in a newly excavated pond because it contains very small amounts of *kada* 'clay'. People plough in cow dung into the bottom of the pond to cover this lack of clay as it helps to increase the amount of *kada* in the pond. Then water is introduced into the pond. Owners pump water in. When the pond is full, some fertiliser, like Urea and Potash, should be mixed into the water at fifteen-day intervals; this helps *sheola* 'molluscs' to grow which are the staple food of fish. On the other hand, people may bring in some *tetulia pana* plants from the *beel,* which will grow very quickly in the pond with the

support of the fertiliser. No other aquatic weeds grow in ponds because of the absence of water during the dry season. On the other hand, many weeds and plants grow around the ponds. The fish are fond of them. *Kura* and *khail* 'husked rice and mustard cakes' also be introduced as fish food. Fish need clean water to grow well. They eat the food thrown on to the water which prevent it decaying and polluting the pond. But large amounts of fallen leaves are always rotting in the water which harms its quality. When the water hyacinth decays after the monsoon, it is harmful to the water. Some people think fish can grow in muddy water

Many people believe that certain fish can only grow appropriately in different ponds; It is not possible to cultivate all fish in one pond. Growth of different fish depends on the type of soil in the pond. In some ponds *karfu* fish grow fast, and in others silver carp, due to the different soils in the ponds. The *banjail* 'a loamy soil' that consists of *balu* 'sand' and *kada* 'clay' helps silver carp to grow fast. *Karfu* fish thrive in clayey soil. *Mrigel* fish grow well in ponds with sandy bottoms.

Fish introduced in to a pond are called *renu pona* 'newly hatched fry'. People have the option to cultivate fish three times in a year, during the months of *Chaitraya*, *Srabon* and *Magh*, when fry may be introduced to ponds. After one month, fry grow on average to 7-8 inches, in the second month they grow to 10-11 inches, in the third month 14-15 inches, and in the fourth month to 16-17 inches. The growth rate varies from fish to fish. Water quality varies from season to season.

4.3.5 *Doba* or *Pagar* 'Ditch'

The *doba* 'ditches' are small water-bodies. They fill with water during the monsoon, being connected to canals. Due to blockades and barriers in the canals the ditches in Charan receive less water than formerly. A *doba* may contain both large fish like *kai, shing, magur* as well as *gura mach* 'small fish'. Frogs and crabs also live in ditches.

Photograph: 4.8 view of ditches during monsoon and post monsoon

Few aquatic weeds grow in *doba* because they retain water only for short periods, unlike in the *beel* with its variety of weeds. According to villagers, large numbers of mosquitoes emerge and bad odours are given off by the rotting aquatic weeds. When the monsoon water declines, the aquatic vegetation starts to rot. Then it is called *bondhoya doba* 'closed ditch'. Most *doba* are totally dry in the month of *Kartic*, some retain a small amount of water. Nowadays people remove soil from the bottom of the dried up *doba* in an attempt to create ponds. Some have become large ponds.

4.3.6 Embankments

Artificially created embankments along the river Jamuna have obstructed the entrance of fish fry into the Charan region. The sluice gate in *Bhuapur* remains closed at the beginning of the monsoon, another barrier to fish movement (Barbier and Thompson 1998). Some fishermen think the sluice gate, between the river and *beel* was installed improperly, so it prevented easy access of the *nayapani* 'new water' with the *nayali mach* 'new fish'. The water level does not rise as high as in the past. These changes, due to human intervention, have altered the environment in different water bodies. Several water pumps have also been introduced to provide irrigation to the HYV paddy beside the *beel* during the dry season. They are furthering the rapid decline of water in the *beel*[3].

The decline in *Chamara* cultivation has also affected the fish. *Chamara* paddy was a local variety that used to provide shelter for fish. The garbage that adhered to its stem provided food for fish. Rashid and Mallik (1995) point out that the compartmentalisation scheme of the flood action programme in Bangladesh is incompatible with the indigenous practices of rice cropping. The decline of the local varieties is related to the operational constraints and problems with the construction and maintenance of flood control compartments and their potential environmental impacts.

[3] Barbier and Thompson (1998) stated similar situations in many of the African river floodplains which are disappearing or being modified as the result of water management activities, in particular large-scale irrigation schemes. By combining hydrological and economic analyses they showed that agricultural, fishing and fuelwood benefits were lost through reduced flooding downstream against the gains from increased irrigation production upstream in the Hadejia-Jama'are River Basin in northern Nigeria.

Fishermen of Charan also blame the flood of 1988 which caused an epidemic among the fish as they think that flood water was poisoned in India. Since 1975, India has been diverting at Farakka most of the dry-season flow of the Podma river to one of her internal rivers the Huglee before it reaches Bangladesh. This has affected agricultural and industrial production, disrupted domestic water supply, fishing and navigation, and changed the hydraulic character of the rivers and the ecology of the Delta in the down-stream areas (Swain 1996). Some people catch fish eggs and *renu pona* 'fry' with nets in the Jamuna river which is another reason for fish numbers declining. Lewis, Wood and Gregory (1996:56) report that decline of fish relates to three major causes: over fishing of adult fish, unrestricted hatch collection and interventions in the river system

The fewer fish arriving are caught at an early stage in their development. The fish entering extensive water-bodies, where no one can catch them easily, have the chance to grow large. In reality, the fish populations are in crisis, as are the fisherman, particularly in the lean period of the year.

4.4 Type of water and fish behaviour

The *panir dharan* 'type of water' varies from season to season in the *beel* and has a direct effect on the *boro houa* 'growth' and *ovayash* 'behaviour' of the fish. Different fish are attracted by different water conditions. Aquatic weeds also relate to water quality and, therefore, the species of fish to be found there. Water that is polluted is called *lailta lailta pani* or *pocha pani*. In the month of Ashar the water is *ghola*

'turbid. In the month of Chaitraya many people go down to the *beel* for fishing and the water becomes *khub ghola* 'very turbid'. It is they say *daiya ghola* ' turbid like curd'. The water becomes *daiya ghola* in the month of Ashar because it flows out of the *beel*, eroding its banks. Water that is slightly turbid is called *tal ghola*, fish like *Chapila* are fond this water. When the water is turbid fish cannot be seen and so avoid the fishermen. Some people think *saf pani* 'clean water' is the best water as the fish grow rapidly and it is clear. But the fish can see if someone is coming to catch them and can escape. In *saf pani* they grow rapidly because of their free movement. Suitable conditions for fish growth are called *dhoa* which means the aquatic weeds are not too dense, filling the water. If fish cannot move freely they do not grow well.

There are preferred water conditions and times for fishing. It is easier, as mentioned above, in *ghola pani* 'turbid water'. At night fish stay inside their *ghar* 'houses'. They start to move in the morning, and this is the best time to catch them. There are, however, some fish that can be found only in the evening, such as the *shing*. Fish do not move around when raindrops fall on water. Fish movement is also related to the *uttap* 'temperature' of the water.

In the same season, different water conditions can be found in different parts of the *beel*. This affects the availability of fish. During the month of Ashar fishermen catch *gura mach* 'small fish' like *icha* 'prawn' and *chelar pona* 'fry of *chela*'. In the month of Sraban when the *beel* water is turbid they catch *chapila* mostly, which has

multiplied and grown in the previous months. At this time the *nura-feca* and *puti* fish are in the *tan* 'upper part of the *beel'* where they find *saf pani* 'clean water' which they favour and so grow bigger. In Vadro they find *puti* and *nura feca* in the *beel.* When the water level starts to fall the *nura feca* and *puti* fish come down to the middle of the *beel.* Many fish are available here in the months of Ashin and Kartic. *Tengra* fish are available in the deep pits of the *beel* in the *uinna mash* 'dry season'.

When the water level sinks it becomes *lailta* 'reddened' in colour, though there are some exceptions around bend areas. The water turns *lal* 'red' because some aquatic weeds in the upper part of the *beel,* begin to rot in the dry season. When this *kharap pani* 'bad water' develops the *tengra* fish has *matha kharap kaira dei* 'some problems in the head'. The fishermen are able to catch large numbers of *tengra* fish at this time as the *pocha pani* 'rotting water' makes them 'mad' i.e. very active. At this time it is easy to catch other fish, too, as they move towards the banks in search of clean water.

In the month of Agrahayan and Poush fishermen go to the *Jhata* inside the *beel.* They catch *boal, chanda, feca* and different kinds of *gura mach* 'small fish'. During the months of Chaitraya and Baishakh large fish decline in numbers. It is then that large numbers of *gura mach* are caught. During the month of Ashin most *boro mach* 'large fish' are found in the *beel.* Fish occur in huge numbers in the *beel* in the months of Ashin and Kartic, because of the flooding across the *chawk* allowing fish to spread themselves widely.

The numbers of fish decline dramatically at the end of Kartic for several reasons, including polluted water (caused by rotting vegetation); restrictions on fish

movement by the shrinking water-body and their concentration in small areas making them easy prey for fishermen.

The taste of the same fish varies according to where it is caught. Those caught in the *beel* taste better than those from ponds. The water in the *beel* receives sunshine all day which is uncommon for ponds, and also people put fertilisers into pond water.

4.5 Aquatic Vegetation

There are large amounts of vegetation available inside the *beel* that influence the water. The aquatic weeds which grow inside the *beel* include *cham, potka, pana, ichadal,tetulia, tepa pana, sheola, helencha, pawta, shapla, shaluk, ghetu, kalmi, shinchi, jal dubla, cheicha, arraila, ghosa, badail, keokala/gangkala* and *vatshola*. These water plants are the *ghar* 'houses' of fish. People identify them according to *rang* 'colour' and *akrite* 'shape'. The characteristics and growth cycles of these plants relate to the different water quality at different periods of the year. Khan and Halim (1987) reflect their scientific notions when they state:

> The vegetation of *haors*, *beels*, lakes and ponds are rich in aquatic flora and constitute very important resources of food and medicine for the rural population. (p.1)

It shows the scientific bias to the approach in the research on ethonobotany in Bangladesh (see the discussion on anthropological ethnobotany and biological ethnobotany in Chapter 2). There are many of the aquatic plants in the *beel* that the people of Charan can identify and they are aware what an impact many of the plants have on the water. Some of the aquatic plants are consumed by the local people but most of them have no use for human consumption. People are very

much aware about the diverse characteristics of the aquatic plant. Khan and Halim (ibid) found aquatic plants problematic to classify scientifically. They think water plants are 'taxonomically difficult' as these are highly adaptive in form and structure in relation to aquatic environment. They have discovered 123 species under 67 genera distributed in 35 angiosperm families on the Bengali floodplain. The listed number is 6 times greater than what was identified by the Charan people. It is clear that the number of water plants they mentioned were found scattered all over Bangladesh and all of these were not collected from a particular place.

In Charan, there were more varieties of water plants in the past. The reason for their decline is unknown. People think the plants need clean water in order to grow in large numbers. In recent years the floodwater entering the *beel* during the monsoon has been very *ghola* 'turbid', which does not help these plants to grow. In the months of Agrahayan and Kartic, when water levels go down, plants rot in the water, creating *dosh* 'pollution' which leads to disease among the fish.

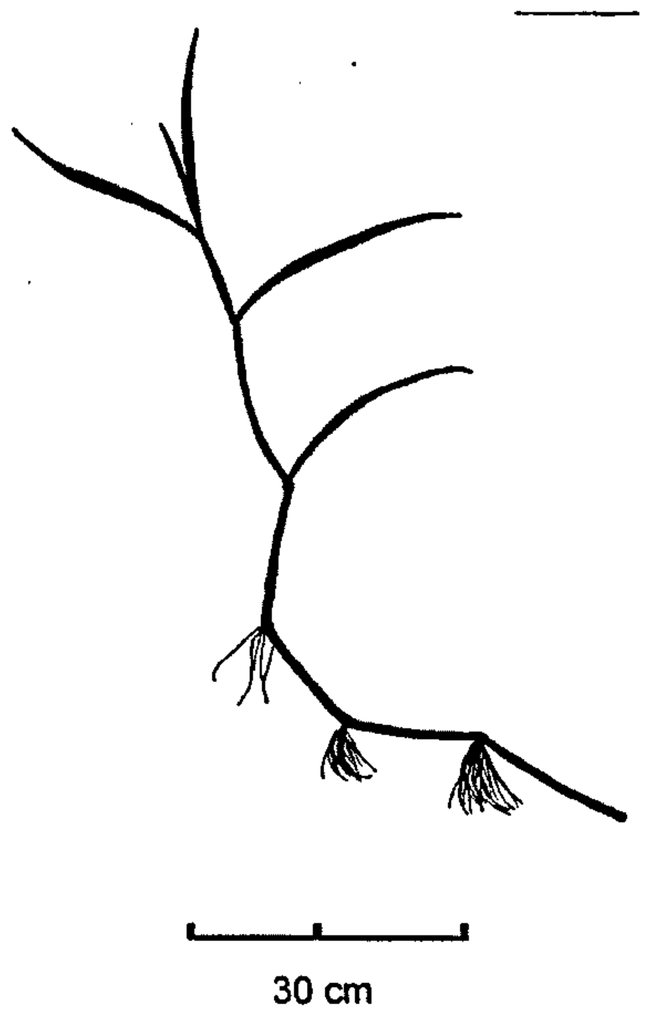
Figure:4.1 Aquatic vegetation

Variety	**Colour**	**Size**	**fruit**	**Leaf**
Jaldubla	Green	Large	Nil	Flat
Helencha	Green	Large	Nil	Flat
Vat shola	Deep green	Medium	Nil	Round
Ichadal	Black	Large	Nil	Like a needle
Cham	Black	Large	Nil	None
Badail	Green	half a hand	Nil	long
Araila	Green	Same to paddy plant	Nil	Sharp
Cheicha	Black and white	Large	Nil	small and round
Shaluk	Deep green	Large stem	black yellow	Similar to betel leaf
Ghechu	Green	Large	Black	Similar to bamboo leaf
Keukala	Green	Large	None	Similar to *arrailla* and *cheicha*
Sheola	Green	Large	Nil	None

Pana (three varieties)	Deep green	One hand	Nil	Round
Pawta	Black	Large	Nil	Like reep
Shapla	deep green & red	Large	Small and round	Round
Kalmi	Green	Large	Nil	Have wound spots

Local name: *Jal Dubla* (lit. water grass)

This plant grows with the *borosher pani* 'monsoon water'. It is green and similar to grass. The main difference is that it has a long stem that grows rapidly to keep up with the rising water level.



It shrivels in the *beel* and *chawk* during the *uinnaya mash* 'dry season'. It serves as animal fodder. Most fish eat it. It also provides them with good shelter. It is good for the water. It is harmful to crops.

Local name: *Helencha or henchi*

This plant floats on water, remaining close to the bank. It is also known as the *shenchi shak* (meaning vegetable). It is named *helencha*[3] because it always grows downwards. No one has seen it going upwards. It is *shobuj* 'green' colour. The plant roots remains in the ground under water and then grows according to the water level. When the water goes down it lies flat.

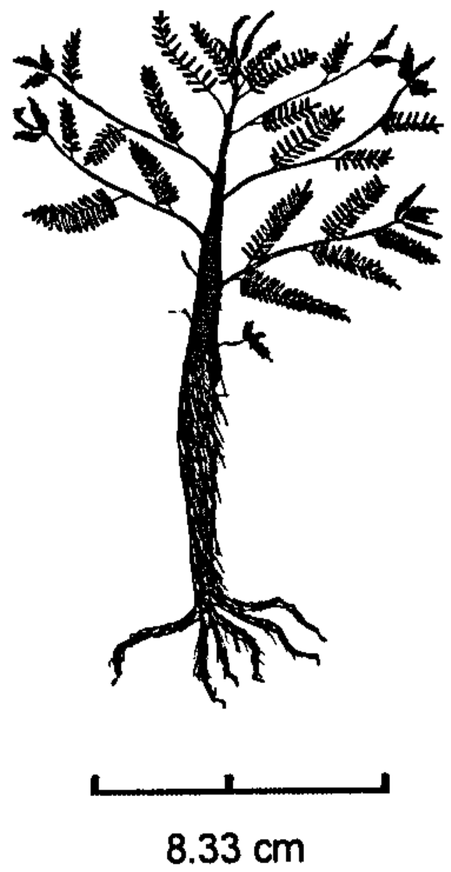
54.25 cm

Its branches carry leaves on both sides. These leaves are long and narrow. This weed grows in the *beel* during the rainy season and on the open *chawk* in the *uinna mash* 'dry season' when its leaves are *khub chotto* 'very small'. People use it as a vegetable. It also serves as *gorur kahon* 'fodder'. It provides good shelter and food for fish. It is not harmful to the water.

Local name: ***Vat shola***

This plant grows in the *beel* and on*chwak* during the month of Sraban. Its leaves are *khub shobuj* 'deep green' similar to the *tetul gacher pata* 'leaves of tamarind tree'. It grows to about four inches.

[3] It derives from the Bengali word *helano*, which means lying down.



8.33 cm

It is very light and used by fishermen as floats on the *chela* net. The word *shola* refer to this, it means cork. It is also used in Hindu rituals. Brahmins need it while worshipping. It provides shelter for fish and does not harm the water. However, it interrupts the growth of *Chamara* paddy 'a variety of deep water *aman*'.

Local name: *Ichadal*

This plant grows according to the water level. Its stem is full of *kera bera* 'like knots joining two pieces of thread'. Its leaves are thin and *shuier moto* 'needle like'. It grows in the month of *Jaistaya* and increases in size until *Vadro*. Large amounts of *Ichadal* are found in the *beel* in the month of *Kartic*.

75 cm

It spreads extensively at this time, creating problems for the fish by, restricting their movement. It remains on the water surface. It is favoured by fish not only as food, but also as extensive shelter in the *beel*. The *icha mach* 'prawn' mainly remains in this vegetation, which is why it is named after this animal. When water goes down it begins to rot and is known as *poche jaoa*. It turns the water *lal* 'red', which is injurious to fish.

Local name: *Cham*

This plant is *lomba* 'long' and colour is *kalo* 'black' colour. Its leaves are not obvious. Its *dalpala* 'stem' grows with spreading branches. The *cham* grows in the months of Jaistaya and Ashar in the soil on the floor of the *beel* and its branches come up and cover the water surface.

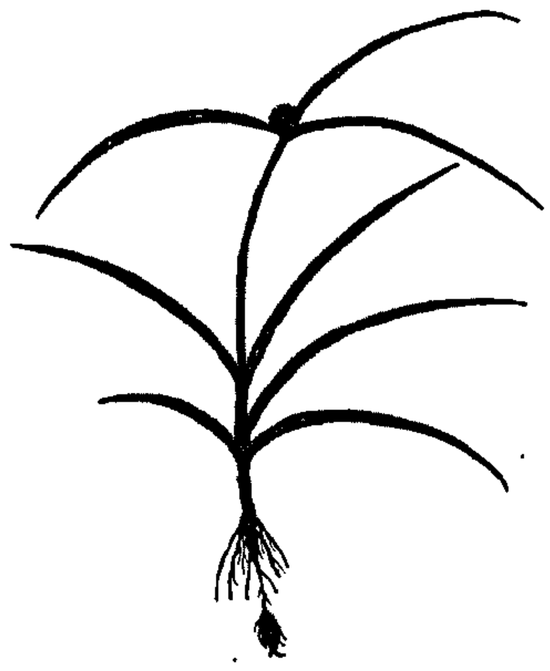
You can see this plant under water at the bottom of the *beel*. It grows throughout the *beel* and appears as a jungle. This plant cannot grow in areas where there is a current. During the *barsha mash* 'monsoon', when *saf pani* 'clean water' is introduced into the *beel*, this plant grows. If the water turns *ghola* 'turbid' then all

cham dies. Its growth follows the water level. It is exposed in large amounts in the month of Kartic due to the lack of water in the *beel.* It favours fish in various ways, as well as sheltering them. Fish eat many insects found in *cham.* It is difficult for fishermen to find fish when they hide in the *Cham.* It creates problems when fishermen throw their nets because it fouls them. Although useful to fish during the monsoon, it is harmful in the dry season as it makes the water dirty. In the months of Kartic, Agrahayan and Poush *cham* begins to rot and emits a bad odour and poisons the water. Fish cannot survive in this *lal pani* 'red water'.

If someone looks at the bottom of the *beel* they than can see this plant under water. Actually it is very soft, though it does not appear so. Sometimes it helps fishermen and sometimes it interferes in their fishing as mentioned above. During the month of Kartic all the fish hide inside the *Cham* but when the fisherman clears it away he can find the fish very easily.

Local name: ***Badail***

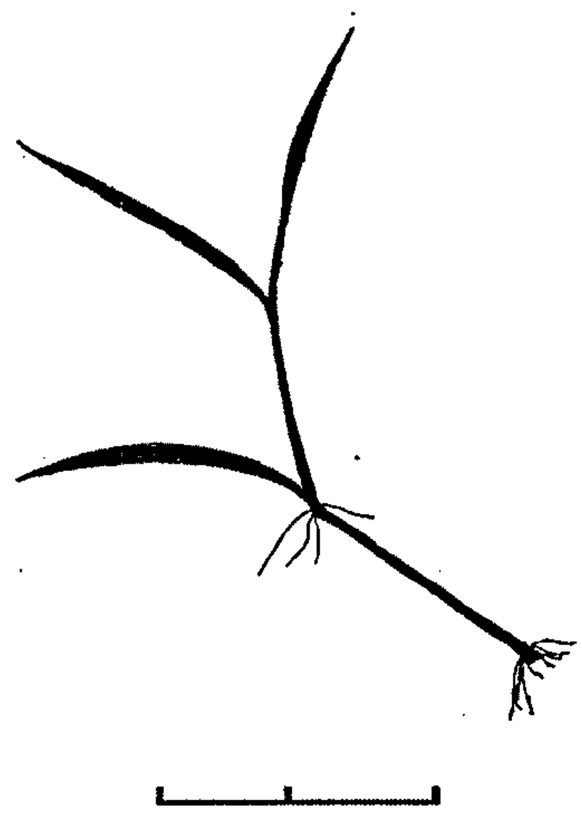
This plant grows in shallow water. Its leaves are green and more than half a hand long. It grows two hands long.



When the monsoon water declines in the months of Kartic and Agrahayan the *Badails* grows rapidly. It is a good quality fodder. It is neither useful nor harmful for fish.

Local name: ***Arrailla***

This plant is green and looks like the leaf of the paddy plant. The sides of the leaves are *dhar dhar* 'sharp', and hurt people when walking through it.



It creates itching if the hand touches it. In the months of Jaistaya and Ashar it grows with the *Chamara dhan* 'traditional deep water *Aman* paddy' and provides shelter for large fish. It can grow above five hands. It creates a dense jungle in the water. Fishermen find it difficult to catch in from the *Arrailla* bushes because of the risk of itching to their bodies. It is not harmful to water quality.

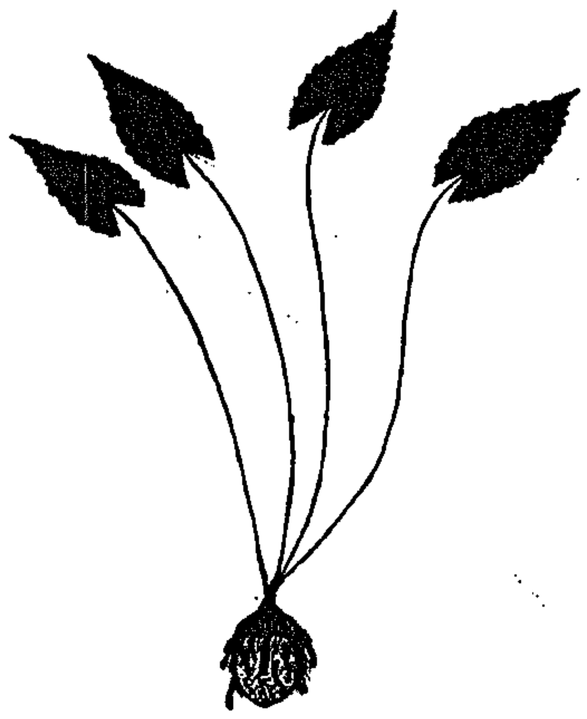
Local name: ***Cheicha***

Colour of the weed is *shada-kala* 'black and white'. Leaves are *lomba* 'long', *chikan* 'small' and *goal* 'round' in shape. It grows in side the *beel* in the month of Jaistaya. The roots of the weed remain inside the soil but the leaves float on the water.

It grows according to the water level. It has *choto choto bichi* 'small seeds under the leaf' which people eat by making it into a kind of cake. This weed is found in a huge numbers when the *borshar pani* 'flood water' declines in the month of Kartic. It does not do any harm to the water quality. All the *gura mach* 'small fish' take shelter in the *cheicha*.

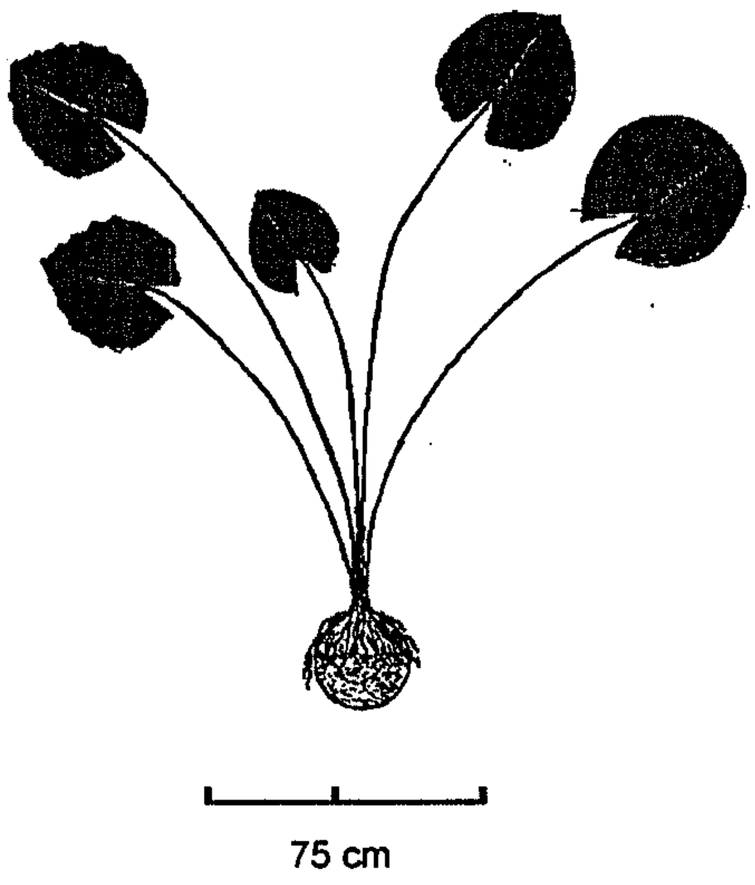
Local Name: ***Shaluk*** (esculent root of lotus)

Also known as *shaluk pan* (*pan* is betel leaf), this plant has tin *kani* 'triangular' leaves and a round seed known as *shaluk*. There are two varieties 1) *shindhu shaluk* 2) *kalu shaluk*. *shindhu shaluk* is *maita* 'soil coloured' and its inside is *shada* 'white'. The leaves are *halka shobuj* 'light green' and *golakar* 'round'. *Kalu shaluk* is kalo 'black' and a *holud* 'yellow' inside.



75 cm

The leaves are *ghono shobuj* 'deep green' and *chikan* 'narrow'. Both varieties are rooted in the soil, but their leaves float on the water surface. Poor people use *Shaluk* for food when other resources are in short supply.



75 cm

They harvest it from the water and market it to earn income. It is boiled before eating.

Shindhu shaluk is considered to be the more tasty.

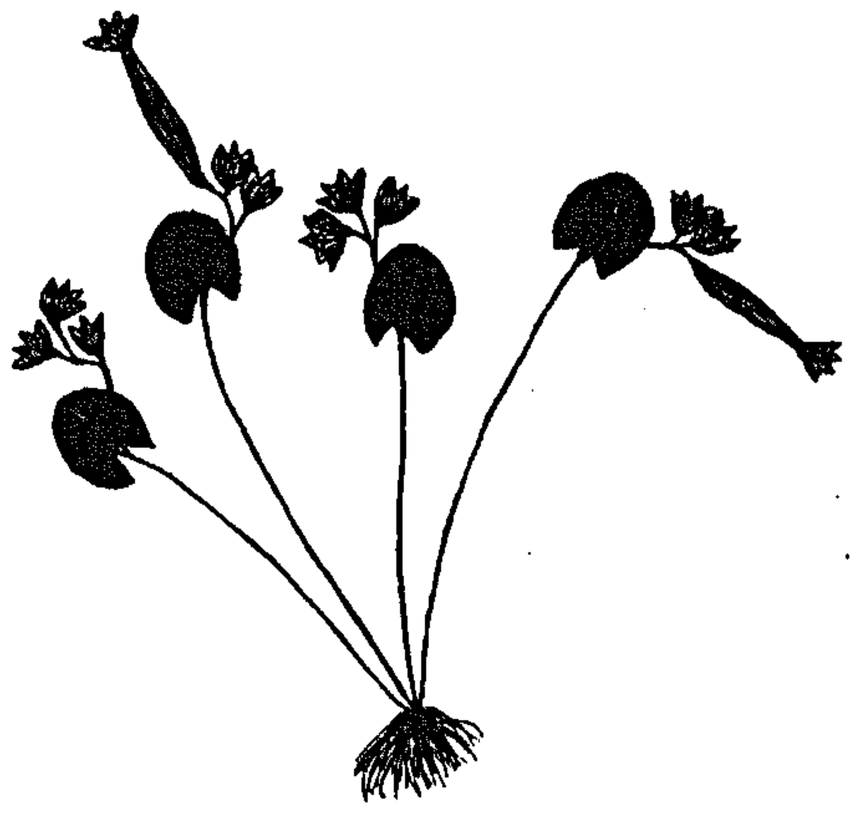
Local name: ***Ghechu***

The leaves of the *ghechu* are similar to *bash patar* 'bamboo leaves'. They are not so *khash khashe* 'rough to the touch' as bamboo. The leaves float on the water the plant rooted in the soil. It grows in the *baishaya mash* 'rainy season' and remains inside the soil as a bulb in the *beel* in the *uinnaya mash* 'dry season'.

It is *maita* 'soil coloured'. Its fruits remain inside the soil. It is not harmful to the fish or water. Pigs are very fond of it. People eat it when food is scarce. It has some medicinal use.

Local name: ***Keukala***

Also called *gang kala*, this plant is similar to the *jhinge* 'cucurbi plant', but is a little *chikan* 'thinner'. Leaves are green and similar to *cheicha* and *arrailla*.

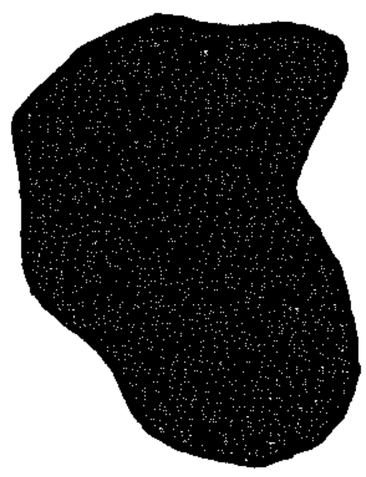


75 cm

It roots in the soil and reaches the water surface gradually. It grows in the month of *Sraban*. It is exposed when water levels go down. It is favourite food of fish. People also eat it as a vegetable. It also helps to cure skin disease. It does no harm to the water.

Local name: *Sheola*

This plant is found in the *beel* during the *uinna mash* 'dry season' and on the *chwak* in the monsoon. It does not occur in the river during the monsoon because of the current. It is *shobuj* 'green' and *pichla* 'slippery'.



1.6 cm

If the *sheola* increases too much it causes problems for fish, as many becoming stuck in it and die. It always grows in *saf pani* 'clean water'. It dies in *ghola pani* 'turbid water' and rots. It is also harmful for paddy.

Local name: *Pana*

Pana occurs everywhere in the *beel*. It is light and floats on the water as its *pet* 'stomach' is filled with air. In some times of the year *pana* is found in rivers and ponds. The leaves, attached to a stem, resemble betel leaf and are *goal* 'round' and *khub shobuj* 'deep green'. There are four types of *pana*. The largest is known as *kochuri pana*, there two varieties of medium size, called *potka* and *topa,* and the smallest one is called *tetulia*. Fish such as *kai*, *shing* and *taki* hide in the dense roots of the *pana darir moto jhulano bala* 'hanging like a beard'. This *bala* 'beard' helps the weed to spread. It spreads when male and female *pana* come together. In each plant there is a part called like a *lathi* 'stick', called the *kanjail*. When it comes in touch with another *pana*, then starts to spread.

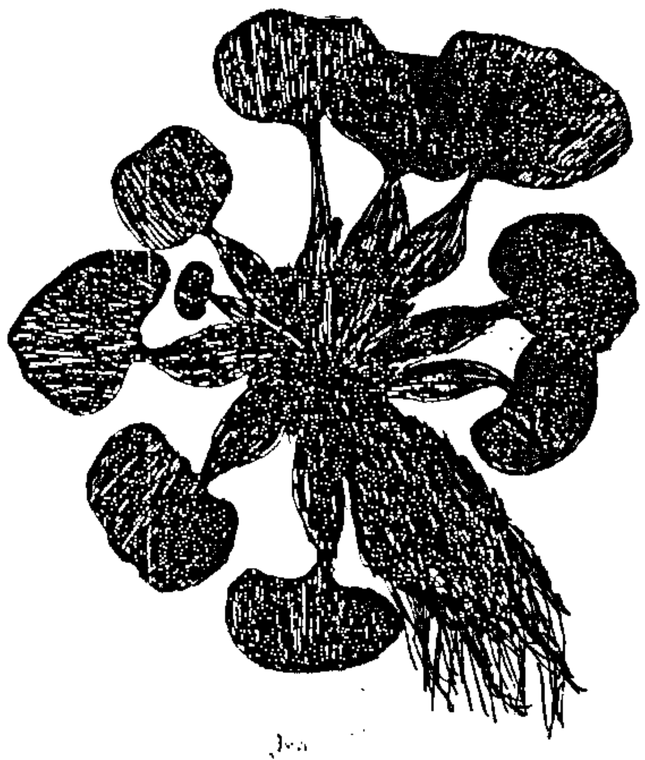
a) Kochuri pana: The largest with *bala* 'hanging roots' in the water. People used to fetch it from the *beel* and put it into ponds as staple food for the fish, but it is harmful during the dry season when its roots rot and spread bad odours.

9.5 cm

It is hard for fish to survive in these conditions. This plant is used as cattle food. In the month of Ashin and Kartic fishermen put *kochuri pana* on ponds so as to lower the water's temperature, making it more bearable for the fish. Its size makes it useful for this purpose.

b) *Potka*: This medium sized floating plant with *goal* 'round' and *choto* 'small' leaves and under every leaf there is *putul* 'like small ball'. The roots of this plant, hanging under the water spread rapidly. They appear like a bundle of small hair. It provides shelter for fish. People put it on the *jhata* to feed the fish particularly grass carp, as they are fond of the leaves. Fishermen are able to catch *Batashi* fish that swim among it.

c) *Topa*: The leaves of this medium sized plant are *khas khase* 'dry'. Its *pet* 'stomach' is fatter than that of the other varieties.



9.5 cm

So it is called *Topa pana* (locally *topa* refer to something full of air). Otherwise it is similar to *kochuri pana*.

d) *Tetulia pana*: also called *khudi pana* is round in shape and is smaller than the other varieties of *pana*. People call it *Tetulia pana* because its leaves are similar to those of the *tetul* 'tamarind' tree.

9.5 cm

It floats on the water and helps to cleanse it. Most fish are fond of it and take the small leaves directly into their mouths. People collect *Tetulia pana* from the *beel* and put it into their ponds.

Local name: ***Pawta***

The leaves of this weed are like *nal gach* 'reep'. It grows tall and narrow. During the rainy season everything seems black around *pawta* plants as they grow densely under the water.

It is difficult to travel by boat where this weed is growing. It forms a good hiding place for fish.

Local name: ***Shapla***

The plant grows in large amounts in the *beel.* Its leaves are *khub shobuj* 'deep green' and round. Its stem grows ten to fifteen hands long during the monsoon. It grows mostly in the *beel,* but is also found in ditches and ponds.

281 cm

The seed of the *shapla* is very small and remains in viable the soil for years. Whenever the floodwater arrives the plant starts to grow. There are two varieties of *shapla*. One is green and the other is red and called *rocto* 'blood' *shapla*. The stems of this lotus are very thick. People, particularly the poor use it as vegetable, although nowadays the supply of lotus is low during the *barasha* 'monsoon'.

Local name: *Kalmi*

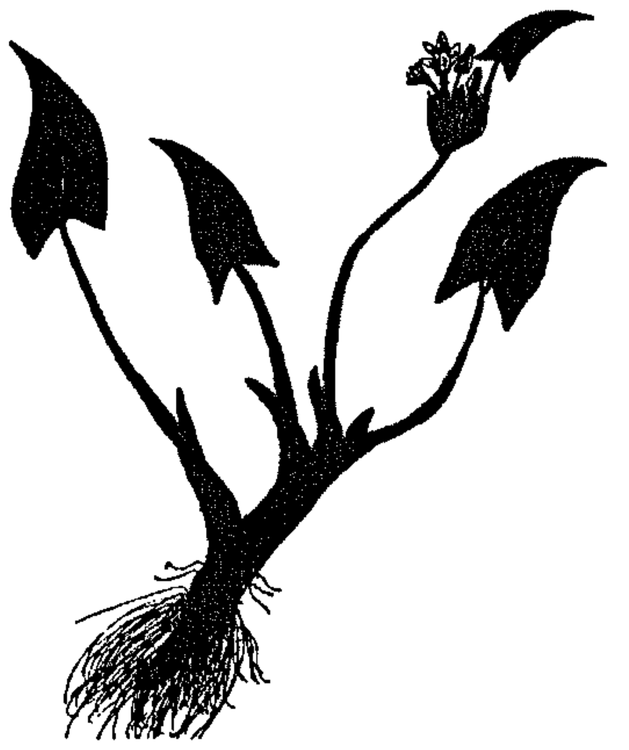
This plant is one kind of *lata* 'creeper' which grows at the edge of the *beel*. Its branches extend towards the water.

56.25 cm

It has a number of *kata kata dag* 'wound spots' on the leaves. There are two types of *kalmi*: the thin one, used as a vegetable, and the fat one which is hard and is of no use. The thin one is also used as animal food. People use the fat one for fuel.

Local name: ***Harmoniaum pana***

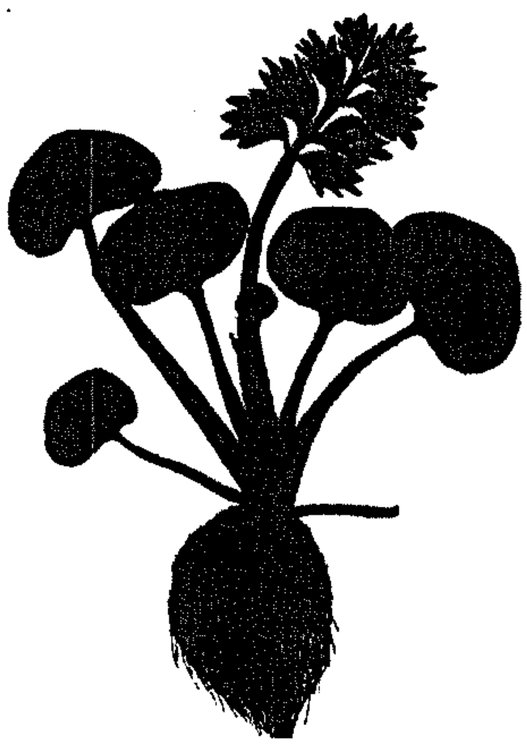
The colour of this weed is yellow green *(dhani).* Its leaves are similar to *kalmi.* It grows in the *chawk* during the month of Ashar when the fresh water arrives. It cannot survive in deep water but grows well in shallow water. The main difference between it and the other *pana* is that its root remains inside the soil, whereas the other *pana* floats.



When the plant is mature it produces flowers. It keeps the water clean but is harmful for paddy. This is because it interferes by shading the plant and competes with it for space. The *pana* can spread out over a wide area. Fish use the *pana* for shelter.

Local Name: ***Kosturi pana***

This *pana* grows very long stems of more than two feet. The *bala* (root) is very heavy. It produces beautiful bluish-white (known as *nilche shada)* flowers. The *papri 'spathy'* (stamens and carpels) are blue and yellow. It grows well in the *beel* and in the ditches and can occupy huge spaces in the paddy fields, preventing the paddy from growing.



25 cm

Fish, such as *balm charingi, khalisha, kai, gutm, geol* and *chingi,* like to shelter inside the pana. Fish such as the *magur* eat the leaves when they start to rot. The plants also attract animals. Another problem with the *pana* is that when it rots in the winter it pollutes the water. However, the *bala* of the *pana* increases the fertility of the soil.

4.6 Water Animals

Animals which frequent the *beel* and other waterways include the *ud* 'otter', a fish eating aquatic animal, *shap* 'snake', *bang* 'frog', *kaitha dura* 'turtle', and *kakra*

'crabs'. People have an intimate knowledge of the behaviour of these animals. These animals relate to the environment in the *beel*. Only a few of these animals used to eat fish. People do not eat most of these animals available in the water. Ali (1997:8) only refers to turtles, snail and molluscs in the *beel* as he thinks that they are the only aquatic creatures apart from the fish. The fishermen of Charan mentioned more varieties of names of creatures, which they think are part of the aquatic environment. Sarker and Saker (1988) found 24 species of fresh water turtles and tortoise in Bangladesh. The people of Charan acknowledged only five of them. People are aware, also, about the animals, although many of them are not included in their diet. There are a few animals considered as fish by the fisheries scientists, but not by the local people.

Figure:4.2 Aquatic animals

Variety Name	Colour	Size	Consumer	Behaviour
Shap	Stripe	3 hands	None	Harmless
Bang	Yellow	Half a hand	Hindus	Shout & jump
Udbilai	Brown	Three	None	Fish eater
Kaitha dora	Black	One hand	Hindus	Stays in *jhata*
Kakra	Black & brown	Hand span	None	Harmless
Shamuk	black	Fist	Ducks	Moving slowly
Kuichaya	Brown	One hand	Poor people	Like *baim* fish

Local name: *Shap*

Several types of *shap* are found in the water, few are *bishacto* 'venomous'. First, the *dora shap*, which means 'snake with stripe'. There three types of this striped snake. One is yellow-black, one is white-black and another one is red-black. They grow up to three hands in length. They are not poisonous and are harmless. Some people believe that the venom of this snake is left on cow dung. If someone

receives a bite from this snake they have to avoid cow dung for a certain period, otherwise if they touch cow dung, the venom will activate in their body. These snakes eat small fish.

One of the snake is black backed with a reddish and yellow underside. It grows gradually to about 25-28 inches and sheds its skin (*chalang)* once a year. It spawns during *Baishakh* and is seen in frequently in *Kartic.*

Local name: ***Maicha allat*** **or** ***maicha shap***

This snake, which grows to about 18-20 inches, has a black striped, cream coloured, dry body, which has shiny round spots known as *shada chakkar* on its underside. It spawns 8-15 eggs, which hatch within 28 days, during the months of *Chaitraya* and *Baishakh.* It is a river dweller and is rarely found in the *beel.* It feeds on small fish and, occasionally, frogs. It is not considered dangerous by local people.

Local name: ***Jaldura shap***

This Is a very slender red snake, which grows slowly to about 18 inches, and sheds its skin once a year. It is found throughout the year in both the river and the *beel,* and also in the *chawk* 'paddy field' during the monsoon in the month of *Kartic.* It is rarely seen in *Chaitraya.* Although it has no venom, it can inflict painful wounds when it bites.

Local name: *bang* 'Amphibians'

The *bang* 'frog' stays on the water hyacinth and consumes insects. There are several different types of frogs. Nowadays two types of frog are to be found in the waters of the *beel;* these are termed, locally, as the *shona,* also known as *bairagi* or *baiya bang,* and the *teli bang*. The *shona,* which is the larger type, is yellow in colour and has a narrow head. It has long legs compared with its body. It grows quickly to more than half hand in length. It is very strong and agile, being able to leap 10-12 feet. In dry weather, these frogs tend to stay inside holes in the riverbank, but when it rains they congregate in shallow water, feeding on the insects and small fish. Small ditches are also a favourite place for it. During this time they produce a loud croaking sound, known as *ghago.* Spawning takes place in the month of Ashar. Some Hindus in the village eat this frog but Muslims strictly avoid it.

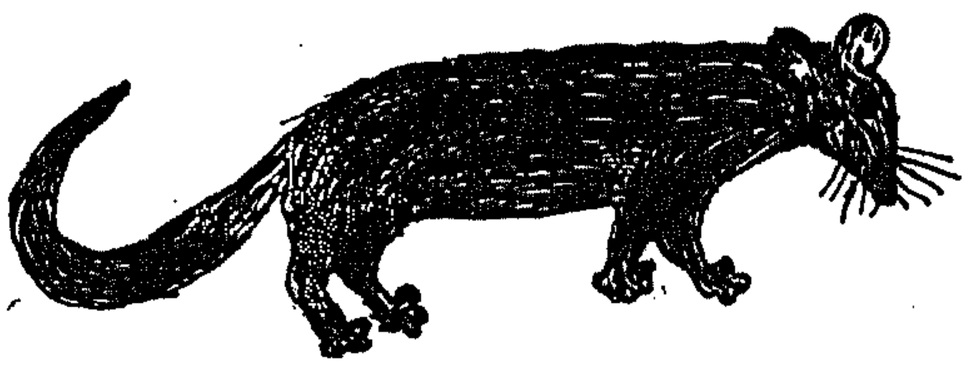
Local name: *Teli bang*

This small black frog, which only grows to 2-3 inches in length, can be found throughout the year in stagnant water containing rotting plants. As heat has a deleterious effect on its skin, this frog spends most of its time in the water. It feeds on small fish and insects. Like the *shona,* it spawns during the month of *Ashar* and is seen in great numbers during the month of *Chaitrya.*

Local name: *Ud bilai*

This four-footed black furred creature is similar in appearance to a cat, though it is not related and has a completely different life-style. It lives in the water, which is

why it is called *ud bilai*. It grows three hands long. It is brown and has a *much* 'moustache'. They are round-headed and give birth to two or three offspring. They spend their days in the jungle, but at night they spend their time in the water, in the river or *beel,* catching and feeding on the fish. According to a few fishermen it dwells in holes at the edge of the *beel* and moves round the under water 'jungle'. When fishermen cover *katha* with water hyacinth, the *ud* takes shelter underneath. In the months of Kartic and Agrahayan they are most obvious.

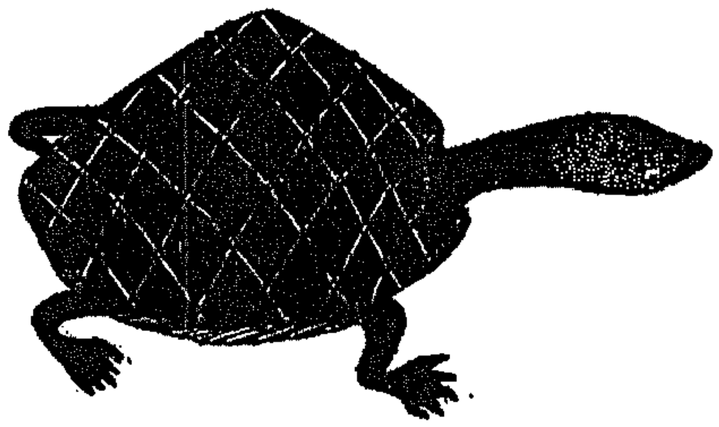


45 cm

The skin of the *ud* demands a high price in the market. It is thought by the local people to help to cure *ras-bat* (pain derived from rheumatic fever). They use the fur also as bed sheets to assist in treating painful illnesses. The animal is very strong and will attack people, inflicting painful wounds. They are fond of big fish and sometimes feed where fisherman stock fish. The *ud bilai* is strong and difficult to catch.

Local name: *Kaitha dura*

This hard shelled animal is black and grows more than one hand. In earlier times there were many *Kaitha dura* in the *beel*, but their numbers have decreased. They stay inside *jhata* and in some *dhopa* 'comparatively deep' areas in the *beel*.

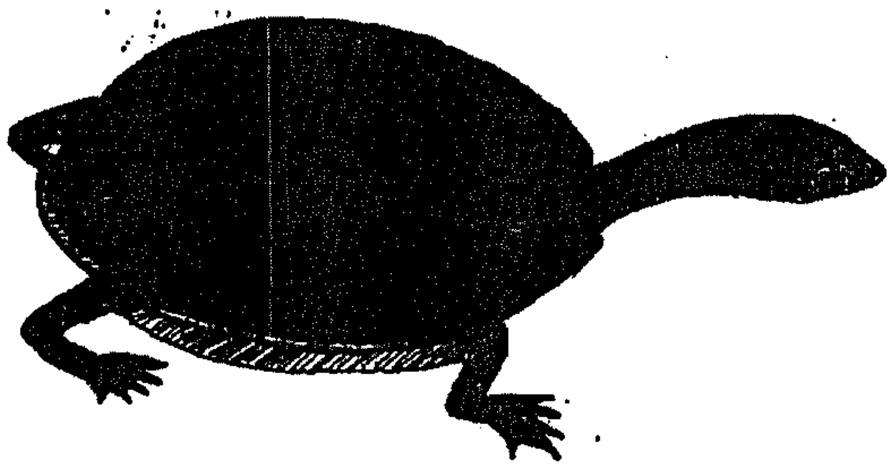


18.75 cm

When people put water hyacinth and tree branches in their *jhata* pits to attract fish they hope also to attract *kaitha dura* 'turtle'. They could expect to find ten to fifteen turtles there previously but this rarely happens nowadays. Hindus find their meat very tasty, but it is forbidden for Muslims.

Local name: *Kachim*

This creature is sometimes known also as *jal khasi* 'water sheep'. This is because people consider that it tastes similar to mutton. It is white and *mete* i.e. soil-coloured and has a domed shell, with a flat underside, which grows to about 9 inches. It has four legs, but moves very slowly.



7.18 cm

Eggs are laid, on the riverbank, prior to the monsoon. During the monsoon the eggs hatch and the baby turtles descend into the river. They are found, mainly, in the big

rivers, but can also be found occasionally in the *beel.* Holes inside the riverbanks are their favourite habitat. They are caught for food by the Hindus, but are forbidden food for the Muslims.

Local name:*Choa*

This is similar to the *kachim* except that it is black instead of soil-white and about 4 inches longer. Again, like the *kachim* it is very round in shape and very strong and has the same method of spawning. It is found, occasionally, in the river. Hindus find them very attractive as food, but they are forbidden for Muslims.

Local name: *Chim*

It is similar in shape to the *kachim* in that it is plate-like rather than domed. Its shell is black and pale fawn or cream *(mete)* and has a large spot on it. *Chim* can grow very quickly and can weigh more than 40 kg. They are to be found in both the river and the *beel.* Eggs, numbering over 20, are laid in the month of *Jaistaya.* As *chim* are very strong and agile and are known to attack people, the fishermen are wary of them. Hindus are very fond of *chim* flesh.

Local name: *Kali kaitha*

It is similar to *kali dura* having a very hard shell with a black top and pale underside and weighs about 10 kg when mature. The shells used to be used as receptacles by the women of fishermen for carrying cow dung. Eggs, which are laid in batches of

50-60 at any time in the year, are white and resemble hen's eggs. These turtles, favoured as food by the fishermen are now rare.

Local name: ***Gaichiba dura***

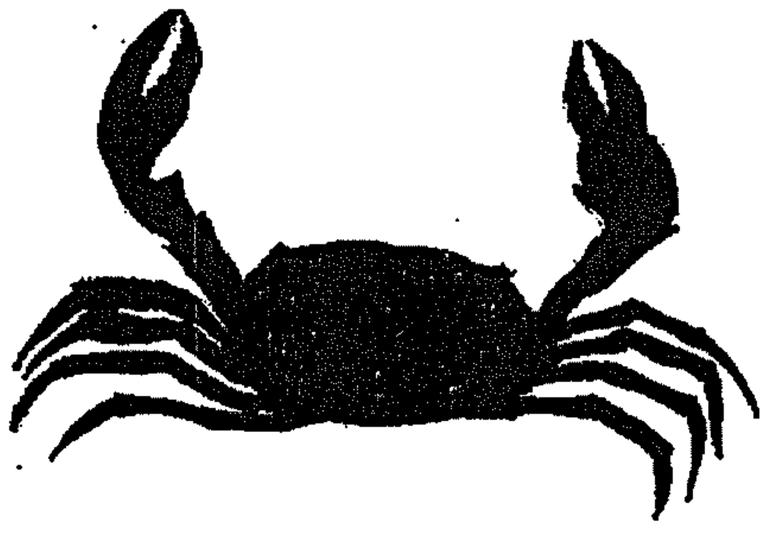
Its top is black and patterned with round spots and its underside is *mete shada* (soil white). It is round in shape and slightly domed and has four legs. It grows to about 4 inches.

1.5 cm

They tend to stay inside small pits, ditches or bushes, burying inside the soft soil. They lay eggs, which will hatch three months later in Ashar or Jaistaya. The night is their favoured time for laying eggs and is the best time to catch them. A tribe called *maithal* used to catch this animal with an *ekaila* (a kind of harpoon).

Local name: ***Kakra***

The *kakra* 'crab' does not grow more than a *dab* (the distance between outstretched thumb and small finger). It is mottled *badami* 'brown' and *kala* 'black'. It has six legs, the front pair having *choto dharail angul* 'small sharp claws' used for attack and defence.



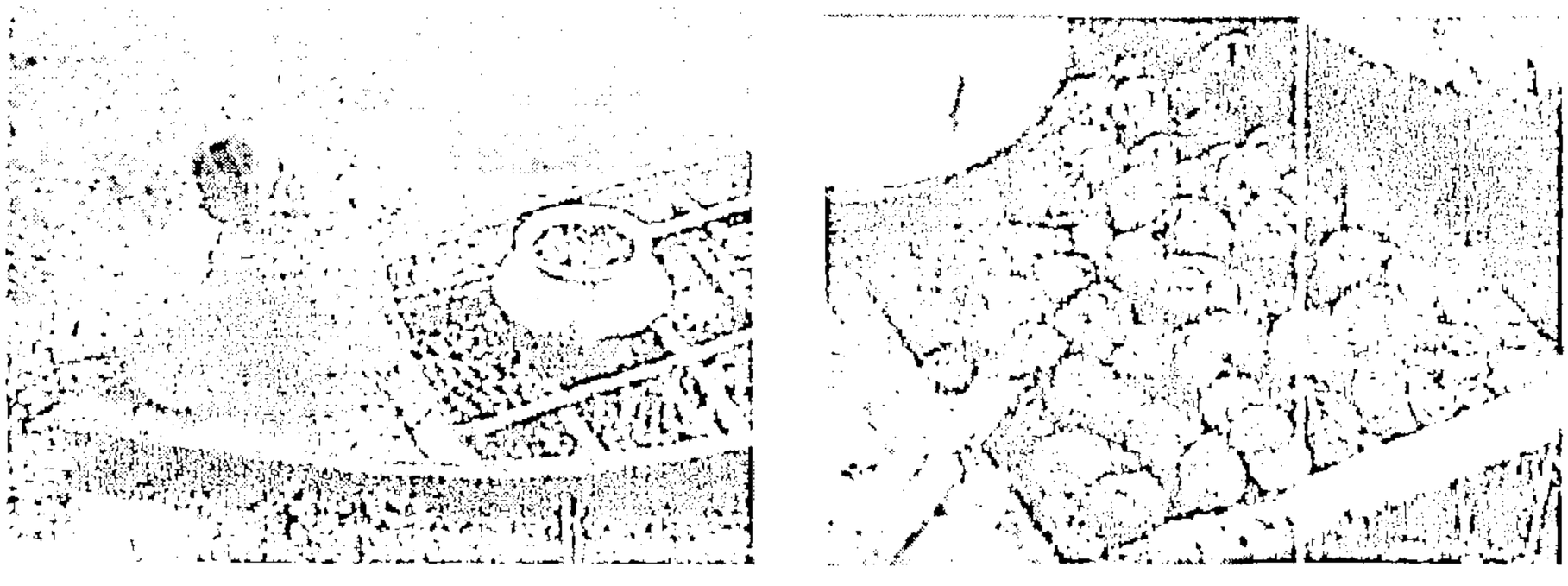
7.5 cm

The *kakra* remains inside small burrows under the water. It is most common in the monsoon period. Fishermen usually throw them back when caught in their nets. Some Hindus eat them but Muslims strictly deny doing so.

Local name: *Shamuk*

This snail lives in a *chinai* 'a shell'.

Photograph:4.9 A house wife is Collecting snails to feed the ducks



There are three types of *shamuk* identified by the people. The *boro shamuk* 'big snail' and *khude shamuk* 'small snail' and *muchrainna shamuk* 'snail with threads'. The big ones frequent the *chawk;* others are found in the *beel*, ponds, rivers, and canals.

Local name: ***Khude shamak***

It is black and round and grows to not more than one inch. It comes with the new water of the monsoon, and stays in the areas where the water is deep.

0.8 cm

It is very attractive as food for the ducks.

Muchrainna shamuk (local name)

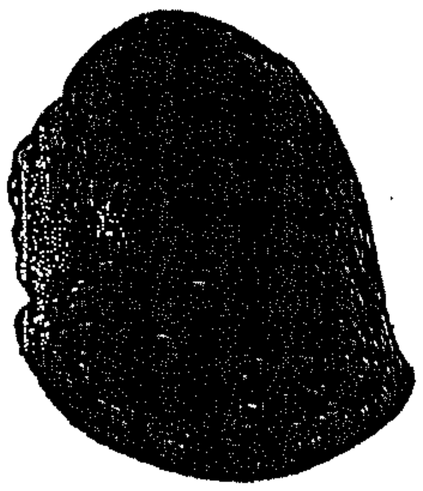
This *shamuk* has a three inch thread (local term *tong)* extending from the rear or its body which it uses as a form of propulsion in the water. It grows above one finger long.

2.4 cm

It tends to spend its time on or close to the riverbed feeding on the silt. Ducks against which it has no defence will eat it.

Local name*: Boro shamuk*

This is round and is the largest of the *shamak*s. It is present at the time of the monsoon and can be found both on the water and on land.



3.37 cm

It moves with the help of its thread *(tong).* For food it ingests soil. Spawning takes place in Baishakh and Jaistaya. As with the other two varieties, it is food for the ducks.

Local name: *kuichaya*

This leg less animal is red coloured and of similar appearance to a snake, except that it has a more pronounced head, and a scaleless hard skin which is very moist and *khub badami* 'dark brown'. According to some people this animal is like a large fish, similar to the *baim mach*, but no one considers it a fish.

14.06 cm

It grows more than one hand long. It lives in stagnant water and hides in small recesses in the banks and among the vegetation. It feeds by ingesting soil. Spawning takes place in the months of Jaistaya and Ashar. In the monsoon season the *kuichaya* are not visible, but when the waters in the river and *beel* go down they emerge and are caught in large numbers by the local people. However, the majority of people deny using it as food, only poor people tend to eat them. The bulk of the

catch in taken to be sold in distant places. According to them it increases blood in the human body.

4.7 Insects

There are many *poca* 'insects' to be found around the water. Most are unknown to the fishermen. They can identify only a few of them according to their colour, shape and behaviour. Insects mainly inhabit the *beel*, though some are present near rivers, ponds and ditches. So long as the *beel* contains water they thrive. The insects are eaten by the fish.

Figure: 4.3 Insects

Name	Colour	size	Habit
Chat poca	Black	Round	Beats roughly
Ghurainna poca	very black	Small	Move circularly
Chauta	Dark	Small	Squirts sticky liquid
Pani kamar	Unseen	None	Creates itching
Joke	black	One inch	Sucks blood

Local name: *Chat poca*

This insect is *goal* 'round' in shape and black. Its back is *chepta* 'flat' and *palish* 'polished', with legs on its lower segment. It is generally two to three inches long. This insect moves by drawing its head and tail together and then springing them apart in a jump. It has a strong bite and attacks anyone, human or animal, who comes near it.

Local name: ***Ghurainna poca***

This insect is black and small and found in all aquatic weeds. If some one pushes or shifts weeds, this insect starts to move round. Its movement creates a circle in the water. This is why it is called *Ghurrainna* 'circling' *poca*.

Local name: ***Chauta poca***

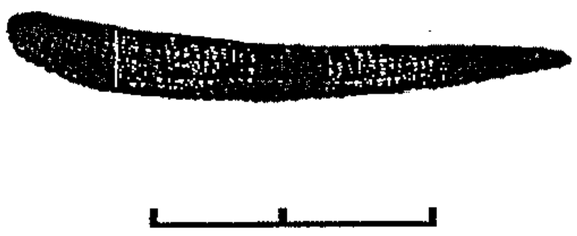
A small and flat insect, dark in colour, it remains with fish and weeds. It ejects some liquid from its mouth which helps it stick on the body of fish. It does no harm to the fish and they tolerate it.

Local name: ***pani kamar***

This insect's name means 'beaten by water'. It lives in polluted water. According to fishermen it is too small to see. If someone enters the water where these insects live, they feel itching on their body whilst in the water.

Local name: ***Joke*** (lake)

Among the vast range of insects *inhabiting* the *beel* is the *joke*. This black flat insect lives among the water hyacinth and in the stagnant water containing rotting vegetation. It is not found in clean water and avoids currents.



Although it is usually only one inch long, when it attacks people and animals and starts sucking their blood, it extends to three or four inches. It will also attack fish. It is considered by local people to be very dangerous; especially as it is very difficult to drive away if it intends to attack. Wounds inflicted by it can become infected.

This Chapter has described the aquatic environment of Charan which included description of how people classify and identify aquatic fauna. In the next Chapter an emphasis will be placed on the fish species to examine how people relate fish in this aquatic environment.

Chapter 5

Ethnoscientific Classification of Fish

5.1 Introduction

In this chapter I shall examine the way people classify fish. The importance of fish in people's everyday lives will be explored and attempts will be made to explain how they identify the different types of fish in order to categorise them. Finally, a description of each fish will be given.

Before discussing Charan some published ideas regarding fish classifications will be discussed. Ellen (1993*b*) noted that 780 Freshwater and marine species have been identified in the central Molluscs, but he encountered very few of the fish species during his field work in Nululu. He believes this reflects the lack of knowledge of maritime fauna in Nululu. Hviding and Baines (1994) found that people in Marvo, in the Solomon Islands, classify fish into 400 types. According to the IUCN (1996), there are 77 currently available freshwater fish species in Bangladesh, excluding introduced fish. During my fieldwork in Charan, I encountered approximately 70 species of fish according to local classification.

Rahman (1989) discussed the nature of indigenous fish names and how this has influenced the scientific naming of freshwater fish in Bengal. He also noted the problems of naming encountered by scientists over 100 years ago:

> The majority of the freshwater fishes in Bangladesh have distinct vernacular names. Most of the names are in use for centuries. Hamilton (1822) who originally described most of the freshwater fishes of the Gangetic provinces largely employed the common vernacular names in providing a scientific status for the fishes described by him. ...For

> many of the common fishes several vernacular names, varying form region to region within the country, are often used...The use of the same vernacular name for several different fish creates problems in taxonomy. (p-123)

It has already been mentioned that most fish names have meanings and that these vary from place to place in Bangladesh. People also pronounce the same name in different ways. In most cases people will try to offer an explanation, for the fish names. For instance, in Charan a fish is named *Balu khat khaita* which describes the 'feeling of sand in a person's hand' and *Tepa,* means 'puffed'. Fishermen say the body of the *balu khat khaita* fish feels like sand when touched and the *Potka* fish will puff itself up resembling a football when it hears a noise. This illustrates the naming of fish according to their characteristics. There are certain names for fish which have no meaning, but the variety name may have meaning. For instance, *tangara* is a fish name which has no meaning by itself, but when a fish is termed *Tila tangara* the name means the fish, *Tangra,* has a black spot.

In Charan many names for fish were found which had no match in scientific classifications. For instance, fishermen in Charan mentioned eight varieties of *Tangra* fish whereas scientific taxonomy only names three varieties. However, it is confusing when people apply more than one name to the same variety of fish. (See the discussion on ethnoscience, chapter 1) This indicates that the people of Charan have an extensive vocabulary to describe fish species.

Islam et al. (2000) showed how the people of the Gora Utrai river basin in Mitha Moin Thana in the Kishoreganj district classify the fish. According to this study

fish are divided into categories on ecological, economic, and other grounds. In this classification they to place similar fish together without mentioning what idea the people have about this categorisation. Does it, in fact, reflect the people's knowledge? As we encountered in Charan, people who noticed similarities in fish tend to make analogies between fish in order to identify them, but they did not necessarily put fish with the same characteristics into the same category. In Charan we found the *shad* 'taste', *dekhte kemon* 'appearance' and *ovayash* 'behaviour' of the fish were key factors in identifying fish. However, the way people classify fish does not match well with the ideas of scientists. As it was claimed in the above-mentioned study: "The fisher's classes are in some cases similar to those of science, others are not. Where morphological aspects are a major factor in the categorisation, the classes are similar to the scientific order" (ibid:167). Similarly, EGIS (1997) produced a taxonomic list of fish species which are found in the Bangshi-Dhaleswari floodplain. This study was carried on Charan *beel* as well as on the other two *beel*. According to this list 95 fish species were found in the study area. This fish taxonomy differs with the people's way of classification. For instance, in the taxonomic list fish called *illish, kachki, fesha, chapila* are put in the same 'guild' called 'clupeid', but by contrast the local people, would not put these fish together. According to them *kachki* and *chapila* are *guramach*. On the other hand, *illish* is not seen in this area because it only enters this region at its early stages then goes away again in a few days. The people call it *jhatka* instead of *illish*.

5.2. The people's way of looking at a fish

There is a popular saying *macheye bhateye bangali* 'rice and fish that's the Bengali' in Bangladesh. The identity of the Bangali 'Bengali people' is symbolised with fish, which shows how important fish is not only in their diet, but also, in the greater social and cultural sphere of life. Hviding (1996) mentions the Marvo fishermen of Pacific Island who also share a similar attitude towards fish. The fish occupy a focal place in discourse among a majority of Marvo men. The fishermen spend hours and hours discussing their experience with fish, the way fish behave etc. According to Hviding:

> their fishing practices relate to fish...in a fundamentally social manner. Fish capture is primarily an outcome of a series of events involving both the fishing person and the fish as social agents and actors. Like people, fish belong to groups, in manners both behavioural ...and classificatory...(p-198)

However, fish are not only of importance to Bengali fishermen but also the whole of Bengali culture. In the Mohabharat myth, one of the appearances of Vishnu, the Supreme God, was either as a *motsho* (fish), *kurmo* (crocodile), *borah* (pig), *nrishingho* (lion), *bamon* (dwarfs), Porshuram (a mythical character),Ramchondro (God Ram). The name 'Fish God' (*motshobotar*) is at the top of the list. The story of the Fish God, according to the Bengali text, is as follows:

> 'প্রলয়কালে পয়োধি-জলে বেদ নিমগ্ন থাকায় ভগবান মৎস্য-রূপে তার উদ্ধার করেন; এইজন্য এঁর নাম মৎস্যাবতার..'
> 'একদিন একটি খুদ্র মৎস্য নদী তীরে এসে মনুকে বলে, বলবান মৎস্যদের হাত থেকে আমাকে রক্ষা করুন। মনু সেই মৎস্যকে একটি জালার মধ্যে রাখলেন। ক্রমশ: বড় হলে মনু তাকে পুষ্করণীর মধ্যে রাখলেন। কালক্রমে মৎস্য এত বৃহত হল যে, তাকে গঙ্গায় ছেড়ে দিতে হল । গঙ্গাতেও স্হান সঙ্কুলান না হওয়ায় তাকে সমুদ্রে স্হান দেয়া হল...'
> (Sarkar:1958, pp-217, 412-413)

When the Ved (Veda, the main religious book of Hinduism) was sinking in the water during the era of destruction, the Supreme God came to its rescue in the

guise of the 'Fish God'. Once, when Monu (the son of the supreme God, Brahma) was in deep meditation on the bank of a river, a small fish came up to him and asked for help, as a large fish was pursuing it. Monu picked up the fish and put it into a small pot. In time, the fish gradually grew larger and then it was put into a pond. Later, when it grew too large for the pond, the fish was put into the river Ganges and when it grew too large for the Ganges it was moved into the ocean. Then the fish told Monu that, as he had saved its life many times, it was now time to repay him. The fish told Monu to build a large boat and to tie it up securely as an extremely large flood was coming. When the whole of the world went under water, Monu and only a few others were saved. Finally, the fish disclosed its true identity to Monu, that it was Bromma, the supreme God.

The importance of fish in the everyday life of Bengali people is evident in many of their folk songs, where they compare different human characteristics to different fish. The fishermen of Sylhet sing the following:

> এলং মাছের তেলং তেলং পাবদা মাছের ওঁশা / নতুন মাইয়ার বুইড়া জামাই নিত্তি করে গোঁসা গো /এলং মাছের তেলং তেলং / আরে ইলিশ মাছে উইঠ্যা বলেরে আমারে শুনাইওরে আমারে শুনাইও/আমি যামু তেলের শিশি লইয়া / আরে উকিল মাছে উইঠ্যা বলেরে আমারে শুনাইও রে আমারে শুনাইও / আমি যামু বিয়ার উকিল হইয়া /
> (Biswas:1993).

The *along* fish is full of oil, whereas the *pabda* fish has sharp lips. The elderly groom of a young bride often becomes sentimental. The *illish* fish says that it will bring the oil (as an oleaginous fish) that is required for the wedding meal. The *ukil* (lit. advocate) fish says that it will be willing to act as the advocate for the wedding.

Men catch fish and the women cook them. Preparing fish for cooking is a woman's task, which is socially prescribed as women control the domestic sphere. Such fish preparation is also related in a folksong:

> ও রাঙা বউ মাছ কুটে রে উঠানে বসিয়া / রঙ বেরঙের মাছ কূটে বটিতে ফেলিয়া বউয়ে পান মুখে দিয়া / শোল বোয়াল কই কূটে ইলিশা খলিশারে। (ibid)

The beautiful wife is seated in the homestead chopping the fish. She is chopping fish of different colours and chewing a betel leaf. She is chopping fish such as *shoil*, *boal*, *illish* and *Khalisha*.

People's thoughts and interests about fish and their behaviour are reflected in many Bengali literary works. The following Bengali text is from a famous novel where fishermen's thoughts about fish behaviour are evident:

> তবে মাছ বলে কথা। যেমন তার মর্জি, তেমনি জলের মর্জি, সে কারু প্রজা নয়। খাজনা টেকসোর ধার ধারে না। জল যদি এল তো, সব ভাসিয়ে নিয়ে গেল। না এল তো বাদলেও দুফোঁটা আসবেনা। মাছ আরো স্বাধীন। ঠাকরুণ নদীকে ভাল না লাগলে মাতলায় যাবে। ইছামতীকে মনে না ধরলে, গঙ্গার মোহনায় ঝাঁক বেঁধে যাবে। সময় পাঁজি-পঞ্জিকার আঁক-কষা কথাকেও ঠেলে ঠেলে ফেলে মীনেশ্বরী চলাফেরা করে। (Bosu:1974:134)

It is about the fish which moves according to its own desire. The water has the same idiosyncrasy when it erodes everything, when it floods. Sometimes it avoids falling on the ground, even only one or two drops, but remains in the sky as clouds. The fish has more freedom than the water. It can move elsewhere if it does not feel comfortable in the river. If it does not feel well in the Ichamati river, then it swims with other shoals of fish to the estuary of the Ganges. Sometimes the words written in the *Ponjika* (a book which forecasts the time and the

movement of the tides and mentions the auspicious and inauspicious times of the year, according to Hindu cosmology) forecast the movement of the 'Fish Mother'.

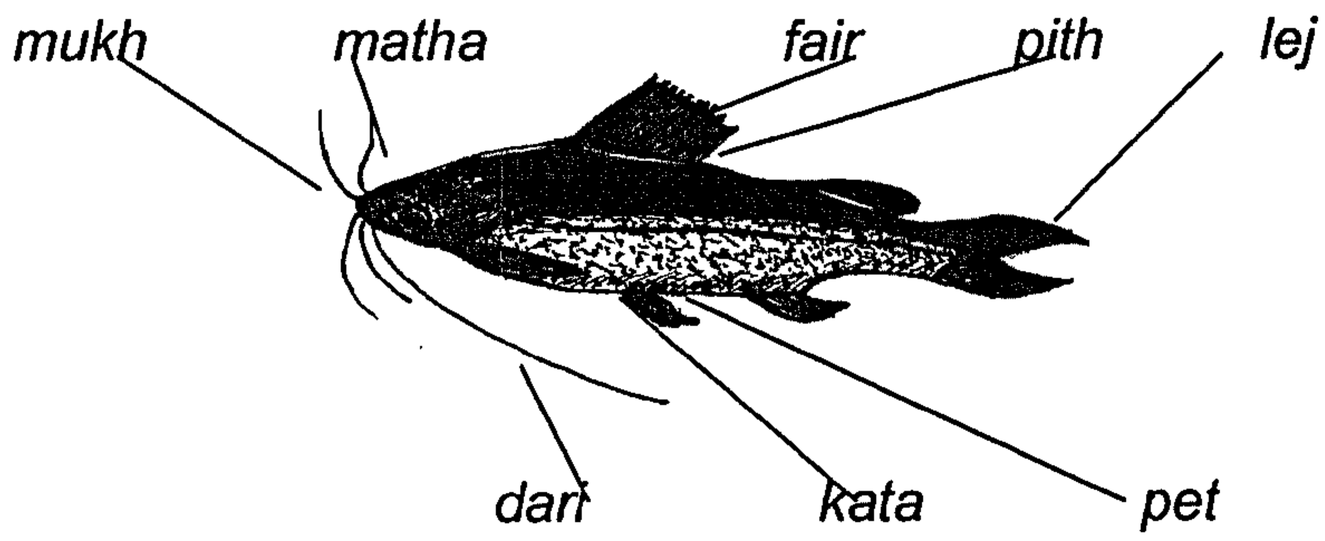
Fishermen of *Charan* use several criteria to identify fish. The *macher rang* 'colour of the fish' is important. The main colours mentioned in identifying fish are *holud* 'yellow', *sada* 'white', *kalo* 'black', *lal* 'red', *and badami* 'brown'. They refer to some colours not directly but by reference to something of that colour. For instance *sheola* is an aquatic weed, fishermen use this to indicate a shade of *sobuj* 'green' and the word *maita rang* which means soil coloured for a shade of brown. They may also mention *dag* 'spot' and patterns when talking about the colour of fish.

Photograph: 5.1 A villager with fish in hand

The *dharan* 'shape' of the body is also significant in identifying fish. They ask the question *Mach ta dekhte kemon?* 'What does the fish looks like?' They list its key attributes. The size *koto baro* is also important too. They describe the size of fish as *boro* 'big', *choto* 'small', and the shape as *lamba* 'long', *chepta* or *feric* 'flat', and *goal* 'round'. Regarding measurement they refer to fingers and hands. When

someone asked *Machta kato baro*? (how big is the fish) They may reply *ek hat* or *adha hat lamba* 'one hand or one half hand long'. A 'hand' is the measure from the finger tips to the elbow, including the hand and forearm Sometimes they use term *dab* or *kati bana* which refers to a hand span, the distance from the tip of the outstretched little finger to the tip of the thumb. Small fish they talk of in terms of finger lengths, as *ek angul* or *dui angul* one or two fingers long. Very small fishes, called *gura mach*, they measure according to the *anguler kara* "finger's phalanxes". Some people also use *inchi* 'inches' for size of fish.

Figure:5.1 Local name of different fish parts



Fishermen also have terms to describe the appearance of fish. They talk of *kata wala mach*, which means for spiny fish. Some spines contain venom and are called *bishacto kata* or 'poisonous spines'. Some fish have spines on their ventral side called *naiya kata*. The fin is locally called *faire*, and *kan* and *kanshira*, which literally mean 'ears', refer to the gills. The under side of any fish is the *pet*, and the dorsal region is the *pith*. The tail is locally the *lej*. The number of spines and fins are also an important in identification. Scales are *chocha* or *aish*. Fishermen emphasise the *pariman* numbers, *akriti* 'shape', *ache kina* 'presence of scales' in describing fish.

Fish eggs are called *macher dim* in Bengali. When fishes spawn eggs fishermen say *dim dey* or *dim chare*. The transition period between egg and fry is said *dim fute bachcha hay*. Fry, which are common during the monsoon, are called *nayali mach*. Fish grow rapidly during the hot season (*garam kal*). They also move around faster at this time. They grow most rapidly in the month of *Falgun*. In the cold season (*sheet kal*) fish hide under aquatic plants and do not grow much. They do not have the right food (*bhal khaoa khadaya payna*) in the month of *Ashar* in the very early stages of their development and so grow only slowly at this time.

Fish exhibit some common behaviour characteristics centring on the *paribesh* 'ecology' of *beel* and river during the day and night and to the *srot* 'current' and *joar vata* 'flood tides'.

According to some fishermen, fish come out of hiding in large numbers at night when they move freely. They go out from the *jangal* or under water vegetation in search of food. This is usually the best time to catch them. During the *vata* period, when the flood water starts to decline, and no wind blows, so that the water is *ghola,* still, this is the best time to catch many large fish. Rivers become full of fish in the *vata*, as the current sweeps them from the *beelagary* (the water of the upper *beel*). At this time many fish are to be found in rivers during the daytime.

The fishermen say that they find most fish near the banks of river during the night, whereas they go into the middle or the deepest part in the daytime, so as to escape the *atayachar* 'torment' of people and ducks. They come close to the bank in search of food. Although they usually eat throughout the twenty-four hours, they obtain most of the food during the night. Fishes do not sleep for any period. When people do not discern any movement among fish they say that they are asleep. People differ over the reason for the behaviour of the fish. Some say that fish are not able to eat during the night because they cannot see anything in the dark, only in the daylight. Some people say that fish keep quiet and do not move much, others think that they move around a great deal during the night.

Fish gather in the middle of the *beel* when the water level is low in the months before the monsoon. At other times most fish are found towards the *dakhinagari* southern end of charan *beel* due to the water current. The flow of water *panir srot abong chap kam* is comparatively less at the *Uttaragari* northern end of the *beel.* In the later monsoon period, *barshar shesh dike,* the fish move towards the *uttaragari,* northern end, so as to avoid the strong down stream current sweeping them out of the *beel* and into the river. There is a disease called *Khoto rog,* wound disease, which spreads among fish during the month of *Kartic*.

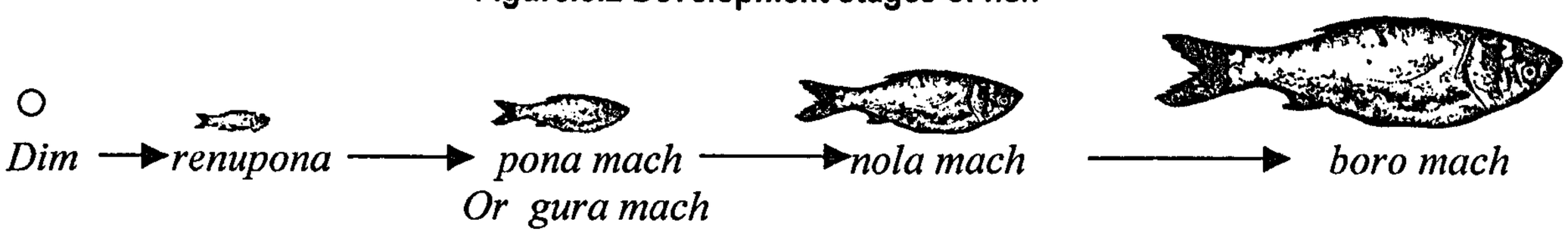
The fishermen can tell which fish are in a locale. They identify the presence of the fish moving by the waves caused by their movement. They learn this through experience. The *boal,* for example, disturbs the clay when it moves creating

'bubbles' *vogla* in the water. When the *shail* and *gazar* move they create fewer bubbles.

5.3 Classification of fish

Fishermen divide fish in to two major categories: a) *jeol* and b) *ojeol*. They further sub-divide these two classes: *gura* and *boro mach* (*jeol*) and *gura*, *nola* and *boro mach*. Eggs of the fish are locally called *dim* and the fry is *renu pona*.

Figure.5.2 Development stages of fish



Jeol refers to fish that can survive for a time out of water. *Ojeol* refers to fish that cannot survive if taken out of water. *Gura* refers to small fish; it means powder. All fish are called *gura mach* at the very early stage, but there are certain fish, which do not grow to more than two or three inches and these are specifically known as *gura mach*. *Nola* generally refers to middle sized fish. And large fish are *boro mach*. Ali (1997:7) mentioned the distinction between *boromach* and *choto mach*, but the *nola mach* 'middle size fish' and their characteristics are not evident in this work. There are some particular fish for which people use different names when these attain medium size. For instance, *nola* of *rui* mach is locally called *nura* and *katla* is *feka*.

The introduced fish are thought of as solely pond fish, though occasionally they escape into the *beel* and *chawk* and then are called *pagaira mach* 'fish of pond'. There are some fish, which people think are not edible and these are called *na khauinna mach* 'inedible fish'.

In Charan, people prefer many of the small fish rather than the big ones. It is not because the prices of big fish are high. According to them *gura macher shad beshi* 'small fish are tasty' as these contains *tel* 'oil' in their body. People also like some of the big fish, but they are not so many of these as compared to the small fish. People think small fish also help them to avoid *chokher oshush* 'eye disease'. They also, prefer the fish which grow in open water instead of still water such as in pond or ditches, because the open water fish is tasty as they have the chance to move and travel long distances. People are very reluctant to eat cultivated or pond fish. The pond owners or leasees sell out these fish to outside buyers.

5.3.1 *Jeol mach*

Some of the *Jeol fish* are difficult to catch because they have spines. When people try to catch them by hand they can push the *kata* spines into their flesh (*kata bidhiye dey*). All *Jeol* fish grow slowly. Fish in this category include *shing, magur, kai, baim, chekmeka,* etc. People say the eggs of *jeol* fish remain buried in the soil during the dry season, hatching to produce fry during the monsoon. Some have scales, some do not. People prefer *jeol* fish because they taste better, though some *ojeol* fish are also flavourful. The *jeol* are mostly bony fish,

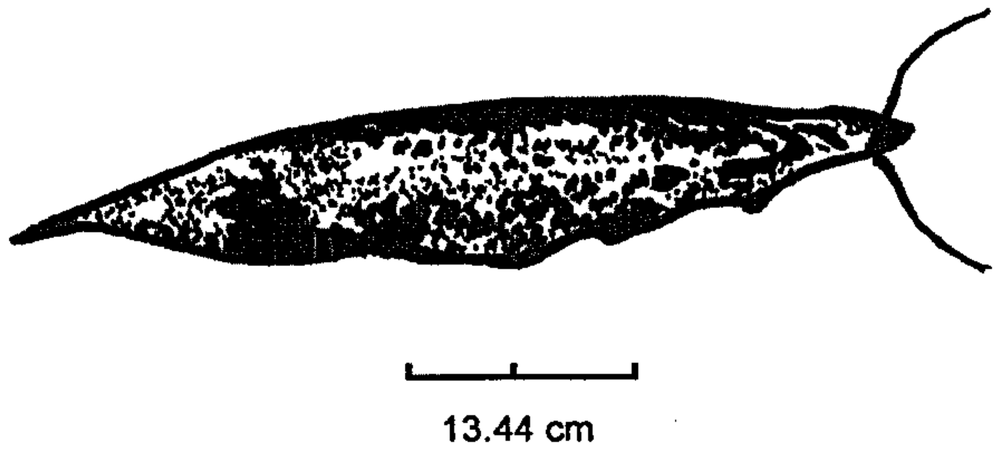
and some people prefer their boniness (they like eating fish bones, they believe they are nutritionally good, supplying vitamins). Villagers used to put *jeol* fish into a water pot for a few days in order to consume them fresh. Some people think *baim* fish does not belong to the *jeol*, but the fishermen of Charan strongly disagree.

Figure:5.3 *jeol mach*

Local name	**Scientific name**	**Size**	**Ecology**	**Demand**	**Month of spawning**
Shing	*Heteropneu -sies fosilis*	½ hand	*Beel* Clay	High	*Baishakh*
Taki	*Channa punctatus*	½ hand	Beel Surface water	Highly	*Baishakh Jaistaya Ashar Sraban*
Baim Naya baim tara baim guchi baim	*Mastacemb -alus armatus Macrognath -us aculeatus* *Macrognath -us pancolus*	2 *dab*	*Beel* River Mud	High	*Baishakh Jaistaya Ashar*
Kawni		1 hand	River	High	*Chaitraya*
Magur	*Clarias batrachus*	< 1 hand	*Beel* Deep water	High	*Baishakh Jaistaya*
Gazar	*Channa marulias*	4 hands	*Beel* River	Medium	*Baishakh*
Shoil	*Channa striatus*	2 hands	*Beel* Middle water	High	*Jaistaya*
Koi	*Anebas testudineus*	1 *dab*	Beel Ditches Deep	High	*Baishakh*
Chekmeka	*Chaca chaca*	½ hand	*Beel* Deep water	Medium	*Chaitraya*
Gochi	*Macrognath us pancolus*	½ hand	*Beel Deep water*	High	*Jaistaya And Ashar*

Bengali name: ***Shing***
Scientific Name: ***Heteropneusies fosilis***
Number of variety:1
Indigenous fish

In the early stage this fish is *lal* red; when mature it is black. The head looks *chepta* flat and it is *shocto* hard. *Shing* means horn in Bengali. It does not grow fat (*mota hayna*), but has a *lamba* long and *patla* slim body. It grows to one half hand long. It has two *bishacto kata* venomous spines behind its *kan* 'gills' which can inflict a painful wound. They use them to defend themselves. This fish is full of blood and people say that it increases the blood level of those who eat it. It has one *faier* fin on its back to use when swimming. It has a pair of *dari* "barbles" underneath its jaw.

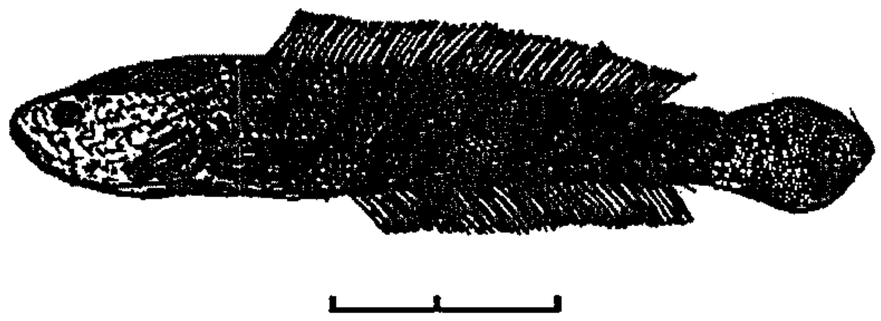


The *Shing mach* is very fond of mud. Clay is its main food. It also eats *pacha abarjana* rotting organic matter. These fish are common during the *Unna mash.* dry season. They prefer to stay most of the time hidden under aquatic vegetation. The place to find them is inside *ghona* bends around the edge of the beel. In Charan *beel* the favourite place is *joga baiter ghona*. They avoid *srot* currents and like to stay in the *ghola pani* turbid water. Some people think *shing* has a house under the water in the mud or vegetation. They do not come out when it rains.

They spawn eggs in the month of *Baishakh*. These become fry during the month of Ashar. This fish does not come with the floodwater in the monsoon but remains in perennial *beel* all the year round. They are not much affected by disease, as, according to the local people, it remains in deep water. The *Shing* is a flavourful fish and therefore commands a high price in the market.

Bengali Name: ***Taki***
Scientific Name: ***Channa punctatus***
Number of variety:1
Indigenous fish

This fish is *maita kalo* soil-black. Its body is like a *lathi* 'stick', circular in shape and is thin. It grows to one half hands long. It is also slippery. In its early stages it is called *chaitan*. The head is hard and covered with round scales. It eats aquatic weeds and also small fish, especially *titputi* and *icha* fish. This is why it belongs to the *rakhusheya* category. They are very agile and

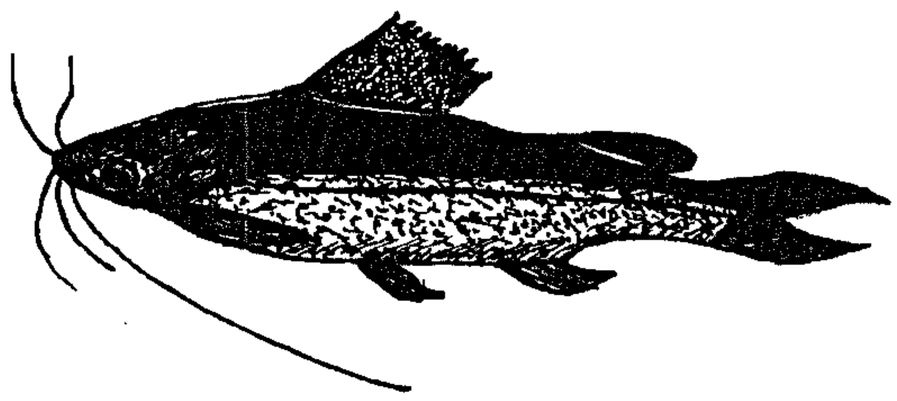


jump forcefully if people try to catch them by hand. They hover under the floating water hyacinth, preferring small ditches containing a small amount of water. This fish is abundant in Charan *beel*. This fish grows quickly during the monsoon. A *chaitan* can grow to adult size within two months if fed properly. If they are unaffected by disease and can survive for more than seven years. In one year it grows 3-4 inchi (inches) long. They *dim chare* spawn eggs in the month of

Baishakh, and on through to the months of Sraban and Vadro. According to some people the eggs of this fish are to be found in the *kachar* area close to the bank of the *beel* where there are many under-water plants. The eggs are *guriguri* small like sand grains and *atailla* sticky. They shine on the water *jhilmil jhil mil kare*. After a day *kuri kuri* small growths can be seen in the *spawn*. Three or four days later they become *guri guri* 'small' *pona* 'fry' like rice grain (*chauler gurar moton*). The eggs produce fry within twelve days. Adult *taki* fish always accompany the fry. They like to move around the *beel* in search of food. After a week, fry is edible.

Local Name: *Kawni*
Scientific Name:
Number of variety:1
Indigenous fish

Kawni is black and similar in colour to *magur*. It has a small, hard head and the shape of it is similar to *Gujakata*. The main differences between *Kawni* and *Guja kata* are colour and size. *Gujakata* is white and grows bigger, whereas *kawni* is smaller and black.



18.75 cm

It grows to approximately one and a half hands long, has three spines and is very slippery. It is fond of rivers as it prefers a current. It stays in vegetation in the

doho 'whirlpool'. There are some small pits inside *doho* constructed by the fish in the *atel* 'sticky' soils which is locally called *khair*. It feeds upon garbage. It spawns during the month of *Chaitra*. It creates a noise in the water, which alerts people to its presence. It is a very flavoursome fish that commands a high price. Nowadays it is very rare.

Bengali name: *Baim*
Scientific name: *Mastacembelus armafas*
Number of variety:3
Indigenous fish

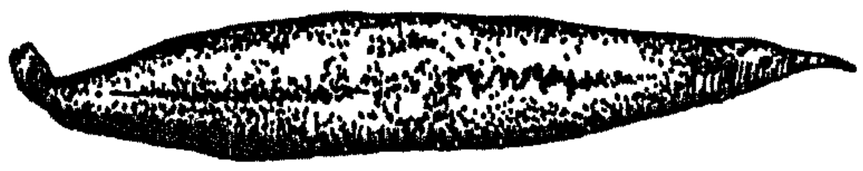
This fish is black. It is narrow and round like a snake. Its mouth is *chokha* angular. It grows one to two *dab* hand spans long. It has a row of tall *kata* spines along its *pith* back. It carries a large *kata* spine on its ventral side; people call it *naiya kata* 'nevel spine'. It remains at the bottom of the *beel* or river*bed*, digging holes *(garto khure thake)* in the months of *Jaistaya* and *Ashar*. Fishermen catch them from these holes. It remains in the deep areas. It is very *pichla* slippery so difficult to catch by hand. It prefers to be in the river. It is available throughout the whole year and is especially plentiful during the monsoon. Its main food is soil, though sometimes it eats rotting prawns and *puti* fish if they are available. They spawn in the month of Baishakh and Jaistaya. It takes at least twenty days for fry to emerge from the eggs. If someone touches this fish it will attack with its *naiakata* 'ventral spine'.

Nayabaim

7.5 cm

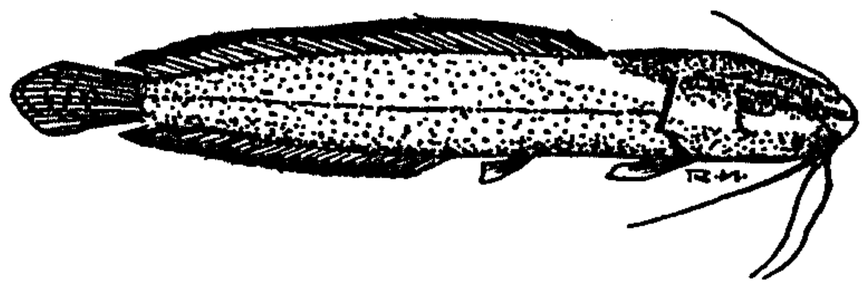
There are three varieties of *baim* fish: *Naiya baim, tara baim* and *gaicha baim.* They are distinguished by their size and colour variations. *Naya baim* is the largest growing two hands of long and has several checked patterns on its body. *Tara baim* has only one check in the middle of its body. *Gaicha baim* has no checks and is *sheola* green colour. These fish look the same at first glance (*pratham shakhayate*), *Nayabaim* small *kata* spines on its *pith* back and resembles a snake, with small eyes and has smaller *aish* scales than the other two types. *Tara baim* has small star-like spots on its body, from which its name comes, *tara* meaning star. *Guchi* is brown; it is the smallest of these fish.

Bengali name: *Tara baim*
Scientific name: Macrognathus aculeatus
Number variety:1
Indigenous fish
This fish is like a large *gachi.* It is narrow and has an angular mouth. It grows eight to ten *inchi* inches long. It has a long *dag* spot on its body, which



identifies it. It has small scales, and is very slippery and so difficult to grip. It also has a *naiya kata* 'ventral spine' like *naya baim*. It spawns eggs in the months of Jaistaya and Ashar; the eggs become fry within fifteen to twenty days. These grow through the months of Ashar, Sraban, and Vadro. It prefers deep water. Small fish are its main food, though sometimes they consume soil if small fish are scarce. It is becoming rare fish, like many fish after the 1988 floods.

Bengali name: ***Magur***
Scientific name: ***clarious batrachus***
Number of variety:2
Indigenous fish
The head of this fish is fat and hard and ash colour. It has two *dari* 'barbles' and two *kata* 'spines' behind the *kanshira* 'gills'. It is similar to the *shing mach*, except that it is fatter. It has a strong tail and can swim quickly.



13.23 cm

It grows above one hand long. Just behind the gills there are two *faire* 'fins' used in swimming. It is fond of rotten garbage (*abarjana*). It prefers to stay under the *bala* 'hanging roots' of water hyacinths. In the *beel* the *Magur* occupies areas where currents are less strong. It favours the *ghona* 'bend' in the *beel*. In Charan *beel* large numbers of *Magur* are found at *joga baiter ghona.* It is available during the dry season and likes to burrow in to the mud. It spawns in the months of Baishakh and Jaistaya. After fifteen days the eggs produce fry. It is tasty to eat, and commands a very high price. People say it helps to produce blood in the human body (*sharire racto baray*).

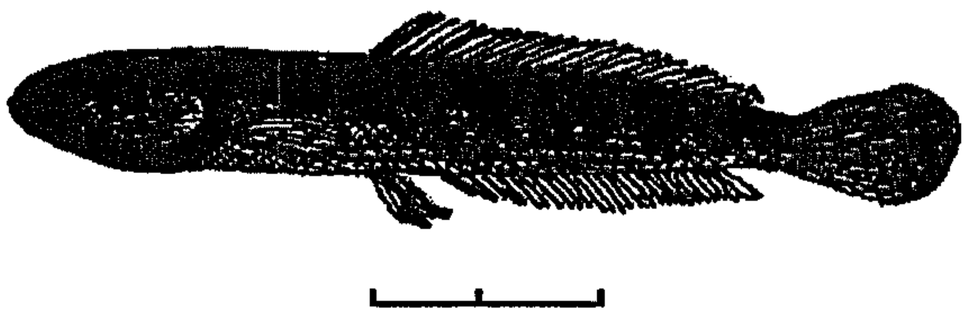
Bengali name: ***Gazar***
Scientific name: ***Channa marulias***
Number of variety:1
Indigenous fish

This fish is black and long. The head is very hard. It grows large; three to four hands long. It is like the *shoil mach*, but has different markings on its body and differs in shape .The *gazar* has a *shada chakkar* 'white circle' on its body, it has same *holud dag* 'yellow lines' too. The *shoile* has some red cheques (*lal cheque*) on its stomach. The mature *gajar* has a spot (*fota*) appear on its head. .

The *Gazar* grows longer than the *shoil*. They have very slippery bodies. The *gajar* eats all other fish, also *sheola* and *potka* (under water vegetation). They are found both in the *beel* and river. People do not keep them in ponds. When the *gazar mach* moves in the water it produces fewer *volga* bubbles than the *boal* fish. They spawn in *Baishakh* and within fifteen days the eggs produce fry.

The *gazar* is also known as the *rakhuseya mach* 'demon fish'. Some people say that when a *gazar* grows large it becomes a *rakhi* 'spirit'. Some fishermen say that it becomes the *maicha dew* 'demon fish' when it become older. Sometimes a vermilion spot (*sindurer fota* like that worn by married Hindu women) is found on the forehead of the large *gazar* fish. The fishermen are frightened if they see a big *gazar*. The *rakhi mach* and the *maicha dew* should not be caught.

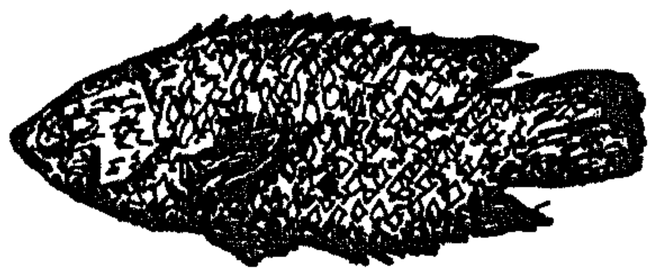
Bengali name: ***Shoil***
Scientific name: ***Channa striatus***
Number of variety:1
Indigenous fish
This fish is black and long (*kalo ar lamba*), a round body, with a wide and hard head and many large round and *gole chocha* 'scales'. The *shoil* fish like the *gazar*has some similarities with black *taki* fish. It grows one to two hands of long, growing, principally, during the rainy season. It is strong fish. If someone tries to catch it will writhe forcefully. However, it is becoming rare today, so it is difficult



to find them in the river now. Only a few are found in the *beel*, as they prefer the middle to upper water levels. They are surface feeders. *Sheola, Katuripana tetuler pana* and other small fishes are their favourite food. This fish is also referred to as a *rakhayas* 'demon', because it eats all other fish. They spawn during *Jaistaya*. Eggs become fry within ten days. People buy the fry in the month of Ashar. Some whole sellers bring the fry in from the hatcheries in Mymensing.

Bengali name: ***Koi***
Scientific name: ***Anebas testudineus***
Number of variety:1
Indigenous fish
This fish is covered with spines. It grows one dab 'hand span' long if it survives to maturity. The whole body is encircled with a ruff-like *faire* 'fin'. This fish

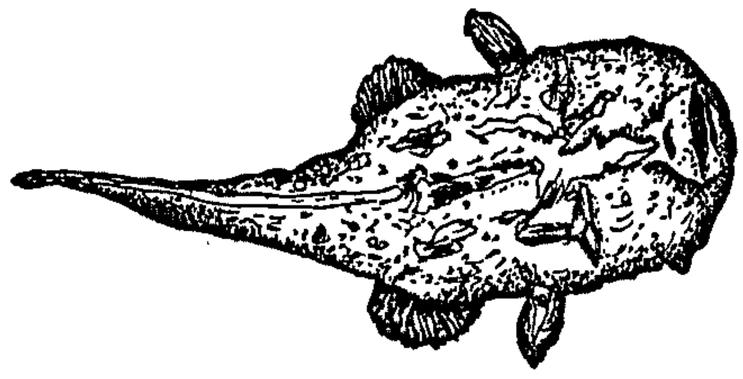
epitomises *jeol* fishes in surviving long periods out of water. It can walk on land (*hauinna mach* 'walking fish'); people find it on paths after it rains. Some say that it can even climb on the trees. They usually spawn in the month of Baishakh; eggs producing fry within fifteen days. Some people say that the eggs of *koi mach* remain in the soil of paddies and *beel* during the dry season, producing fry the next year when they come in contact with water again.



3 cm

The *koi* is less affected by the disease called *khoto rog* 'wound disease', which spreads among the fish during the month of Kartic because it remains in deep water people say that it prefers *tela pani* 'clean water'. It is considered to be a very tasty fish.

Bengali name: *Chekmeka*
Scientific name*: Chaca chaca*
Number of variety:1
Indigenous fish
A flat fish (*khub chepta*) that is described as *khas khase* 'dry'. It is *maita* 'soil coloured'. The *mukh* 'mouth' and *thot* 'lips' are larger than the fish. It grows half a hand long. It is flatter at the front and thinner at the back. It has two *kata* 'spines' behind the *kan* 'gill' and a *khara* straight spine on its back.



7.25 cm

It eats large quantities of clay (*kada khaura mach*). They escape the range of net because they remain burrowed in the soil. It is very common during the month of Chaitraya. It spawns in Chaitraya and Baishakh, producing fry in the months of Jaistaya and Ashar.

Bengali name: ***Gochi***
Scientific name: ***Nastacembelus panculas***
Number of variety:1
Indigenous fish
This fish is the same colour as *sheola* 'molluscs'. It has several spines on its back, an angular mouth and some small *chocha* 'scales'. It is very slippery.

7.25 cm

It resembles a snake and can grow above half a hand in size. During the month of Jaistaya and Ashar this fish spawns with the new floodwater, these eggs producing fry in fifteen days. Usually this fish eats snail, molluscs and mud. It lives in the *beel*, where prefers to remain on the bottom of the water bodies, and likes *Alta pain* 'murky water'. It grows rapidly during the months of Ashin and Kartic.

5.3.2 ***Ojeol mach***

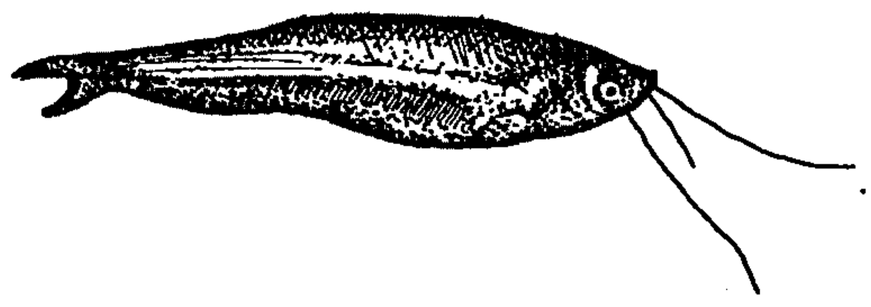
Most of the *ojeol* fish are naturally slow except the *rui* and *katla*. They cannot create strong force like the *jeol*. Most of the *ojeol* lack sharp poisonous spines. All have scales. These are easy to catch. Test is also varied fish to fish. Some of the *ojeol* fish are sought after, whereas others are less favoured. People of Charan put both spine less fish and fish with spine together in the *ojeol* category, the only distinction they make as they say most spiny fish are more *beshi shader* 'flavoursome'. The *ojeol* is in a category which is contrary to scientific classification when it puts a few catfish with the other species in the in the same category.

Fig.5.4 *ojeol mach*

Local Name	Scientific name	Size	Ecology	Demand	Month of Spawning
Pabda *a)naila pabda* *b)chaira pabda*	*a).Ompok pabo* *b)Ompok pabda*	1 dab	a)*beel* b)river	High	Baishakh
Chital	*Hypophihalmichthysmolitri*	< 1 hand	River	High	Baishakh
Katla	*Catla catla*	1-1 ½ hands	*Beel* River Pond Clear water	Medium	Jaistaya
Fali	*Notopterus notopterus*	>Half hands	*Beel* River	High	Chaitraya Baishakh
Boal	*Wallagu attu*	< 4 hands	holes in river bed *Jhata*	High	Jaistaya Ashar
Rui	*Labeo rohita*	3 hands	*Beel*, river Pond Clean water	High	Jaistaya
Kali baush	*Labeo calbasu*	< 1 hand	River mid-depths	Medium	Jaistaya Baishakh
Baitka	*Labeo bata*	< ½ hand	*Beel* and river	High	Baishakh Jaistaya

Kakila	*Xepentodon cacila*	< 1 dab	*Beel* River Upper region	Medium	Jaistaya Ashar
Mrigel or Mirka	*Cirrhinus mrigala*	2 hands	*Beel* River Deep water	Medium	Baishakh
Bacha	*Eutropuchthys vacha*	1 hand	River Surface water	High	Baishakh Jaistaya
Gaira	*Clupisoma garua*	1 hand	River	Low	Baishakh
Shilong	Slionia silondia	< 1 hand	*Beel*	High	Baishakh Jaistaya
Jhatka or Ilish	*Hilsa Ilisa*	1 dab	River Beel	High	Un known
Guja kata	*Aorychthys seenghala*	< ½ hand	River Deep water	Medium	Jaistaya Ashar
Gutum a)ghoragutum b)gutum	*Lepidocephalus gunica*	< *dab*	*Beel* Deep water	Medium	Jaistaya Ashar
Veda	*Nandus nadu*	< dab	*Beel*	high	Jaistaya Ahsar
Airr	*Mystus aor*	Three and half hand	*Beel*	High	Chaitraya
Baghair	*Bagarious bagarious*	< 10 hands	River	Medium	Chaitraya Baishakh
Vangra		½ hand	River pond	High	Jaistaya Ashar
khosholla	*Mugil corsula*	< ½ hand	River *beel*	Medium	Chaitraya Baishakh
Vol	Barilius bola	< ½ hand	River	Low	Chaitraya Baishakh
Rita	*Rita rita*	½ hand	River	High	Chaitraya Baishakh
Raikh or Tatkuni	*Cirrhinus sophore*	8 inches	*Beel* River	High	Chaitraya Baishakh
Guitta		< *dab*	*Beel* Deep water	High	Chaitraya

Bengali name: ***Pabda mach***
Scientific name: ***Ompok pabda***
Number of variety:2
Indigenous fish
There are two types of *pabda*: *Naila pabda* and *Chaira pabda* (*Pabda* means papaya). The *naila pabda* is *norom* 'soft' to touch. It is red. It resembles the *Boal* but does not grow so large. It grows one *dab* 'hand span' long. Its head and face is also smaller and softer.



6.92 cm

The *Chaira pabda* has a white body (*sharer*) and red lips (*thot*). Otherwise it is similar to the n*aila pabda*. Both types of Pabda eat mud and snails. *Naila Pabda* fish is found mostly in the *beel*, whereas the *Chaira pabda* is found mostly in rivers. They prefer *tela pani* 'clean water'. The *pabda* is considered delicious and commands a high price in the market.

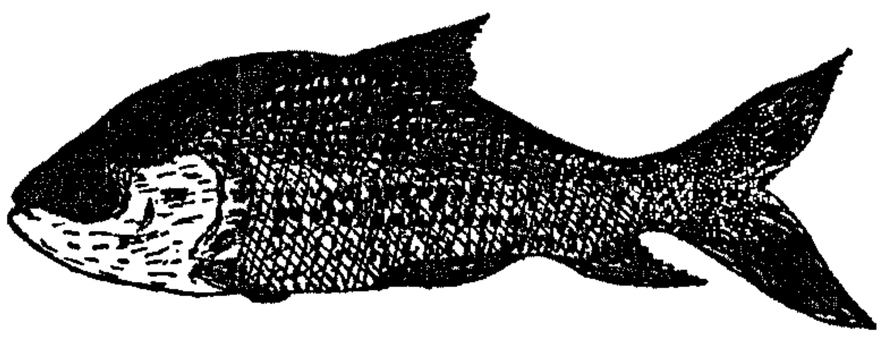
Bengali name: ***Chital***
Scientific name: ***Hypophihalmichthysmolitri***
Number of variety:1
Indigenous fish
This fish shimmers like a silver coin (*rupali*). It has many small scales (*chocha*) covering its body. The topside (*pith*) of the *fish* is *maita* 'soil coloured'.

6.66cm

It has round black spots on it head (*matha*) and on the tail (*lej*) area and its head is small compared to its body. It grows less than one hand long (*ek hatero kam*). It has small scales and is very slippery. It has a sharp row of spines around its flat stomach which wounds people if they try to catch it. There are some similarities between the *Chital* and *Faila* (or *Fali*), but the *Chital* fish is not so flat as the *Faila*, it grows rounder and larger. It is found in rivers where it feeds on small fish. As it stays in large water bodies and hides inside holes and crevices when it matures, it is difficult to find and catch. If kept in a pond, it will consume all the fry. They usually spawn in the month of Baishakh, eggs producing fry in the months of Jaistaya and Ashar.

Bengali name: *Katla*
Scientific name: *Catla catla*
Number of variety: 1
Indigenous fish

This fish is broader and shorter than the *Rui mach.* The underside (*pet*) is white and the back (*pith*) is darker. When mature they are reddish. It has a large head which when removed appears very small. It grows to one to one and a half hands long. It spawns in the month of Jaistaya. The fry come to rivers and *beel* during the monsoon. They are called *Feka or shalka* when small.



10.38cm

They grow quickly during the *barasha* 'monsoon'. This fish prefers clear water. They consume large amounts of food compared to other fish, and like to frequent paddy land where food is plentiful. The *jangla* 'weeds' in the paddies are their favourite food. They also eat water hyacinth, mud, molluscs and tiny fish. Fish caught in paddies taste better than those from the *beel*. The prices also differ in the market. People also cultivate this fish in their ponds. The *katla* grows larger in the *beel* and canals than in the ponds. They feed them *khail* 'mustard cake' and *bhushi* 'husked rice'. The disease *chat org* infects *Karla* fish, as it does *Rui* and *Boal* more than other fish. This happens people say because they frequent the surface water.

Bengali Name of fish: *fali*
Scientific name*: Notoplenus notoplenus*
Number of variety:1
Indigenous fish

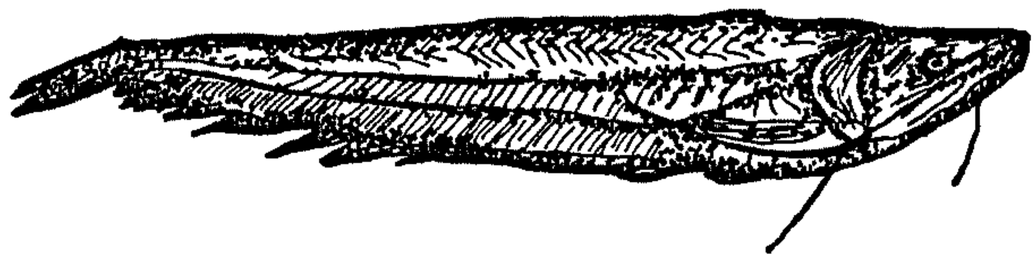
Another name for this fish is *boka faila* 'fool *faila*' as many fishermen think it is a fool. This fish is *halka badami* 'light brown'. Some fishermen refer to the fish as being white with red lips. Its topside is black and breast is white. It has many scales on its body and has small and sharp teeth.

It fish grows above a half hand long. It is sometimes difficult to distinguish from *Chital* fish. According to some fishermen they are the same fish. The difference between them is their head size, *Chital* having the smaller head. Small fishes are

its main food, thought it sometimes consumes mud and aquatic weeds. It is found in the *katha* 'refuge' in the month of Poush. It spawns in the months of Chaitraya and Baishakh. Within ten to twelve days the eggs hatch, which produce very small fry. This fish is common during the winter.

Bengali name: *Boal*
Scientific name*: Walago astlu*
Number variety:1
Indigenous fish

Fishermen say that this is a very nice looking fish *dekhte khub sundar*. It is easy to identify as it has two large barbells on its two *nali* 'pipes under the jaw'. It has a very wide mouth. It has no scales. It is a little slippery. It can grow large, up to four or five hands long. It eats all other fish' including their fry '*nijer bachaya khai*'. For this reason it is called a *rakhayash mach* 'a fish of demon lineage'.



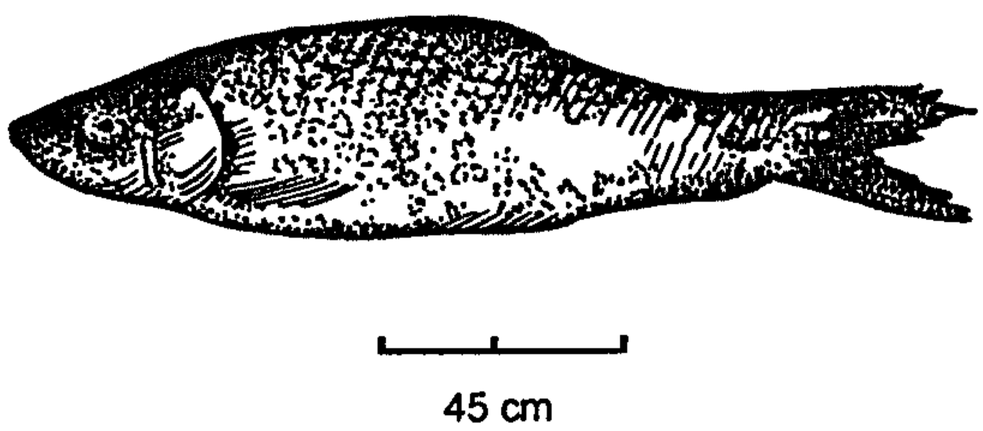
56.25 cm

It also eats *shamuk* 'snails' and *sheola*. They are fond of deep water and occupy holes in the riverbed. In the *bee*l they move around close to the bank or shelter inside the *jhata* 'refuges' excavated by fishermen. The *Boal* also prefers the light. Some people avoid *boal* because they think it eats rats. The fish catches them at night by putting its the tail up on the bank. Rats in search of food along the bank seize the tail and the fish pulls them in to water and, it is believed, eats them. The *boal* fish leap out of the water, and can leap out of nets. There are two types of *boal:*

one is *black* and called the *futi kata boal* 'black prints' and the other is white which the called *dhali boal*. Some fishermen do not agree that there are two types *boa*l. Some people think the fish eats humans. The *boal* spawns during the *Jaistaya* and *Ashar* and within twelve days the eggs produce *pona* fry. The disease called *khato rog* attacks *Boal* fish. Together with the *Rui* and *Katla it more* affected than the other fish. The *Boal* is very popular and commands a high price in the market.

Bengali Name: *Rui mach*
Scientific Name: *labio rohita*
Number of Variety:1
Indigenous fish

This fish is called *Nura* when small. When it has grown two hands of long it is called *Shalka mach*. It grows in to a large thin fish, above four hands long. The underside of the fish is white and the back (*pith*) is black. It becomes reddish when mature, whereas the *Mrigel* remains white. It has large and round scales (*boro baro gole gole chocha)*. Both the *rui* and *katal* have large scales, but the *katal* fish has a wider mouth (*charainna mukh*). The *rui* is available in the *beel* and river.

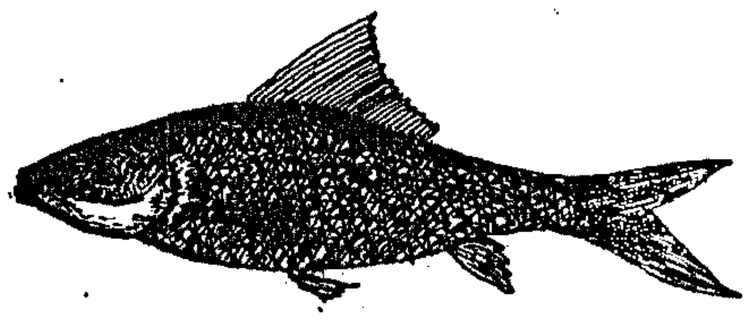


It likes clean water. Some people cultivate it in their ponds. It prefers to stay in middle of any water body. In the sunny days during the monsoon they are found under aquatic vegetation. Water hyacinth, various aquatic weeds and small fish are its food. During the small *Nura* stage it prefers the flooded paddy fields. The

jangla 'weeds' paddies are its favourite food. Fish caught in the paddies have a better taste and command a higher price than those caught in the *beel.* If cultivated in a pond people feed it husked rice (*kura*) cow dung (*gobor*) and mustard cake (*khoil*). They spawn in the month of Jaistaya, eggs producing fry within fifteen days. Large numbers of fry come down to the river and *beel* during the monsoon. They grow faster in the *beel*, and during the monsoon when there is plenty of food available. The *rui* command a higher price than the *katal* or *mrigel,* having better flavour. It is a favourite because it is less bony than the other fish. However, the *rui* is susceptible to the disease called *khato rog,* as is the *katla* and *Boal.* This occurs it is believed, because they remain close to the surface of the water.

Bengali Name :*Kal Baush*
Scientific Name: *Lebeo kalbasu*
Number of Variety:1
Indigenous fish

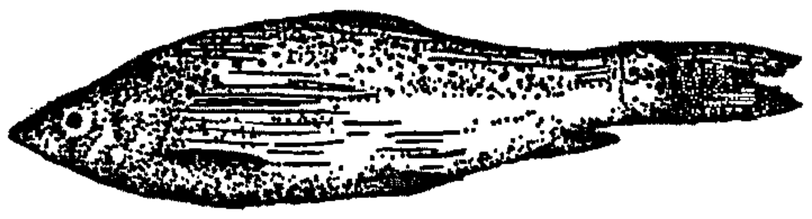
It is similar in size to *rui* and *katla*. It is very black and grows longer than one hand. The Chest (*buk*) of this fish is *mete* 'soil coloured'. It is found more often in the rivers than the *beel*. They stay in the mid-depths of the water.



They eat the same food as *rui* and *katla*, and also like to eat mud. Many people do not like the smell of these fish after cooking it. It is difficult to get rid of the

odour. They spawn in the month of Jaistaya and Baishakh and after about fifteen days the eggs produce fry. Some people call the fry of this species *kalkini*.

Local name: *Batka*
Scientific Name: *Labeo bata*
Number of variety:1
Indigenous fish
It is white and similar to *Rui*. Its head is long, round and hard. Its scales are white, round and small and it has five *fair* 'fins', two of which are behind the head, one on the back and the others on the *navi* 'underside'.



7.6cm

It grows to more than half a hand long and it is somewhat slippery to the touch. In the past, it was found in deep water in *beel* and rivers, but nowadays it is cultivated in ponds. It is plentiful during the monsoon. Only a few are now found in the *beel* during the rainy season. It is a very flavour some fish but is very strong and will try to escape if one attempts to catch it. It spawns during the months of Baishakh and Jaistaya. It feeds upon soil and rotting garbage.

Bengali name: *Kakila*
Scientific Name: *Xenentodon concila*
Number of variety:1
Indigenous fish
It is *lamba* 'long' and *chikan* 'thin'. It is black and white in colour. This fish's stomach is fat compare to its tail and lips. It has few *aish* 'scales'. It grows more than *dab*. Its lips are distinctive, being long and sharp (*chokha o lamba thote*). Some people say that its lips are like the *kak* crow's beak, hence its name *kakila*

mach. They use its dried lips like a straw to suck the venom from people who suffer snakes bite.

6 cm

It has many small *dat* 'teeth'. They move very quickly and stay in the upper parts of a water body. It prefers small bodies of water. It is difficult to catch because it is very agile. It eats small fish, grass and insects and according to some people, they eat *abarjana* 'garbage', as well, often the rotting corpses of animals. They are found in both river and *beel*. It spawns during Jaistaya and Ashar, eggs producing fry within fifteen days.

Bengali name: *Mrigel or mirka*
Scientific name: *Cirrhinus mrigala*
Number of variety:1
Indigenous fish

A white fish with a slightly darker back. There are some similarities between *mrigel* grass carp and *rui mach*. It is longer than the *rui*, but slimmer. It also has a larger head.

30 cm

It grows one to two hands long and is covered with round scales (*gole chocha*). They live in deep water in the *beel* and the river and like to remain in the mud. It

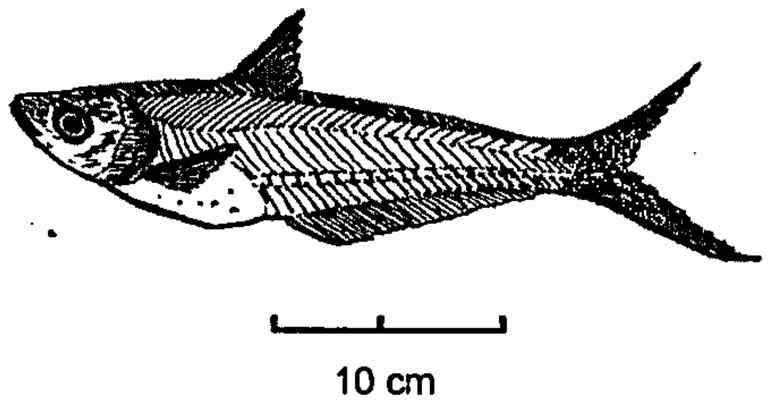
grows well during the monsoon because of the large amounts of food available at that time. This fish is easy to cultivate in ponds but the river and the *beel* produce the best fish.

It grows quickly in both the river and beel, although compared to other fish it grows quickly in ponds too. It is fond of *patka* 'vegetation', *sheola* 'molluscs' *katuripana* 'water hycinthe' tetulia pana 'vegetation' and *choto mach* 'small fish'.

It spawns in the month of *Baishakh*, and within fifteen days the egg produce fry.

The *mrigel* is less tasty than the *rui* or *katal*.

Bengali name: *Bacha*
Scientific name: *Eutropuchthys vacha*
Number of Variety:1
Introduce fish
This fish is white and grows to half a hand long. There are some similarities between *it* and the *gaira* fish. However, the head of the fish is smaller than that of *gaira*. It is little bit lighter in colour and flatter. It is scale-less and very slippery, and has three spines and *fair* 'fins'. It is not only found in the *beel* but lives in rivers where it stays mainly under water in the vegetation though it swims near the surface. It feeds on garbage and rotting vegetation. It grows quickly during the *barasha* 'monsoon'.



It spawns in Baishakh and Jaistaya and within twelve or fifteen days the eggs produce fry. It is full of oil and therefore flavoursome and commands a very high price in the market because it is an uncommon fish.

Bengali name : *Gaira mach*
Scientific name: *Clupisoma garua*
Number of variety:1
Indigenous fish

A white fish with three *kata* 'spines' in its body. Its features are is similar to *bacha* and *pangash* and its head is green and *maita* 'soiled colour'. It has no scales and is slippery. It grows to about one hand long. This fish is only found in the river, as they do not like the still water of the *beel*. It is difficult to catch this fish with small nets because it stays in deep water.

10 cm

They are abundant during the monsoon. It eats *abarjana* 'garbage', human stools and spit at their food and for this reason some people avoid eating it. The digestion capacity of the fish is very low, so undigested foods is still found when people open up its stomach. It spawns in the month of Ashar and is available until Kartic. Nonetheless it is tasty and full of oil.

Bengali name: *Shilong*
Scientific Name: *Slionia silondia*
Number of variety:1
Indigenous fish
Shilong is white and similar to *Ghaira* but has a smaller head. It grows to more than a hand in length, is scale-less, slippery and has three spines which are used in defence when one tries to catch it.

10 cm

Fishermen catch it in the *beel* during the monsoon but it is also found in the big rivers where it hides in the vegetation. It spawns in the months of Baishakh and Jaistaya and feeds upon garbage and weeds. It is full of oil and also very flavoursome.

Bengali name: *Jhatka* or *Ilish*
Scientific Name: *Hilsa Ilisa*
Number variety:1
Indigenous fish
A *rupali* 'silver fish'. People call it *Jhatka* when young and *illish* when fully grown.

6 cm

In the Charan region they do not grow more than a *dab* 'hand span' long before migrating away. Some people confuse it with *chapila* fish. The main difference

between *jhaitka* and *chapila* is that *chapila* has a few spots on its body which are not found on *jhaitka*. It is also fatter than *chapila*. It has small, round scales and it grows from one to five inches long. It is only available during the months of Ashar and Sraban in the river and *beel*. It arrives in the rivers as eggs two months before the monsoon. When these produce fry these only remain for two to three months. When water levels start to fall, they return to the *Jamuna* river. It totally disappears from sight after the monsoon.

Bengali name: *Guja kata*
Scientific name: *Aorychthys seenghala*
Number variety:1
Indigenous fish

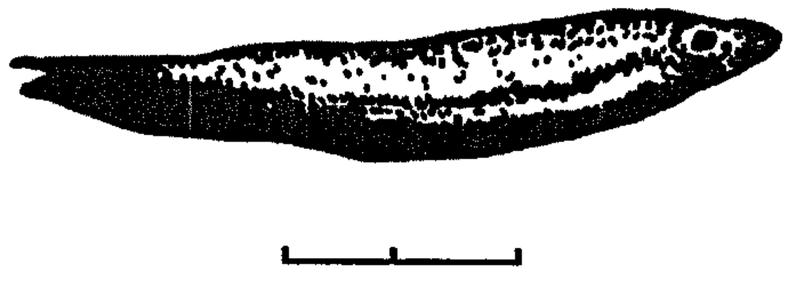
This fish is *sada* white with a *kalo* black and *shocto* hard head. It is *pichla* 'slippery'. It grows to less than a half hand long. It has two *faire* fins just behind its *kan* gill. These stabilise its *lej* tail when it swims. It has a very strong *kata* spine on its *pith* back which it uses to defend itself. There are many similarities between *Guja* and *Tengra* fish, the main difference between being that the *Guja* fish grows bigger to more than one hand of long.

7.5

They are found in rivers, rarely in the *beel* and *khal* canals. They prefer the bottom of the river. Clay is their main food, they sometimes eat other small fish. It

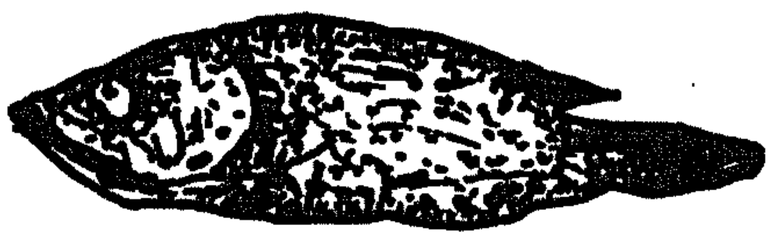
is a flavoursome fish. The *Guja* fish spawns in the month of Baishakh. After fifteen days the eggs produce fry.

Bengali name: *Gutum*
Scientific name*: Lepido cephalees geentea*
Number of variety:2
Indigenous fish
This fish is *maita sada* mixture of white and earthen colour: It does not grow large, a little longer than a *dab* 'hands span'. It is slippery and difficult to catch by hand.



It has two *kata* 'spines' close to its *mukh* 'mouth'. These stab people if they try to catch hold of the fish. It has tiny scales, not easily seen. There are two types, one is *gutum* and and the other is *ghora gutum. Ghora* means a horse, and people called it *ghora gutum* because of the horse like markings on its body. It is a little larger than the *gutum*. They both occupy the same depth of water and eat the same food. They burrow in the soil, which they eat (*mati khaora mach*), together with garbage. This fish is available the whole year. It spawns during the months of Jaistaya and Ashar. After fifteen days the eggs produce fry. *Ghora gutum* also stay in the same water depth and receive same food.

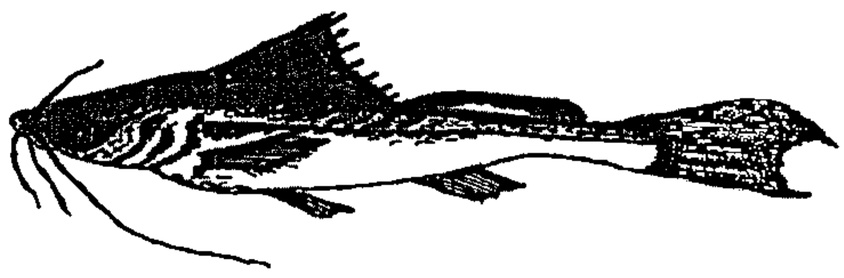
Bengali Name: ***Veda***
Scientific name: ***Nandus nadu***
Number of variety:1
Indigenous fish
A black fish. It has *chocha* scales like the *puti* fish. The body is *khas khase* dry like *balukhaika*, it can not escape from the grip. It is *chepta* flat and narrow and grows above a *dab* hand span in size. The mouth of this fish is stretches wider than its body. It is becoming a rare fish. It eats soil and *abarjana* 'garbage' sparingly. It spawns during the monsoon. The eggs become *bachaya or pona mach* 'fry' within 10 to 12 days. They grow quickly during the *barasha mash,* rainy season. It is available all the year. This fish is fond of dark water.



It prefers deep water, remaining at the bottom of the *beel* in the clay. This fish behaves like a fool, in that it does not swim away quickly when people try to catch it and so it is called *veda mach*, meaning 'stupid fish'. It is also called *lunda* mach.

Local Name: ***Airr***
Scientific Name: ***Mystus aor***
Number of variety:1
Indigenous fish
This fish is similar to *Guja* but larger, growing to approximately three and a half (*kata bana*) hands long. It is white with a narrow head and tall, and a round

body. It has three straight spines and three *fair* 'fins', two of which are beside the jaw and one before the tail. It is scale-less and has a slippery body.

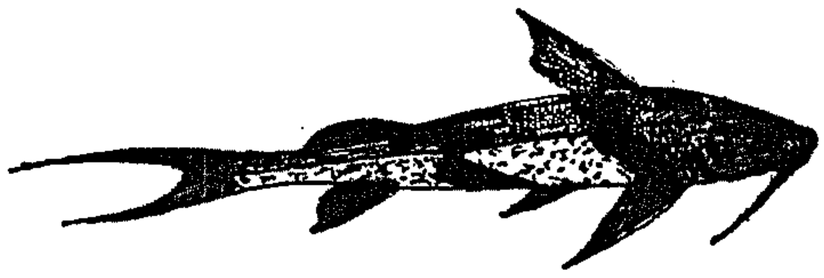


52.5 cm

It is, for the most part, found in rivers and large ditches. It feeds on soil and small fish. It grows quickly during Ashar, Srabon and Kartic. This fish is very strong and resists being caught. Fishermen catch it using *jhaki* and *ber jal* fishing gears. It spawns during the month of Chaitraya.

Local Name: *Baghair*
Scientific Name: *Bagarious bagarious*
Number of variety:1
Indigenous fish

This fish is similar to *Airr*. It is black with *dorakata* 'stripes' on its body. It has a hard, fat, flat head, no scales but a thick skin which is *khash khashe* 'dry' (this skin is removed before cooking). It grows more than ten hands long and the fishermen often rent a buffalo cart to carry the fish to the market. This is the largest fish that is seen in this area. It has three spines.

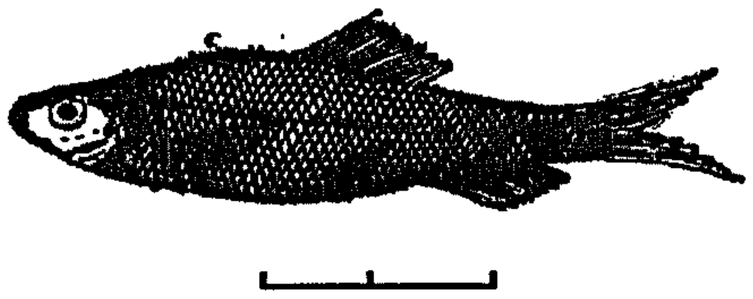


150 cm

Hindu people do not eat this fish as they think that it will bring misfortune upon them. It is found in rivers especially during the rainy season when it is plentiful and it feeds upon soil and garbage. It spawns during the months of Chaitraya and Baishakh. It is very strong but not difficult to catch because its body is *khash khashe* 'dry'.

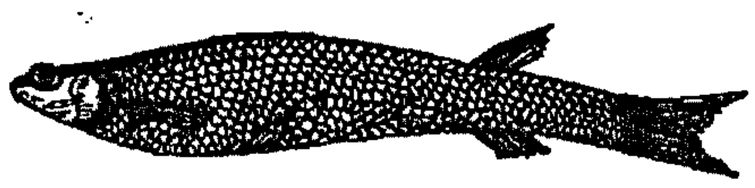
Local name: *Vangra*
Scientific Name:
Number of variety:1
Indigenous fish

Vangra is a very flavoursome fish similar to *rui.* It is called *dhuira* in its early stages of growth. It has a large, round body and grows to half a hand long. Its mouth is narrow and round with thin lips.



It has small with white narrow scales and five *fairs* 'fins'. In the past it was a fish of rivers, however nowadays people cultivate it in ponds (where it resides in the middle). It spawns during the months of Jaistaya and Ashar. Its favourite foods include husked rice, mustard cake and rotting weeds. It grows quickly during the months of Ashar and Sraban. It jumps to try to escape when being caught.

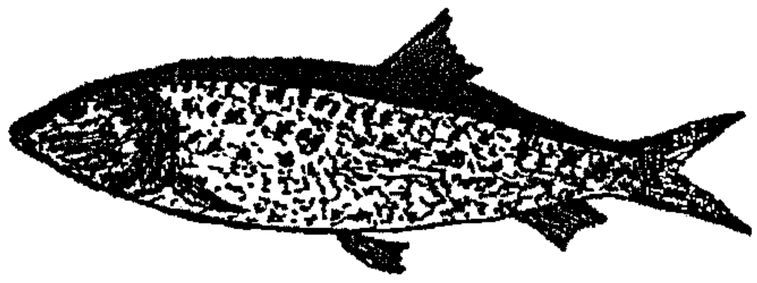
Local Name: ***Khosholla***
Scientific Name: ***Mugil corsula***
Number of variety:1
Indigenous fish
This fish is white and grows to approximately half a hand long. It is long and round with scales and two *fair* 'fins' on its head. It is similar to *bele* but its eyes are bigger and these are what locates this fish whilst fishing as it stays afloat, keeping its eyes above on the water's surface.



7.6 cm

It can leap like a frog and generally does not loiter in deep water for long periods. It can be found in both the *beel* and river and it feeds upon rotting straw, weeds and leaves. It spawns during the months of Chaitraya and Baishakh.

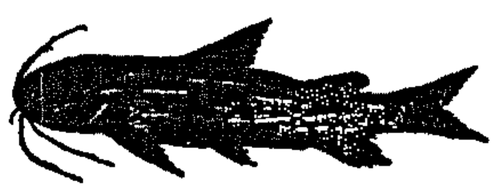
Local Name: ***Vol***
Scientific Name: ***Barilius bola***
Number of variety:1
Indigenous fish
Similar to *bele*, this fish is white with a round head and round, narrow body. It has five *fair* 'fins' and its scales are round and white. It grows to more than half a hand long and dies quickly if taken out of water. It is found in the sea but comes to the rivers during the rainy season, during which time it grows quickly.



7.6 cm

It spawns during the months of Chaitraya and Baishakh. It feeds upon soil and is known as '*khash khashe* ' (a sound which indicates dryness of the skin). It is very easy to catch because its body is not slippery, however it is not considered very good eating.

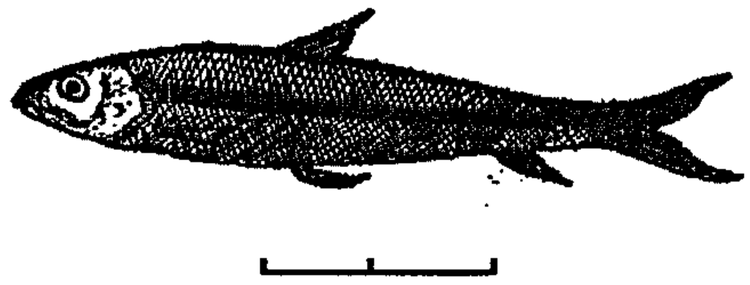
Local name: *Rita*
Scientific Name*: Rita rita*
Number of variety:1
Indigenous fish
Rita is black with a small, hard head. It grows *kata bana* (*dab* or a hand span). It has three spines and two *fair* 'fins' but no scales and so is slippery.



6 cm

It is found in the river in the *jungle* which it seems to prefer. It makes 'sounds' if someone tries to catch it. It spawns during the months of Chaitraya and Baishakh and it feeds on soil. It is a very flavoursome fish.

Local name: *Raikh* or *Tatkuni*
Scientific Name: *Cirrhinus sophore*
Number of variety:1
Indigenous fish
This is a white fish with black spots on its stomach. It is called *tatkuni* in its early stages of growth and *raikh* when it is. It grows to about ½ hand long and its growth is gradual.

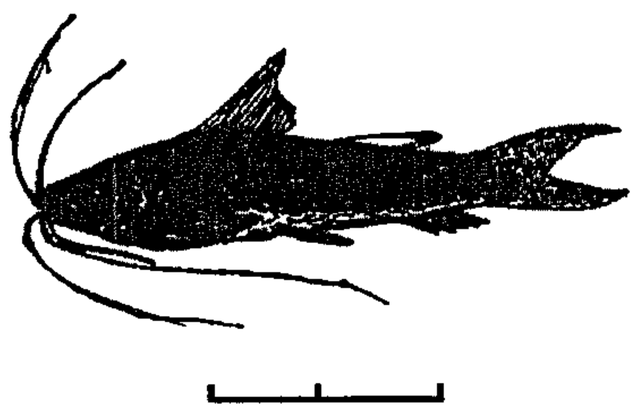


7.6 cm

It has five *fair* 'fins', two of which are on its front side, one on the back and the others on the stomach. It is covered with scales and is a little slippery. It is found in both the *beel* and river but rivers are the main source for this fish. It is found during the months of Vadro and Ashin. It can leap more than three feet high and is very strong. It spawns during the months of Baishakh and Jaistaya.

Bengali name: *Guita*
Scientific name:
Number of variety:1
Indigenous fish

There are some similarities between *guita* and *tengra*. They are difficult to distinguish when young. *Guita* turns *lalche* 'redder' when it grows. It is smaller



and shorter. They both have three *kata* 'spines', which are venomous and cause considerable pain. They remain in deep water. They are uncommon in rivers, because of their currents. They prefer still water. Aquatic weeds, small fry and mud are their main foods. They spawn before the monsoon. They are easy to catch during the *uinnamash* 'dry season'.

5.3.3 *Gura mach*

All *gura mach* are very popular with the Bengali people. They are small fish and do not grow more then two or three inches. They are called *nayali mach* 'new fish' as they arrive at the beginning of the monsoon. Villagers go to catch *gura mach* for themselves when they arrive with the monsoon flood. Sometimes fishermen distribute them among the villagers free if the catch is plentiful. These are very flavoursome fish and highly preferred. They demand high prices in the market when the monsoon ends. The fishermen of Charan think it increases *chokher dristi barai* 'vision power'. It is thought that *gura mach* is one of the main sources of vitamins. Local people became aware of this through the Awareness Building programme of the government.

Fig.5.5 *gura mach*

Local name	Scientific name	Size	Ecology	Demand	Month of spawning
Chela	*Chela cachius*	1 finger	*Beel* river	High	Chaitraya Baishakh
Icha	*Macrobrachium styliferus*	< 1 kara	*Beel* Surface water	Medium	Monsoon
Chatta	*Nemacheilus botia*	3 inches	*Beel* River Upper reaches	Meium	Jaistaya
Rani	*Botia dario*	1 finger	*Beel* River Deep water	High	Jaistaya Ashar
kajali	*Ailia coila*	1 finger	River *Beel*	High	Baishakh
Batai or Batashi		5 fingers	River *Beel* Deep water	High	Jaistaya Ashar
khalisha	*Colisa sota*	1 angul	*Beel* River Deep and mid water	High	Baishakh Jaistaya
Baila	.*Glosogobius*	1 angul	River	Medium	Jaistaya

	giurus		*Beel* Deep water		Ashar
Napitkai	*Badis badis*	½ angul	River *Beel*	Low	Chaitraya Baishakh
Chanda	*Chanda baculis*	1 finger	River *Beel* Surface	Medium	Jaistaya-Ashar Agrahayan-Poush
Kechki	*Coricasoborna*	> 2 kara	River *Beel* Surface water	High	Chaitraya Baishakh
Tengra *a)sada gulsha* *b)boga gulsha* *c)tengra*	*Mystus vittatus*	> 1 dab	River *Beel* Deep water	High	Jaistaya Ashar
Mola	*Amblypharyngo don mola*	2 inches	River and *beel*	High	All year
Dhela or Dheilka		2 inches	river	Medium	Jaistaya, Ashar and Sraban
Ghora kata	*Lepidocephalus guntea*	> a finger	River	High	Baishakh and Jaistaya
kara puti		> 1 angul	*Beel* River	Medium	*Monsoon*
Bagha Puti		1 inch	*Beel*	High	Chaitraya
Tit puti		1 inch	*Beel* And river	High	All year

Bengali name: *Chela fish*
Scientific name: *Chela cachius*
Number of variety:1
Indigenous fish

A thin white fish. It is similar to the *chapila* and *gang chela*. The *chapila* is a little *ferik* 'flat' and whiter. The *gang chela* is *digla* longer. It grows to one finger long.

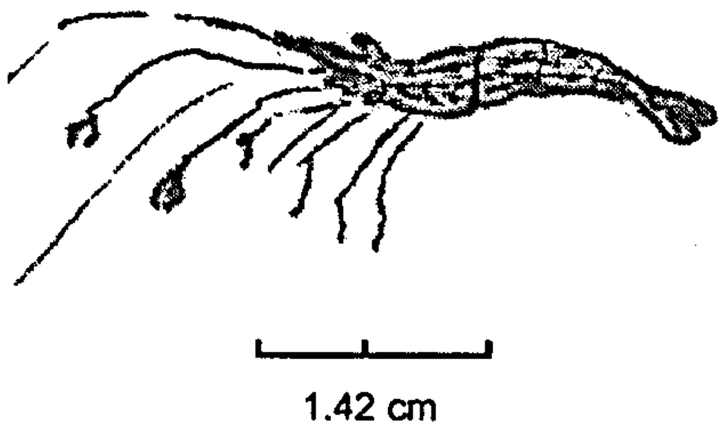
Those found in rivers called *gang chela 'chela* of river' grow larger.

2.1 cm

They like clear water, although in the monsoon they have to tolerate turbid conditions. *Chela* eats very small aquatic weeds. Large shoals of *chela* are found during the monsoon, like the large expanses of water. The numbers decline in the dry season. They spawn during Chaitraya and Baishakh. Eggs producing fry fifteen days.

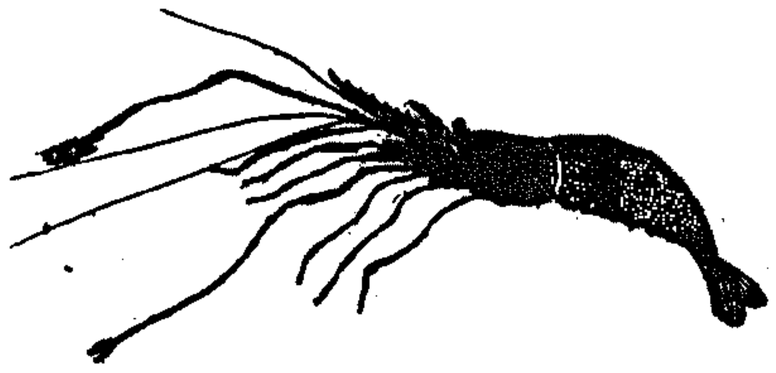
Bengali name:*Icha or Chingri*
Scientific name: *Macrobrachium styliferus*
Number of variety:2
Indigenous crustacean
This crustacean passes through two named stages 1.*guri icha* 2.*Gaita icha*.

During *guri icha* it is very small and white. It stays hidden under aquati vegetation, favouring particularly an aquatic *beel* weed called *sam*. It likes to be near the surface. It is common during the Monsoon when it spawns.



In the *gaita icha* stage the crustacean is large and turns black. It prefers to hide under the *bala* 'hanging roots' of the water hyacinth. It is also found on the bottom of water bodies. It has two *hat* 'appendages' by its two *pakhna* 'fins'. It uses these organs to hold (*chengi dewa*) on to things. It can escape from a person's grip by forcing its way out with these. It has no scales. It is bloodless,

though some people say that it has *sada* 'white' blood. Sometimes it is found in rivers, where it grows very big. It eats small insects and weeds. It is not very tasty and fetches a low price in the market. This crustacean dies quickly after being caught and taken out of water. Fishermen keep it on the tan 'platform' in a boat, otherwise it will rot.



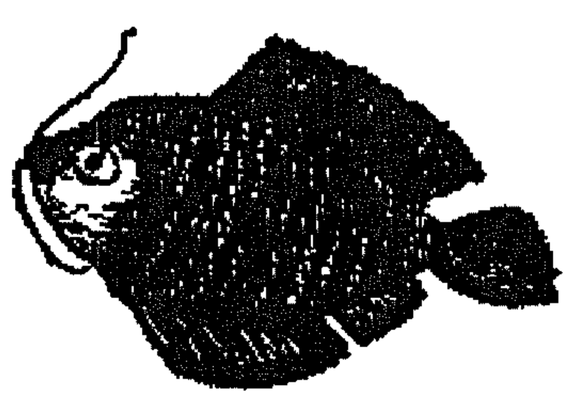
1.42 cm

Shada icha: This crustacean is white and found in the river. It grows to one hand long. The tentacles of the crustacean also grow more than one hand. It is often confused with *gaita icha* during its early stages of growth. The *shorer* 'structure' of all *icha* is the same except for differences in size and colour. It stays hidden in the vegetation in the river and feeds upon soil and stools.

Bairagi icha: This white crustacean is very small (only growing to one inch long) and so is also called *khudi Icha* 'small *icha*'. It is found in both the *beel* and the river but is mostly in the *beel.* It is plentiful during the month of Kartic but not during the monsoon. It spawns twice annually and feeds mainly upon garbage.

Bengali name: *Chatta*
Scientific name:
Number of variety: 1
Indigenous fish
Similar to the *khalisha* fish, but smaller. This fish has a *khas khase* 'rough' feel. It

only grows two to three *inchi* 'inches' long.



3.1 cm

It is flat and blue and black in colour. Its scales are comparatively large and closely packed. The *Chata* likes to hide under aquatic vegetation in shallow water. It prefers still water and is found in the upper reaches of a water body. It is abundant during the rainy season. It grows rapidly in the monsoon waters.

It spawns in Jaystaya. The eggs do well in rainwater, producing many fry. The *chatta*, like the *chingri*, dies quickly out of water, and fishermen put them on the *tan* 'platforms of the boat' because the dead fish start rotting if it kept in water.

Bengali name: *Rani* (lit.Queen)
Scientific name: *Botia dario*
Number of variety:1
Indigenous fish
A very colourful fish with stripes of white, black, red, green and other colours.

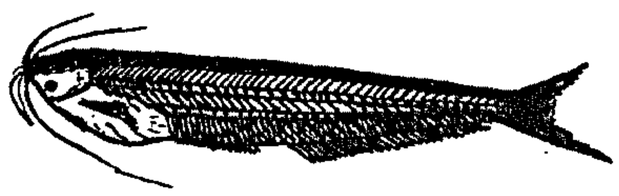
This fish look decorated like a bride, so some people call it *bou* mach 'bride fish'. Some people also call it *betrangi* 'meeting of many colours'. It is famous for its beauty. It has no scales.

2.7 cm

It has *bijal* on its body which makes it slippery. It is similar to *karfu* but *karfu* grow much larger. It grows only one finger long. It likes deep water. Weeds and refuse are its main food. It spawns during the Jaystaya and Ashar, eggs becoming fry about fifteen to twenty days later. It grows quickly during the monsoon. It prefers the open water of the *beel*, but is also found in rivers. It loiters in large water bodies like *beel* and *chawk*. It goes to the river during the dry season. It is a very tasty fish and it has a similar taste to *karfu*. Its numbers are presently declining.

Bengali name: ***Kajali***
Scientific name: ***Ailia coiler***
Number of variety:1
Indigenous fish

A beautiful white fish. This fish is very narrow, has no scales or spines and is slippery. It has red lips and is similar to *sada pabda.* It grows up to one finger long. It is found in the *beel* during the *borosha* 'monsoon' and in rivers all year round.



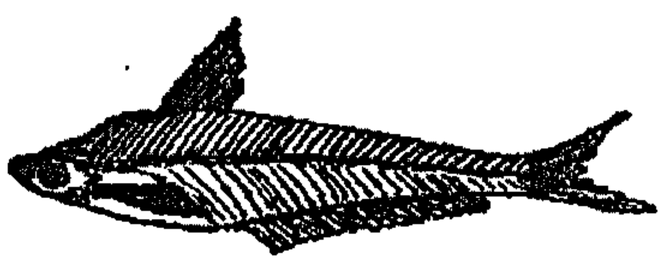
2.5 cm

It prefers *gavir* 'deep' water and for that reason is not found in the *beel* during the *unna mash* 'dry season'. It is a weak fish (*shockti kom*) as it dies as soon as it

taken from the net. It eats small snails. It spawns in Baishakh, fry hatching in Jaistaya and Ashar. It is very flavoursome. Numbers of this fish are now declining compared to those in the past.

Bengali name: ***Batai, Batashi***
Scientific name: ***Pseudeutropus atherinoids***
Number of variety: 1
Indigenous fish

A thin and lightweight fish with three spines on its body. It grows up to one finger long. It found in both the *beel* and river. When found in the river it is white, whereas in the *beel* it is black.



2.7 cm

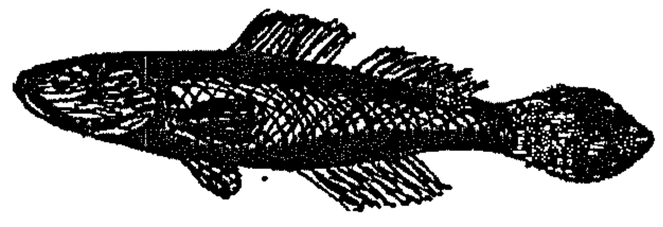
It likes to stay in side the *ghona* 'bend' around the edge of the *beel* where there is a current. This makes it easy to locate and catch all the year round. They spawn in Jastaya or Ashar, and the fry hatch within twelve days. They like to stay in deep water. They grow well during the monsoon because of the wide variety of food available. Insects, sediment and leaves are their main food. People say this fish has higher amounts of vitamins and has a high nutritional value. It is very expensive because of this and the demand for it in the market is great.

Bengali name: *Khalisha*
Scientific name: *Colisha fasciatus*
Number of variety:1
Indigenous fish
It is a *khato* 'short' and *chepta* 'flat' fish. It is black and white. There are some similarities between it and the *puti, chatta* and *koi* fishes. It is larger than the *chatta* and smaller than the *koi*. Its head is larger than that of the *puti* fish.

2.7 cm

Two large *dari* 'barbells' on the face help to identify it. It grows about *ek angul* 'one finger' long. It moves between the surface and medium depths of water. It seeks for shallow water and likes to swim in aquatic vegetation. It avoids stream currents. It eats insects, grasses and sediment. It grows fast during the *borosha mash* 'monsoon'. It spawns during Baishakh and Jayastaya and the eggs produce fry within fifteen days.

Bengali name*: Baila or Bele*
Scientific name*: Awaous stamineous*
Number of variety:1
Indigenous fish
It is *maita* 'soil coloured. It is *khas khasa* 'dry' not slimy. It has many *chocha* 'scales' It is different to many other fish and so is easy to identify. It grows no more than one finger long.



2.32 cm

The word baila means 'full of sand'. This fish is fond of *balu* 'sand' and is found on sandy areas under water. Sand is its main food. Another name for it is *balu khatkhatani* 'sand grating-sound' (the sound made when sand particles are rushed together). It spawns in Baishakh, the eggs hatching into fry in the months of Jastaya and Ashar. This fish is not tasty. It contains little blood.

Bengali name: *Napit Kai*
Scientific name: *Badis badis*
Number of variety:1
Indigenous fish
A *khub kala* 'deep black' fish. It looks like the *deshi kai* but much smaller in size (*khub choto*). It grows only up to half a finger long. It is considered ugly and so people avoid eating it.

1.35 cm

It is fond of sheola 'molluscs' and *pacha lata* 'rotting weeds'. It spawns during the Chaitraya and Baishakh, and after fifteen days fry hatch from the eggs. They are common during the *baishaya mash* 'monsoon', migrating from rivers to *beel* in large numbers.

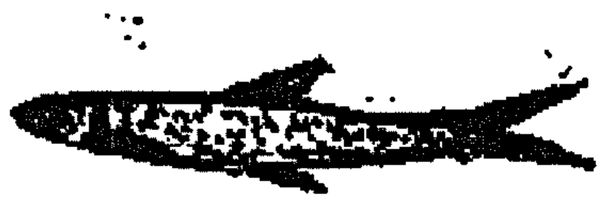
Bengali name: ***Chanda***
Scientific name:*Chanda ranga hamilton*
Number of varities:3
Indigenous fish

There are three types of Chanda mach in the Charan region; 1.*lalachanda* (red *chanda*), 2. *Sada Chanda* (white *chanda*) and 3.*Digla Chanda* (long *chanda*). The *lal Chanda* is also rounder in shape. They all grow only to one finger's phalanx long. The *lal chanda* like *jhar jangal* 'under water vegetation'. It swims around in shallow water. The *digla* and *sada chanda* prefers stream currents. They keep near the water surface. They grow rapidly during the months of Ashin and Kartic.

0.90 cm

They eat aquatic plants and molluscs. All three *Chanda* varieties spawn twice a year, once in the months of Jastaya and Ashar and again in Agrahayans and Poush. Their eggs are like *balur kana* 'sand particles', and take twelve to thirteen days to turn into fry. The *Chanda* fish is not flavourful and so is cheap at the market.

Bengali name:*Kechki*
Scientific name: *Korika soborne*
Number of variety:1
Indigenous fish
A silver fish, similar in head and shape to the *chela mamch*, except that it is smaller, both thin and short. It grows less than *dui kara* 'two phalanxes' of a finger. *Kechki* has very small scales.

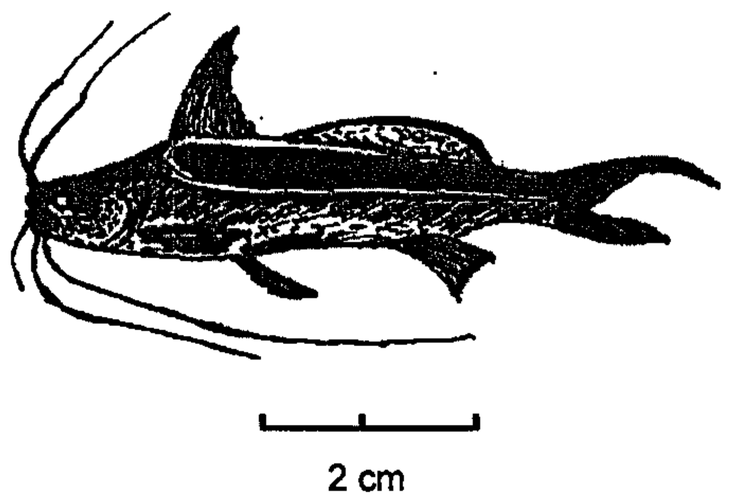


1.53 cm

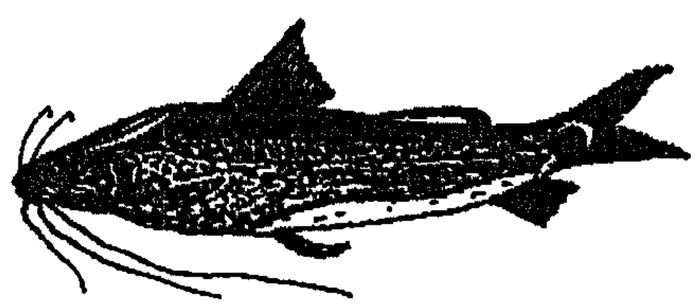
It is rounder than the *chela* fish. It likes the foam on the surface of rivers and rotting material. It is common in rivers near the surface. It arrives in the *beel* with the new water of the monsoon floods, and when water levels go down it goes back to the rivers. A *ghon jal* 'fine mesh' is required to catch it as it escapes all other nets because it is so small. It moves in-groups and likes to stay in large water bodies. It spawns in the month of Chaitraya and baishakh, eggs producing fry in Ashar. It survives only a very short period if removed from water.

Bengali name: *Tengra*
Scientific name:*Chandramara chandramara*
Number of variety:3
Indigenous fish
Three types of *tengra* mach are found in the *Charan* locale: 1.*Sada tengra* 2. *aira tengra* and 3. *Tila tengra*. Some people claim there are more varieties of *tengra* called: *boga gulsha, sada golsha, tengra, guita tengra, kara baija, golsa tengra,*

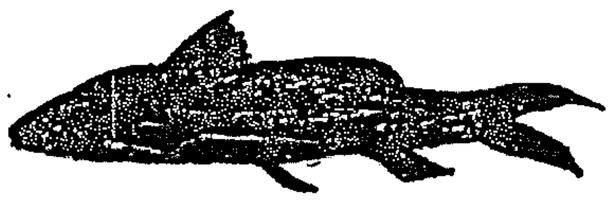
naila tengra. Some of the terms may be synonyms. These fish are available all year.



Sada gulsa is the largest *Tengra mach*. It grows to less than one one half fingers long. It is *sada* white, hence its name. It has three *shocto kata* 'strong spines'. The *baga gulsa* (*baga* means stork) little darker not *halud* or *sheola*. The *aira tengra* has a yellow stomach (*holud peitta*) the rest of its body *sheola ranger* 'green'. It has an elongated mark along the middle of its body. It does not grow more than one finger long.



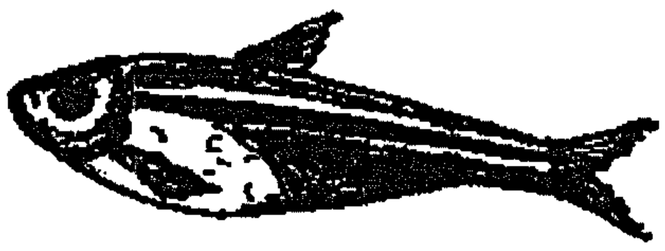
These fish prefers rivers. This is why they are also called *gang tengra* (*tengra* of the river). They can survive only in deep water. They stay on the bottom. Small snails and the *lal pocha* red insect are their main foods. They eat mud and soft weeds. They spawn in the month of Jaistaya and Ashar. The eggs produce fry within 10-12 days. They grow from the month of Sraban to Agrahayan. They do not grow during the winter months.



2 cm

Common characteristics of *tengra* are that they have no scales. All are bearded (*dari ache*). They are very slippery. They have two strong *kata* spines. The head is hardish, like the *gojar*. All varieties of *tengra* like to stay together in a shoal at the same place except for the *sada tengra*. They prefer to stay in clear water. *Tengra* prefer to stay hidden under aquatic weeds. They are flavourful fish.

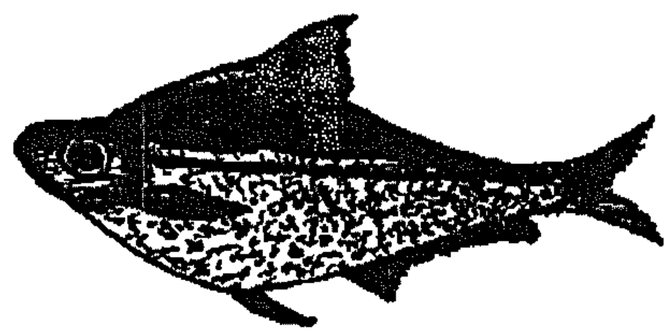
Local Name: *Mola*
Scientific Name: *Amblypharyngodon mola*
Number of variety:1
Indigenous fish
It is *maita jatio* 'soil coloured'. Body of the fish is *norom* 'soft'. It grows about two inches long. Its scales are very small and soft. It is mostly found in the month of Ashin and Kartic.



2 cm

In the *uinnamash* 'dry season', it is found inside the *doho* 'whirlpool' in the river. It is available around the *ghona* in the *beel*. During the month of Vadro, it moves around the surface water and makes a noise with its mouth. It grows very slowly and spawns all year round. It feeds on grass.

Local Name: ***Dhela or Dheilka***
Scientific Name:
Number of variety:1
Indigenous fish
This fish is white and has a slightly wider body than *mola*. It is round and the body is much wider than the head. It grows to two inches in length. Its scales are very soft and not slippery and it has four *fair* 'fins'.



2 cm

It is available only in Vadro, Ashin and Kartic. It prefers rivers and stays in deep waters where there is a *dhala* 'current'. This fish dies quickly when it is taken out of water. It spawns twice a year in Jaistaya-Ashar and Sraban. All these fish do not spawn at once and they release only mature eggs.

Local Name: ***Ghora kata***
Scientific Name: ***Lepidocephalus guntea***
Number of variety: 1
Indigenous fish
This fish is similar to *tengra*. It is white and has three black spots around its head. It grows a little more than two *kora* 'finger phalanxes' long and has no scales.

1.42

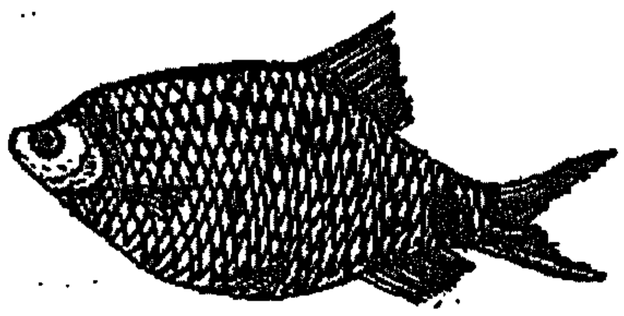
It has three spines on its body. These are always kept straight and people get hurt if they try to catch it with their bare hands, as any wound causes great pain. It is full of oil and very flavoursome. It is mostly found in the river during Ashar and Vadro and it spawns in the months of Baishakh and Jaistaya.

Bengali name: *Kara Puti*
Scientific Name:
Number of variety:3
Indigenous fish
It is shonali 'golden' coloured with a red spot on its gills which people say is the fish's *shari*. It prefers the light. When take taken out of the water it only survives for a very short while.

0.96 cm

The *puti* is not very tasty and so is cheap in the market. Some *puti* varieties have disappeared from the *Charan* region. One variety called *deshi sharputi*, disappeared, people say, after the devastating floods of 1988.

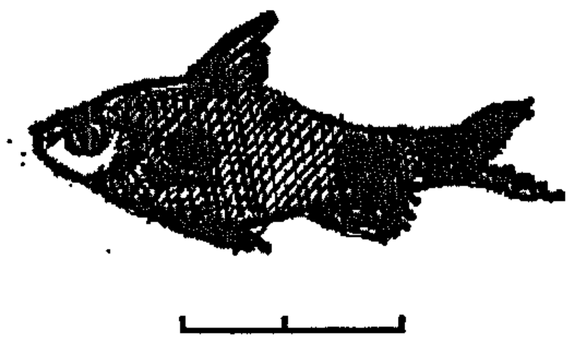
Local name: *Bagha Puti*
Scientific Name:
Number of variety:1
Indigenous fish
This black fish grows to approximately one inch long. It looks similar to *jatputi* but is rounder and flatter and has a smaller mouth. It has many scales and its body is *khas khasa* (a sound which indicates dryness).



0.96 cm

It has five *fair* 'fins' two of which are beside the head and the others are on the underside and back, (like all fish it has a *navi* 'navel'). It can be found in the *beel* during the month of Ashin as it prefers shallow water. It spawns in the month of Jaistaya. Its diet consists mainly of grass and garbage. It excretes and spawns from its underside.

Local name: *Tit puti*
Scientific Name:
Number of variety:1
Indigenous fish
Tit puti is similar to *jat puti* but slightly smaller, growing to only one inch in length. It has a few spots on a very soft body which has small, soft scales. It has five small *fair* 'fins'.



1.3 cm

It moves around the surface of the water and prefers to stay in shallow water such as paddy land during the rainy season. It feeds upon rotting grass, weeds and soil. It spawns all year round and grows very slowly.

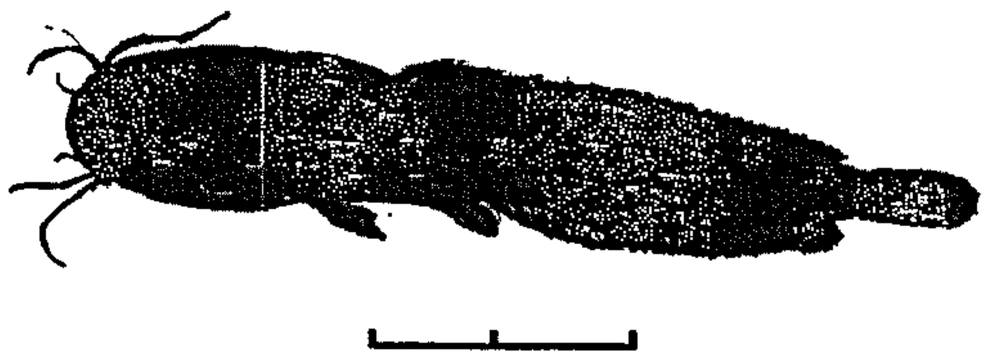
5.3.4 *Pagaira, chawker mach* 'fish of ponds and *chawk*'

This category refers to all introduced fish. These are cultivated in ponds and occasionally on the *chawk* when villagers arrange a common fishery during the monsoon. Some of the fish also escape into the *beel* with the monsoon flood. People also cultivate some indigenous varieties, which they do not put in this category. Sellers from distant districts come along with fingerlings from the hatcheries to sell the pond owners for cultivation. According to people these fish are healthy, full of *mangsho* 'meat', but are not very flavoursome compared to the indigenous varieties. Pond owners cultivate them mainly for business purposes.

Figure: 5.6 cultivated fish

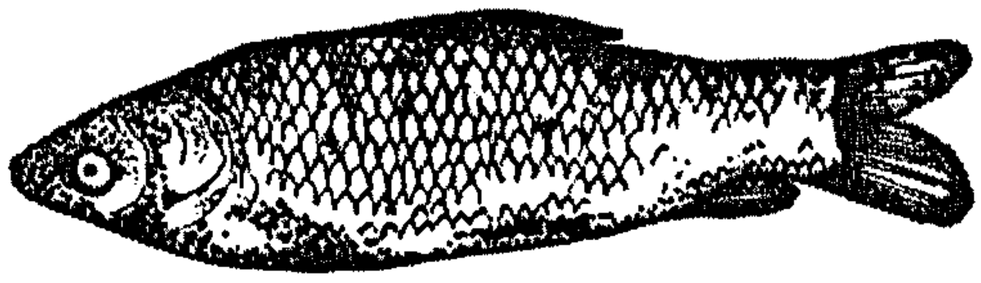
Local Name	Scientific name	Size	Ecology	Demand	Month of Spawning
African magur	*Clarius goriepinus*	2 ½ hands	Pond	Medium	Not known
Grass carp		½ hand	Pond Upper water	Medium	Baishakh
Karfu	*Cyprinus carpio*	½ hand	Pond	Medium	Baishakh
Cross		<2 hands	Canal *Beel* mid-depth	Medium	Baishakh
Silver carp	*Hypophihalm hthysmolitri*	½ hand	pond	Medium	Chaitraya Baishakh
Thai Shorputi	*Puntius sarar*	½ hand	Pond Rivers *Beel*	Medium	Chaitraya and Baishakh
Pangash	*Pangasius pangasius*	3 hands	Pond	High	Chaitraya
Telapia		< dab	Pond mid-depth	Medium	Whole year

Bengali name: ***African Magur*****:**
Scientific name: ***Clarius goriepinus***
Number of variety:1
Introduced fish
It is *maita ranger* 'soil coloured'. There are some marks *(fota fota dag*) on the body of the fish. The head is hard, and has two spines. It grows bigger than the *deshi* 'indigenous' *magur,* otherwise they are similar to each other. The head of African magur is a little larger and wider.



People keep it in ponds. It is not found in the *beel* and river. Cultured in ponds for a long period it grows to two and a half hands long. It is omnivorous. People feed it the blood of slaughtered cattle. It is dangerous when it grows large as it eats all the other fish in the pond.

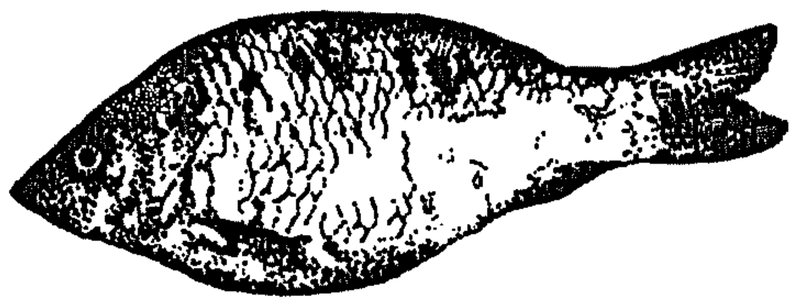
Bengali Name: ***Grass carp***
Scientific name: ***Ctenopharyngodon idellus***
Number of variety:1
Introduced fish
There are some similarities between *mrigel* and *grass carp*. The main difference is that the fin on the back (*pither upare fair*) of the *mrigel* is smaller. The grass carp is small headed (*choto matha*), and grows to half a hand long.



They are slow moving and sluggish. They eat grass, jumping from the water to bite off grass over hanging banks. Farmers cultivate them in paddy fields and also ponds. Nowadays it is also found in the *beel* and river. They spawn during the month of Baishakh.

3. Bengali Name: *Karfu mac*
Scientific name: *Cyprinus carpio*
Number of variety:1
Introduced fish

This fish look similar to the *katla* but it is red and yellow whereas the *katla* is *pit ranga* 'bluish' when mature. A few fishermen claim that it is similar to *rui* but the main difference is that *rui* grows longer and *karfu* becomes rounder. Its head is smaller than its body and it is full of oil. They grow over half a hand long. There are two types of *karfu* fish.



Both are scaly, especially around the tail (*lejer dike*) area. People cultivate them in ponds. It was introduced into this area twelve years ago. They are rarely found in the *beel*. It feeds upon mustard cake, husked rice and green grass. It stays at lower levels of water. A *karfu* fish can grow to as much as three or four kilograms. It spawns eggs usually during Baishakh, and the eggs produce fry within fifteen days.

Bengali Name: ***Cros mach***
Scientific name: Unknown
Number of variety:1
Introduced fish
It is white, with a slightly darker back. This fish is said to be a cross between the *rui* and *katla*, hence it is called the 'cross' *mach*. According to fishermen human have created it. They think Fisheries Department staffs are responsible. It eats small aquatic plants, rotting waste and grass. It moves around in the mid-depths of a water body. It spawns in the month of Baishakh, eggs producing fry which grows in the rivers and canals during the monsoon.

Bengali Name of the fish: ***Silver Carp***
Scientific Name: ***Hypophthalmichthys molitrix***
Number of variety:1
Introduced fish
It is *rupali* silver in colour. The *pith* 'back' portion is *badami* 'brown. It grows half a hand long. This fish has some similarities with *mola* fish *at the early stage. The colour distinguishes it from the mola since the* mola fish is different in colour.

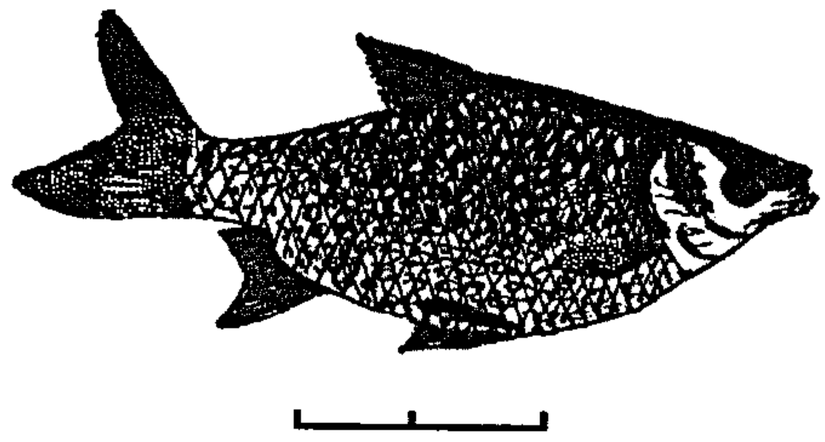
7.03 cm

The middle portion of this fish is the widest it narrow towards the rear. People cultivate them in their ponds. *Kacha ghas* 'green grass', *kura* 'rice husk' and sheola 'mollusc' are their main food. It spawns in Chaitraya and baishakh and the eggs hatching to fry within fourteen days.

Local Name: ***Thi shorputi***
Scientific Name: ***Puntius sarana***
Number of variety:1
Indigenous fish
This is a white, flat fish. Its head is small compared to its body which is slippery.

It grows more than half a hand. It has scales, five *fair* 'fins' and is very strong. It

can leap and does so to escape the net.

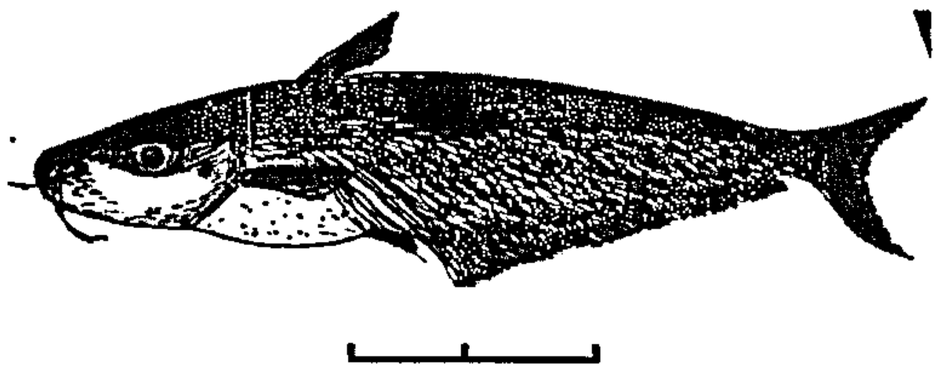


7.66 cm

This fish was imported by the fisheries department from Thailand and so it is called *thai shorputi*. It is cultivated in ponds only. It spawns in the months of Chaitraya and Baishakh. People collect the fingerling of the fish (from the hatchery's people) during the month of Chaitraya. Its main diet consists of mustard cake, husked rice and grass. It is a very flavoursome fish.

Local Name: ***Pangas***
Scientific Name: ***Pangasius pangasius***
Number of variety:1
Indigenous fish
The *pangas* is long, fat fish and flat with a hard head of which the upper part is

fatter then the lower part. It has three *kata* 'spines', one on the back and two beside the head. It is very slippery as it has no scales.

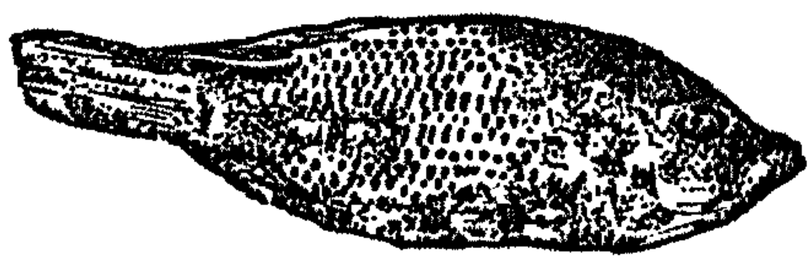


37.5 cm

It is very strong and wriggles strongly if anyone tries to hold it in their hands. It comes from the sea where it grows to two or three hands long. Nowadays, people cultivate it in ponds where it does not grow so large. It has never been seen in a river or *beel*. It feeds on small fish, leaves and soil and spawns during the month of Chaitraya.

Bengali Name of the fish:*Telapia*
Scientific Name:*Oreochromis mossambika*
Nuber of varieties: 1
Introduced fish

A *goal* 'round' fish, *badami* 'brown' in colour. It grows more than *dab* 'hand span' long. People call it *gama gota* when young after the small seed of the *gama*. It gives off a bad smell when young. The Fisheries Department introduced this fish. People cultivate it in the ponds. These fish prefer the mid-depths, but sometimes swim near the surface of the pond. They sometimes escape, but are found rarely in the *beel*.



6 cm

It lays eggs all years, and keeps these in its mouth. When the hatch they release the fry into the water. They are fond of *kura* 'rice husk' and rotting weeds. People do not like the taste of this fish.

5.3.5 *Na kahuinna mach* 'Uneatable fish'

There are certain fish that fishermen usually throw away if caught. Not only fishermen, but most people also decline to eat certain fish. They do not eat them because they think they are very inferior types of fish. They say that these fish are totally taste less, so their forefathers used to avoid them. Recently some poor people in the village have started eating these fish.

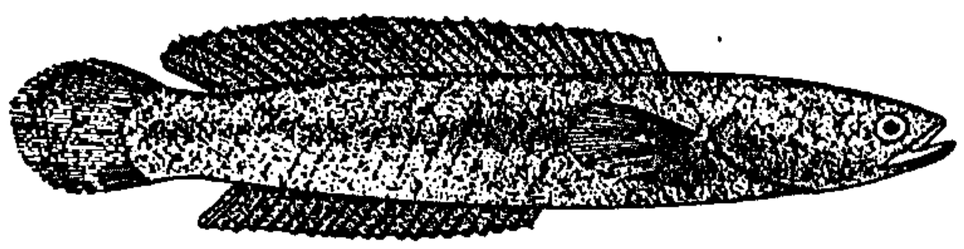
Figure:5.7 Inedible fish

Local name	Scientific name	Size	Ecology	Demand	Month of spawning
Raga		½ hand	*Beel* Surface water	Low	Baishakh
Pachchoikha	*Apolochelius panchax*	< *dab*	*Beel* Surface water	Low	Baishakh
Bamoch	*Anguilla bengalensis*	1 ½ hands	River Beel	Low	*Unknown*
Darkina	Esomus danicus	< a inch	Shallow water	Low	Baishakh-Jaistaya
Debry		< a finger	Rivers and *beel*	Low	Chaitraya and Baishakh
Potka Or tepa	*Tetradon cuticaria*	1 angul	River Beel	Low	*Baishakh*

Bengali name: *Raga*
Scientific name:
Number of variety:1
Indigenous fish

There are some similarities between *raga* and *taki* fish. The main difference is that the head of the *raga* is fatter and whiter (*mota ar sada*). *Raga* is black and *mete shada* 'soil white'. It grows long like the *taki*, up to half a hand long. It has small, with round scales and a very hard head. It looks very ugly because of its fat head and for this reason many people refuse to eat it. Only a few poor

Muslims eat this fish. It is forbidden to Hindus as they think it would invite misfortune. It is common during the monsoon.

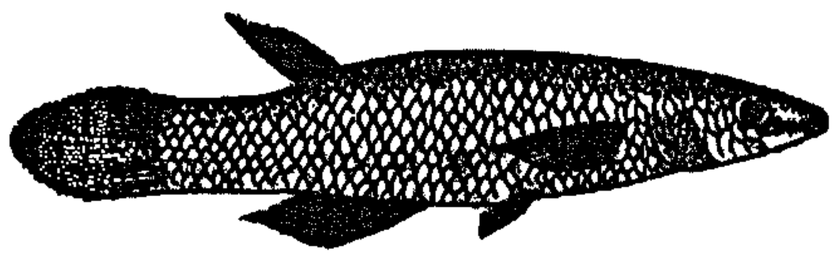


7.66 cm

It is found in the *beel*, river and ponds. It lives in still water. It eats surface water insects, also small fry. It jumps if taken out of water. It spawns during Jaistaya and within a week these eggs produce fry.

Bengali name: *Pachoikhaya*
Scientific name: *Apolochelius panchax*
Number of variety:1
Indigenous fish

It is *mete ranger* 'soil coloured'. It grows more than a *dab* 'hand span long'. There are again some similarities with *Taki*. The main difference is that *taki* are all black, whereas the *char choikha* has some white *fota* 'spot' on its head so it is called *char choikhaya* 'five eyed'.



7.66 cm

It floats near the water surface. It is easy to catch by hand. They eat rotting material (e.g.*abarjana*). They spawn in *Baishakh*; eggs producing fry within ten days.

Bengali Name: *Bamoch*
Scientific Name: *Anguilla bengalensis*
Number of variety:1
Indigenous fish
Translucent like water (*jaljala*), this fish is long and thin like a snake, but it has no

bishdat 'venomous fangs'. Its head and tail also resemble those of snake. It grows one and one half hand long. It is covered with *bijal* 'white slippery jelly.

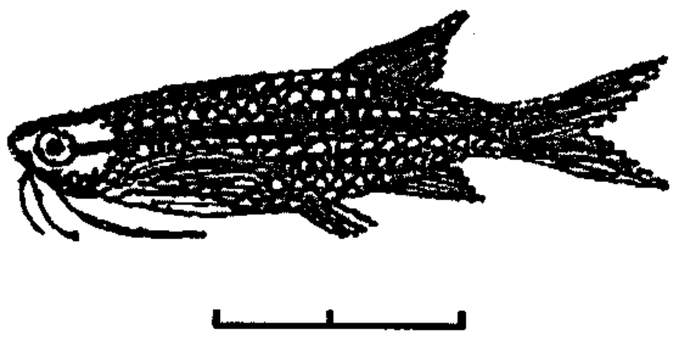
It is only present during the monsoon. It is a fairly new fish in the *Charan* region. No one eats the fish because it confused with a snake. It eats small aquatic

plants. People say that they do not know about its breeding period.

Local Name: *Darkina*
Scientific Name:
Number of variety:1
Indigenous fish
This fish has a long head and a thin body. Its colour depends upon the water it is

in. It seems to prefer small, shallow water bodies consisting of '*ghola pani*' turbid

water in which it appears black and white.

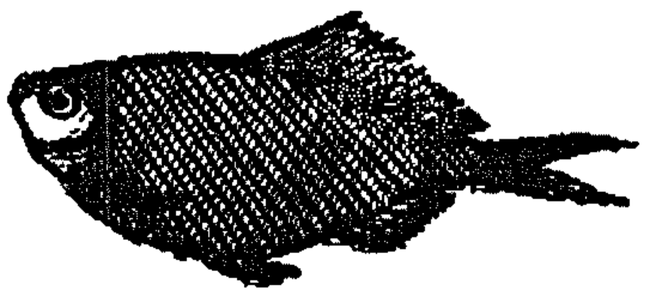


It grows to only one inch long, has very soft, small, scales and dies if one touches it. It feeds on garbage and is for the most part seen during the rainy season. It spawns in the months of *Baishakh* and *Jaistaya*.

Local name: *Debry*
Scientific Name:
Number of variety:1
Indigenous fish
The *debry* is a white fish with golden spots on its body. It grows above one inch.

Its scales are small and round and it has five *fair* 'fins'. It is similar to *bagha puti*

but is much flatter.

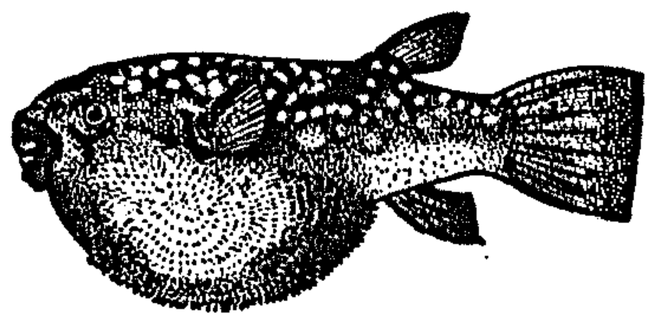


1.04 cm

It loiters on the water's surface in both rivers and *beels*. It can leap a short distance out of the water. It spawns during the months of *Chaitraya* and *Baishakh* and grows quickly in *Sraban* and *Vadro.* It feeds upon leaves and weeds and some people refuse to eat it as they think it feeds upon human spit.

Bengali name:*Potka* or *Tepa*
Scientific name: *Tetradon culculia*

Number of variety:2
Indigenous fish
The back of this fish is *sheola ronger* 'green' and the underside is white. It grows more than *ek angul* 'one finger' long. It has two *dat* 'teeth'. It puffs it self up with air like when taken out of water, blowing up its stomach like a football.



2.5 cm

The head looks tiny when its blows itself up. It prefers to stay under water hyacinth. It found in both river and *beel*. Fishermen usually throw it away, although people believe that it can cure some human diseases. They spawn in Baishakh; fry emerges within a week.

The people's classification of fish indicates that they are not aware of different scientific characteristics of fish like the fish taxonomist, but they have extensive knowledge about all fish species. People are very much aware of colours, sizes, ecology, life cycles behaviour etc. of each fish. People also know how the different water quality in different water bodies determined its taste. They classify, explain and make the distinction amongst the fish not only according to fish's characteristics, but it is also influenced by existing cultural belief and often other reasons which displays a complex sort of knowledge embodied in their very local cultural and historical experiences. They can describe the fish they eat, and those, as well, which they do not eat. This means their knowledge of fish is not falling into the dilemma of 'pragmatism' (see Chapter 2).

This chapter discusses on fish but it is necessary how these fish are caught. In the next Chapter, people's knowledge of fishing technology, how they catch fish where and when, will be described according to the experiences of Charan fishermen.

Chapter 6

Fishing Technology

6.1 Introduction

In this chapter I shall describe the fishing technologies used by the fishermen of Charan. Firstly, I shall review general ideas related to fishing, and address the question: how do people define different types of fishing? Secondly, I shall present the way fishermen classify different fishing gear. Finally, I shall give detailed accounts of all the fishing gears used in the locale.

Although exploiting the same common resources in the territory, methods used and fishing skills differ between the various fishing groups in Charan. Decastro and Begossi (1996) have described a similar situation in Sao Paulo and Minas Gerais where local and recreational fishermen use different fishing gear. In Charan, traditional Hindu fishermen have some entrenched opinions regarding fishing, which help with the preservation of fish stocks. In many respects, their knowledge of fishing is informed in part by their religious beliefs. There are a number of Muslim fishermen (some of them landless agricultural labourers who have recently shifted to fishing during the lean agricultural period) who fish on a seasonal basis and have learnt techniques from the Hindu fishermen. They use many of the same types of nets as the Hindu fishermen, but lack many of their skills. Full-time Muslim farmers also engage in some fishing but the gears they use are different to those used by the Hindu fishermen. Smith and Hanna (1993) point out that within the same fishery, community factors sometime differentiate

behaviours of fishermen, particularly in patterns of information transfer. The face-to-face interaction within communities such as Hindu fishermen, facilitates the transfer of ideas.

6.2 General ideas about fishing.

The main item of Bangladeshi fishing technology is the *jal* 'net'. To fish with a net is called locally *jal baoa*, and people, also, talk about *mach mara* 'killing fish'. Each net is designed for a certain fishing technique. Different nets are used in different seasons throughout the year, depending on water levels. Smith and Nigel (1981:37) also points out in the Amazon region how fishing methods and catch depend on the habitat and fluctuation of water bodies. The size and characteristics of the *jala shay* 'water body' also influence the type of nets used, such that the same net may be used in different seasons in different water bodies. A few methods of fishing are used all year while others are used only during certain periods of the year. Firth (1946) had the same experience at Perupok area in Malay where preferences for different fishing method were governed by some factors like changes in the wind and weather. The seasonal runs of different fish are also a factor in fishing gear selection. However, these factors are very similar to the experiences of Charan fishermen. Gragson (1992) found the Pume of South America use four different fishing techniques at different times of the year. Deb (1996) mentions two fishing castes, in villages Ambiga and Harikantra, of Kamataka, which employ different techniques for throwing nets in the same habitat, demonstrating that the fishing method is not determined solely by the environment but is also related to people's cultural

practices. Crepsi (1998) described how the traditional fishing activity, main fishing methods and fish species composition in the upper River Niger enabled the current fishing efforts a successful seasonal yield. The traditional way of fishing is supporting part of the regional economy. The method of fishing is very selective. The catches are mainly large fish, and low percentages of juvenile specimens are found, which suggests that there is no over-fishing of the exploited fish stocks.

The importance of fish and fishing activities is also evident in Bengali folk music which uses fish as a metaphor. Fishermen and other rural people, in many parts of Bangladesh, sing the following when they meditate in the *majar* 'shrine'. Most of the words refer to Sufi beliefs which developed the 'body theory'. The translation illustrates the use of fish and fishing practices as metaphors in Bengali songs.

মনা জালুয়া জাল ফেলালো এ ভব সংসারে রে / শোন বলি মনা জালে মাছ ওঠে না/ জালুয়া ও পাঁচ পাশেতে জাল ফেলেছি ছয় পাশে তার মালি/ একুশ হাজার ছয়শ কুড়ি বেধেঁছি তার তলি / শোন বলি মনা জালে মাছ ওঠে না / জালুয়া ও অমাবশ্যা পুণিমাতে পার ভাসাইয়া নিল, জালু পার ভাসাইয়া নিল সাদা রাঙা দুইটি মাছ উঠল জালের ফাঁসে / শোন বলি মনা জালে মাছ ওঠে না |(Shah:1990)

Mona, [illegible] d thrown his net into the *bhobo shongshar* (lit. world family), but although the bottom of the net had twenty one thousand, six hundred and twenty parts, there were no fish in it. The fishermen usually put their nets into the five corners of the water body, leaving the other six corners open. But when the banks were flooded during the new moon two red and white fish were caught in it.

The frustration shared by fishermen is also evident in folk songs. The following song is very famous in the neighbouring district of Mymensingh. Fishermen sing it when they become frustrated during the lean period for fishing.

ময়মনসিংহের ময়না মাঝি মাছ ধরিতে আইল নইদাতে/ মাছ না পাইয়া গান বাইন্দাছে আপন ভাইরার সঙ্গেতে

(Biswas:1972)

Maina, the boatman of Mymensing, went to fish in the river. When there was no fish to catch he, together with his brother-in-law, began composing songs.

In Charan, open water fishing is locally termed as *tairani jal baoa*, when fishing in the shallow water is locally termed *ghir kheon*. The use of nets is diverse. According to the fishermen of Charan there are certain techniques that one has to follow to fish with a net. You have to know the *ovayash* 'behaviour' of the fish. In a river the *srot* 'current' is important. Some fish are attracted by light, while others hide away in deep water. These factors dictate which net to use at what time in a particular water-body. Professional Hindu fishermen think *mach hoicheye chor jati* 'fish belong to thieves' jati'[1] because they always try to hide and escape. Hindu fishermen are more skilful when compared to Muslims. Some of them can identify fish by watching the bubbles on the surface water (see chapter 3).

There are several kinds of nets such as *khuiya jal, khara jal, jali, chela jal, chechi jal, jhaki jal, far jal, dhor jal* etc. The holes in a net are called *paha*. Their gauge

[1] The literal meaning of *Jati* is a nation or Individual caste. According to the local people it refers to communal behaviour of particular group. There are villages in Bengal that directly are identified as village of thieves. Here the analogy has been drawn between fish and communal behaviour of thieves.

is important in determining which fish are caught and also highlights the difference between traditional and introduced fishing gears. Thirty years ago most of the nets used by traditional fishermen were made of *sansuta* 'cotton string' and had large holes that allowed the small fish to escape. These were called *boro paha wala jal* ' nets with big holes'. The idea was to *macer bongsho rakhaya kara* 'preserve the fish lineage'. At that time fish were abundant in the water-bodies and only traditional fishermen knew how to maintain and use these nets. Today all nets are made of nylon string. These introduced nets have proved disastrous for the *macher bongsho* 'fish lineage'. Nets like *khuiya jal* and *current jal* make it impossible for any fish to escape. The *khuiya jal* for example trawl a huge area of the *beel*. It is so effective that the fish stocks are depleted for the next season (Leal:1998). Many Hindu fishermen believe these nets are destroying the *beej* 'seed' of fish. For them the conservation and management of fish stocks is part of their religion. Muslim fishermen, by contrast, have no such inhibitions. According to Hindus these nets are *dhormo nasha* 'destroying religion'. Although the government banned the use of the *current jal* about 16 years ago, people continue to use them illegally. The professional Hindu fishermen of Charan do not use certain kinds of gear, for example the *dhor jal*, which other people from other communities may use to fish in their territory. In Charan, other fishing gear includes *barshi* 'hooks', *deer* 'a kind of trap' and *feika mara* 'throwing something' (spears). Some of these gears are uncommon. Some of these people have learnt about gears used in other parts of the country and brought them to the *beel* in Charan. For example, two or three farmers from the

village use a gear called *beer* that is made of jute sack, in the rivers during the monsoon.

6.3 Classification of Fishing Gears

On the Bengal floodplain fifty-one types of fishing gear are found in use, (Tsai and Ali 1997). All of these are not used in any one area. Nets are different from district to district, but they do have some common characteristics, as Ahmed (1955) pointed out. Paul (1997) found use of 21 kinds of fishing gear in the northern part of the country. In their survey for the East India company about 200 years ago Buchanan and Hamilton (1877) saw farmers and fishers of Bengal using fishing gear like screens (*byana*), bag nets (*chakoni*), traps (onta), *kehlpa jal*, *beshjal*, *becharijal* etc. Alam *et al* (1997) studied three *Beel* in different districts of Bangladesh, and describe the types of fishing gear and methods used, according to seasons and the target fish. Fishing gears were classified by them into eight categories, these being; Seine net, Push net, Trawl net, Gill net, Cast net, Clap net, Fish trap, hook, line and spear. This classification derives from the scientific knowledge of the authors, does not reflect fishermen's knowledge or opinion. It is usual to keep both traps and fishing lines together. In this chapter we shall try to classify fishing gears and put them in order, according to people's ideas of their classification.

Some kinds of gears used for generations are locally called *agila kaler machmara* 'fishing method of early period[2]' and these are mainly nets used by the Hindu fishermen in Charan. All the gear that has been introduced into this area in last 30 years are called *Koli kaler mach mara*, "fishing of the *Koli* 'recent' era". Non-fishermen (mainly the Muslim farmer) use other gear and techniques to fish known locally as *Shokher machmara*, 'non-professional fishing'. Pokrant (1987) distinguished the two types of fishing (professional and occasional) as 'Private' and 'Customary' fishing which relates to the issue of water and access (see chapter 7) rights. There are also various miscellaneous fishing methods used in the locale, which are locally called *khuchra machmara* 'miscellaneous fishing'. I shall elaborate on these ideas of fishing through the description of different uses of fishing gear.

6.3.1 *Agila kaler mach mara*, 'fishing of the early period'

This idea refers to the gear which was used in previous times when fishing was an activity of the Hindu caste. The fishermen of Charan believe that these gears were unique to Bengal. They cause no harm to any stocks of fish. The fishermen continue to use these nets; they are considered to be a part of professional fishing. Fishermen sell their harvest and marketing is the main objective of this type of fishing.

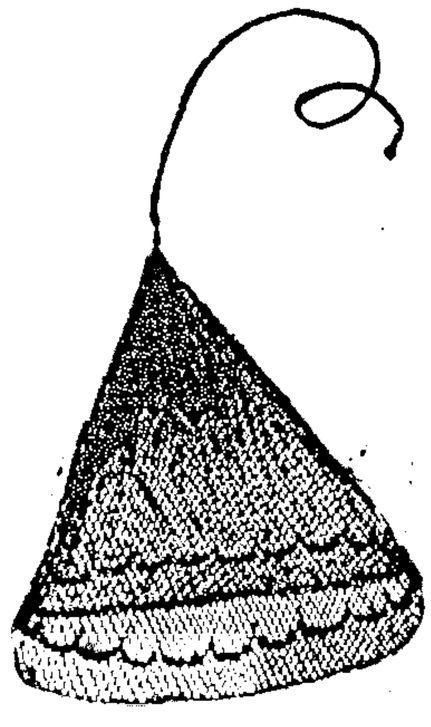
[2] Generally in Bangladesh when rural people refer to their past they fail to mention the exact time. They always refer to incidents that occurred in the locale which people are aware about, For instance, *boro panir bochor* 'the year of big flood' or *choto panir bochor* 'the year of small flood'. This is why when the say *ageye* 'previous period' it refers to their nearest past and when they say *onek ageye* 'long ago' they talk of distant history.

Figure:6.1 The traditional fishing gear

Local name	Main user	Water body	Fish caught
Jhaki jal	Hindu	*Beel* river pond ditch	*icha, chanda, tengra, puti, kai, kajuli, taki*
Borjal	Hindu	River	*boal, air, rui, katla and kaoina*
Shib jal	Hindu & Muslim	Canal and river	*puti, tengra, rui, katla* and *taki*
Khara jal	Hindu & Muslim	*Beel* and river	*chanda, puti, tengra, gachi, mola,* and *chela*
Chela jal	Hindu & Muslim	*Beel* and river	*icha, puti, chanda, tengra, kajuli chela, boal, ghaira, shilong, bacha*
Jali	Hindu & Muslim	*Beel*	*icha* and *tengra*
Far jal	Hindu	*Beel* and pond	*nura feka* and *mrigel*
Moi jal	Hindu an Muslim	River	*tengra, puti, golsha, baim, guji* and *kaina*
Suta jal or thui jal	Hindu and Muslim	River	*kajuli, chapila, jhatka, icha, ghora kata, gutum, chanda, ghaira*
Gainja	Hindu and Muslim	River, *beel,* canal and pond	All fin less fish

Local name: *Jhaki Jal*

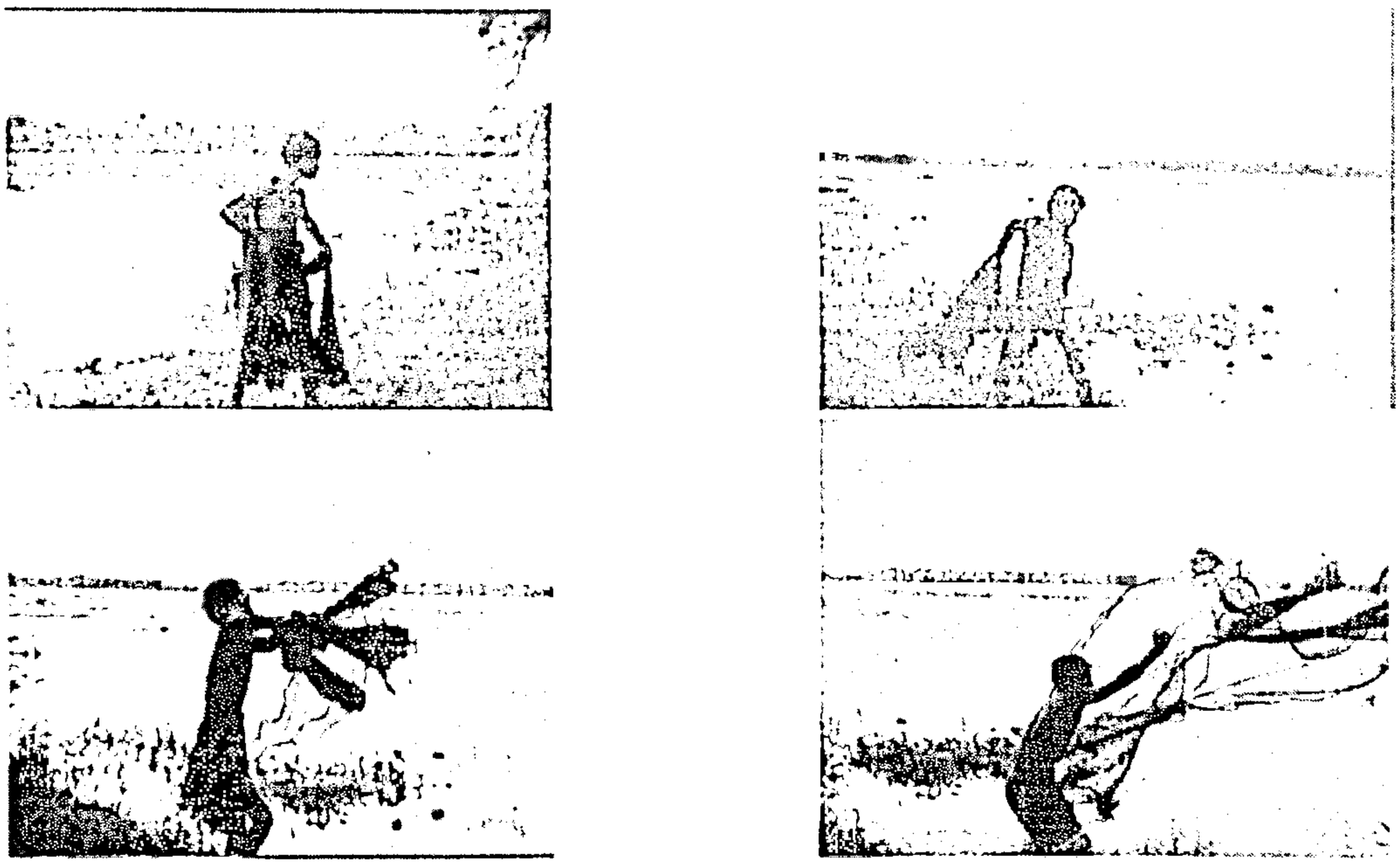
The *jhaki jal*, a circular net eleven hands in diameter, costs 1500 to 2000 taka, but it can be used to catch all kinds of fish. It is particularly useful for small fish like *icha, chanda, tengra, puti, kai, kajuli,* and *taki.* Larger fish such as *Rui* and *Mrigel* may also be caught with it. The smallest of the fish such as *chanda, tengra, batai* are found in the *kush* which is a hem of about 10 centiametres deep around the edge of the net and acts like a pocket to collect the fish. The *jhaki jal* is used



165 cm

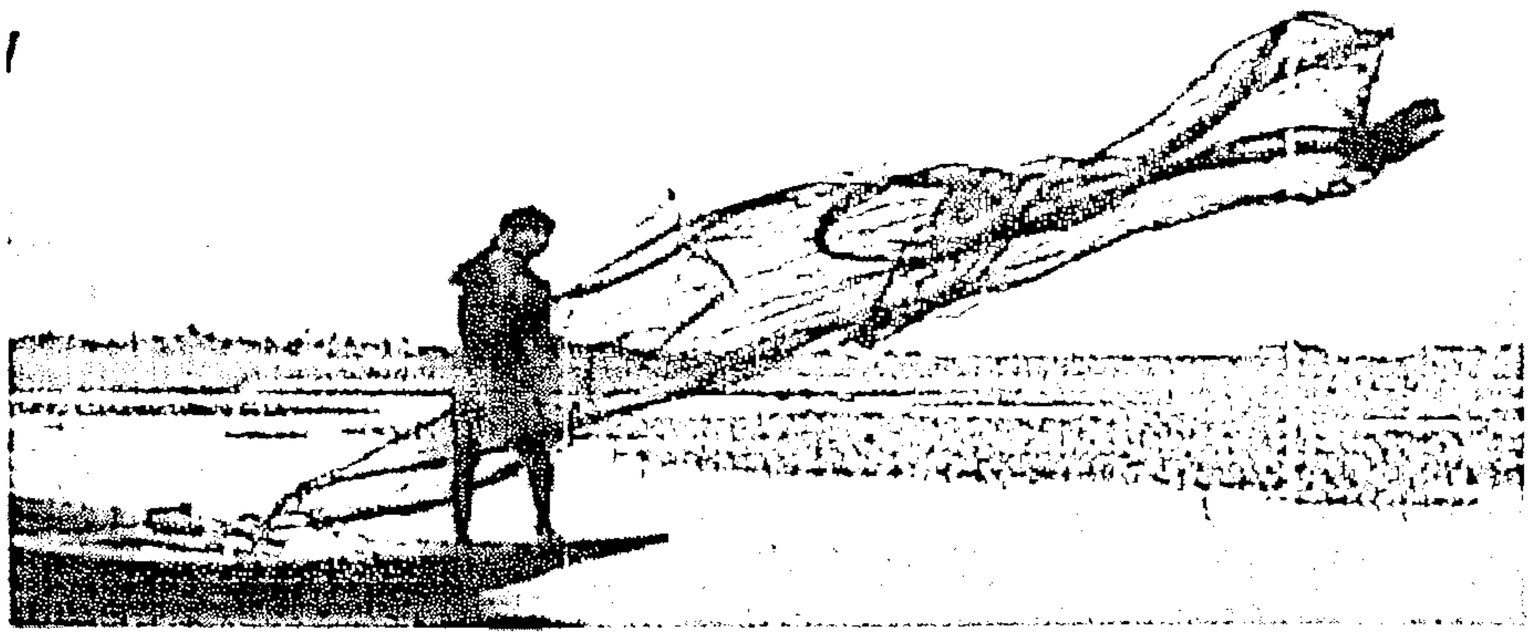
from a small boat costing up to four thousand taka. When used in the *uinna mash* 'dry season' it requires two people to handle the large net. This technique, called *bicha dewa*, catches more fish because the net covers a larger area. At other times, however, one person can handle the *jhaki jal*. It is used in the *beel*, ponds and river.

Photograph: 6.1 Throwing action of *Jhakijal* from the land



Fishermen use it on the river all year, but in ponds only from the month of *Agrahayan* to *Falgun*. Before throwing the net fishermen scatter some *macher adhar* 'fish food' into the *beel* to attract the fish, marking the location with a *thikana* stick. A fisherman controls the net skilfully using his body, largely the *konui* 'elbow' of his right arm, left hand, mouth and right leg. To start with he grasps the *kachi* 'rope' of the net in his right hand and then folds the net carefully placing two to three *guch* 'folds' of the net on his right elbow. He holds the rest of the net in his left hand and casts it on to the water with a circular motion of his body. This technique requires considerable skill. If the cast is not made correctly the net will not spread properly. The next step involves pulling in the net very slowly. Fish under the net start to gather in the folded part around the edge, called the *ghai*.

Photograph: 6.2 Throwing action of *jhaki jal* from a boat

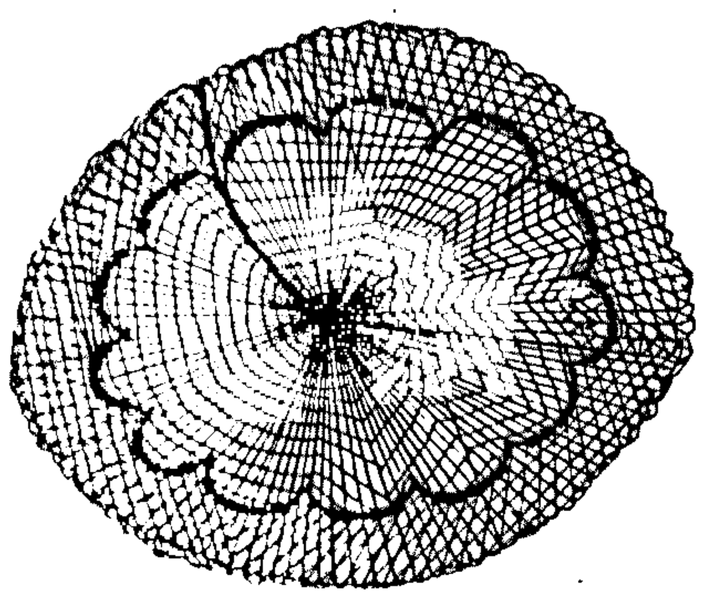


Fishermen then empty the net and remove all fish and garbage. A technique for clearing it is to lay the net across the knee, using one hand to keep hold of the middle of the *ghai*, before pulling it down suddenly, to cause all the fish to fall into the boat. When the monsoon waters decline by one foot and the wind blows from

the south, fishermen say that the net should be thrown towards the north. This action is called *kheon dewa*. By doing so they will catch many fish.

Local Name: *Bor Jal*

This net is similar to the *jhaki jal*. It has *lohar vara* 'iron balls' like the *jhaki jal* attached to its circumference. The balls weigh more than 40kg. The shape of the net is round, and the *paha* 'holes' are three inches wide. One can pass four fingers through each hole. It allows the fish that carry eggs to escape. The net is 150-200 hands long and used on rivers. It is used to catch larger fish within the *doho* 'whirlpools' of rivers. It is a very large net controlled with three boats and eight or more people.



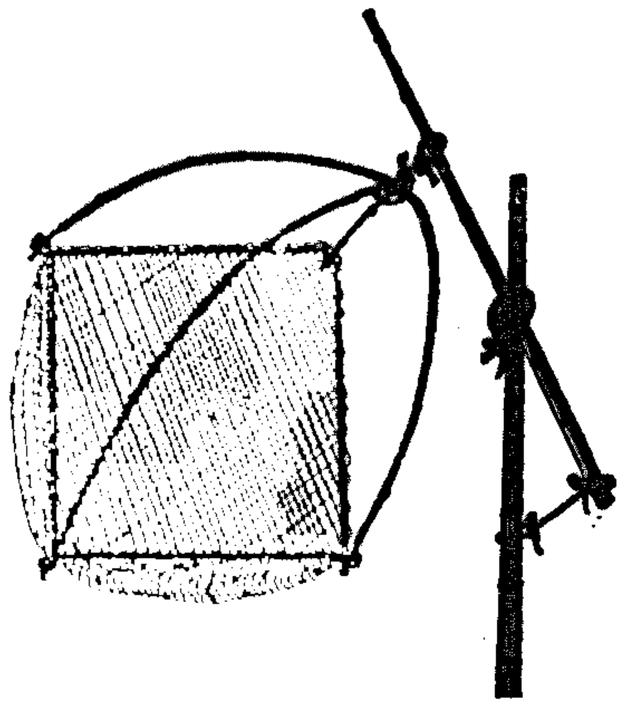
300 cm

In the month of Kartic, fishermen remove the water hyacinth from the *doho*, and arrange the *katha* 'refuge'. They then control the net from three points around the *doho* using three boats, trawling its whole area. For ideal fishing conditions, the

water should be *nirob* 'silent' at this time. The fishermen wait about half an hour after throwing the net before they haul it in. This allows time for large fish that congregate in the big holes by riverbanks to be caught in the *borjal*. The net is hauled up by the fishermen in the three boats circling the net holding the fish in the centre. The net catches fish like *boal, air, rui, katla and kaoina*. It does not catch fish during the *joar vata* 'up and down tide' (tidal periods). The net is only used during the day, if the water is clean. If the water is turbid, it is used by the night. During the months of Kartic and Agrahayon the net is used to fish in the *katha* 'refuges' on the edges of the river. Only traditional Hindu fishermen use this net.

Local name:*Shib jal*

This net is named after *shiva* (*shib* in Bengali) although no one knows why. Some people call it *chip jal* 'net with cane' instead of *shib jal* because it used to be put on a cane frame. People also call it the *dharmo jal* 'the net of religion'. It catches fish such as *puti, tengra, rui, katla* and *taki*.

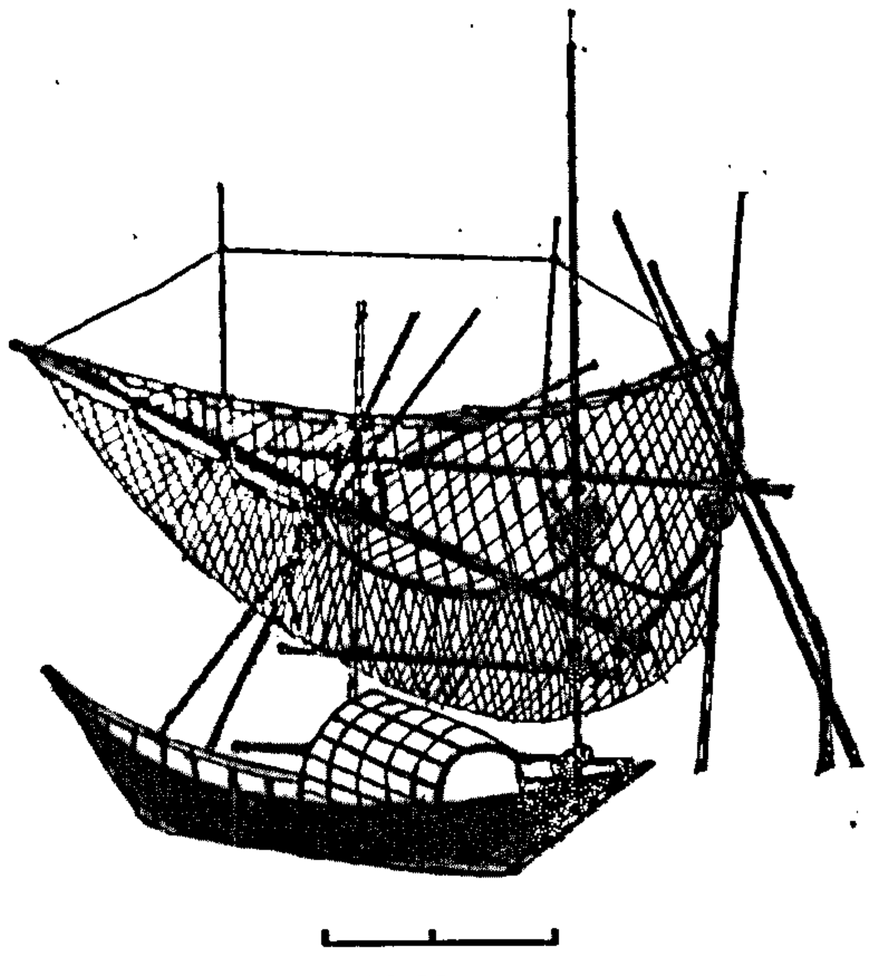


Fishermen use this net in canals and on cultivated land when flooded during the monsoon. The size of the net can vary. The net is *charkona* 'square' in shape and the *paha* 'holes' are concentrated close together to form a fine mesh. As it gets larger the size of the holes also increase. For example if a net is ten hands wide and ten hands long then the size of each *paha* is *adha poa inchi* 'one eighth of an inch'. The net is tied on to a *bati* 'square bamboo frame'. Two curved *kanchi* bamboo canes are lashed across the middle of the frame to keep the net spread as taut as possible. One *logi* 'long bamboo stick' is fixed to the middle of the *bati* 'frame' to move the net up and down in the water in order to catch fish. Fishermen build a bamboo *machi* 'platform' to stand on and operate the *logi*. The net can be managed effectively by one person.

Local name: *Khara Jal*

The *khara* is a fishing gear made of bamboo erected in the river. The *khara jal* net is triangular-shaped. There are two sub types of this gear: *ghon jal* and the *pahil jal*. The *ghon jal* is mostly used to catch small fish such as *chanda, puti, tengra, gachi, mola*, and *chela* and erected in both the river and *beel*. The *pahil jal* is only used in rivers during the monsoon for such fish as *boal, pabda, bacha, chela, chapila, jhatka, rui, katla, pabda, pangas and silver carp*. This net is similar to the *chela jal* but larger (see below). However, it has bigger holes than the *chela jal* and is expensive to erect requiring 100-150 pieces of bamboo and costing forty thousand taka (about £500). The *pahil jal* demands a large investment of labour to install it although only a small boat is required to control the net when erected. The net is withdrawn from water at five minutes intervals to

collect the fish. The handling of the net is locally called *uar dewa*. *Khara jal* 'placing' may be used for twenty-four hours a day providing there are fish in a river. Thus it is only used during the peak season. Fishermen use the *khara jal* from the month of *Ashar* until *Poush*. They use the *pahil jal* in the river only during the months of *Sraban*, *Vadro*, *Ashin*, and *Kartic*.



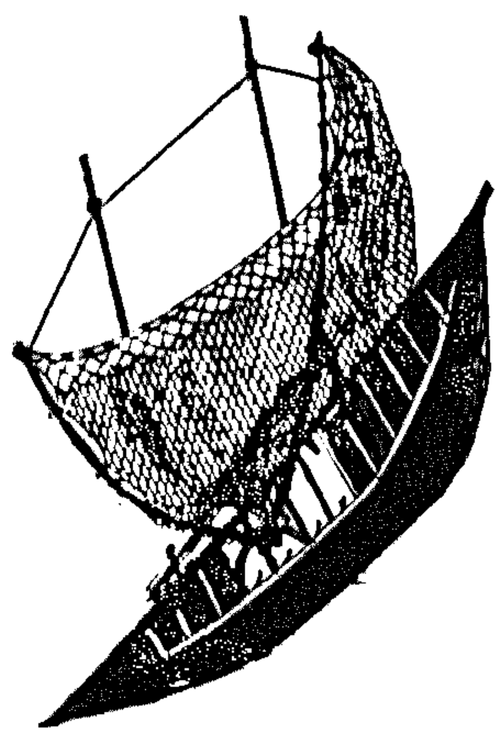
86.53 cm

There are many parts to the *khara jal*, each with a particular function. Two large bamboo poles are required to set (*jal pat te*) the gear up. The two poles are joined together with a *lohar khil* 'iron rod' that passes through holes in their ends. The top of the bamboo poles should be kept eighteen or more hands apart (*jaler map moto* 'according to the size of the net'). Three *gachi* 'strong and tall bamboo's are used as cross members lashed in place with rope. An extra *gachi* is required around the *lohar khil* 'iron rod'. Six more bamboo poles are lashed onto the main frame to help move the net up and down. Another long bamboo pole called the *hatal* serves to keep the net moving while fishing. Several *kanchi* 'thin bamboo' members are used to complete the frame and short lengths of rope

attach the net to the frame. When the fishermen lifts the bottom part of the frame up, the top part goes down into the water with the net and when he brings the frame down again the nets comes up with the fish.

Local name: ***Chela jal***

This net is similar to the *khara jal*. Again, there are two kinds: The *ghon* and the *pahil*. The *ghon jal* is useful for catching *icha, puti, chanda, tengra, kajuli* and *chela* and the *pahil jal* for catching large fish such as *boal, ghaira, shilong* and *bacha* and in particular the *gaicha*. Fishermen use this net the whole year round in both the *beel* and river. However they use it particularly from the month of *Ashar* to *Magh*.



462.5 cm

The net is fixed to a boat. This normally involves two pieces of wood called *kupa* fixed to the *bata* 'gunnel'. The space between the two pieces of *kupa* wood should be more than three hands. The *kupa* are erected vertically and have a cup shape cut in the top end. A bamboo cane called the *dolla* is placed like a crossbar between the two *kupa*. Two long bamboo canes serve as the frame of

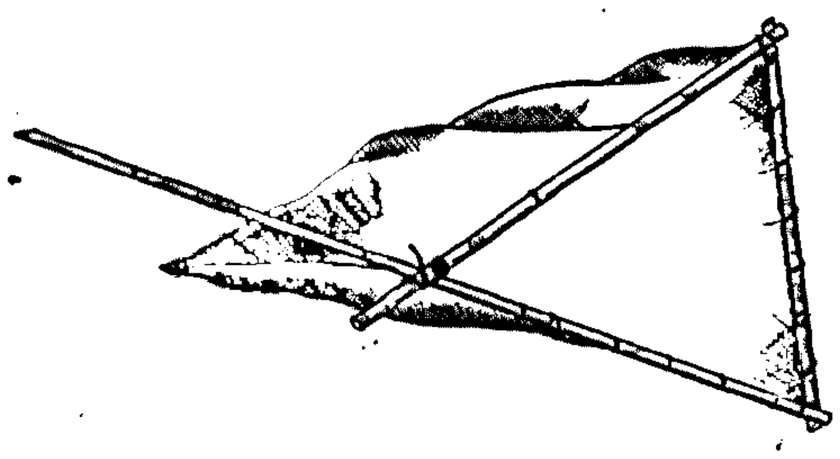
the *chela jal* net. They are arranged in a 'V-shape'. They are fixed together at the apex with a *lohar khil* 'iron rod' passing through holes in each. The frame is fixed on the *dolla* on the boat. A third length of bamboo serves as a handle to lever the net up and down in the water. Fishermen lower the wide end of the frame with the net attached into the water. This action is called *uar dewa* 'placing'. After a while they push down on the bamboo handle and lift the net out of the water with the fish. Two people are required to control the boat while a third stands in the middle and handles the net.

Photograph: 6.3 Fishing with *Chela jal* in the canal

The *chelajal* is fairly easy to control. Some of the time two fishermen enter the water to pull a rope to *aul* 'drive' the fish so that they swim into the net. The net needs a large boat that does not move much as it is heavy to pull from the water.

Local name: *Jali or thela jal*

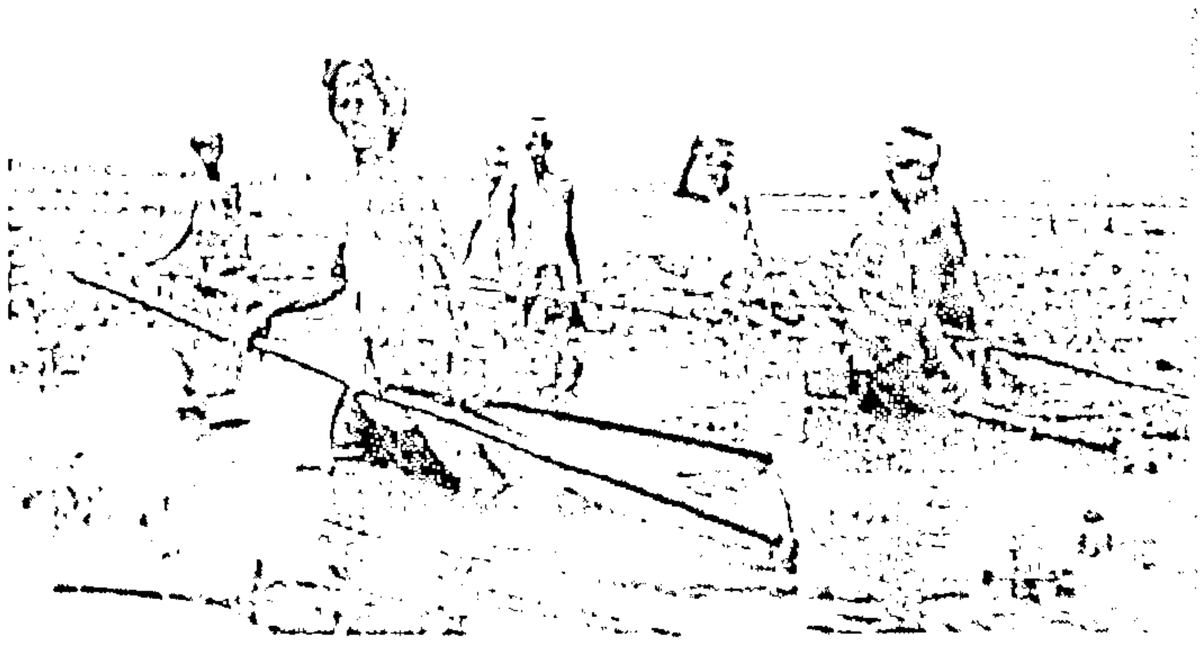
This *tin kani* 'triangular' net is made of two rigid lengths of bamboo and one *bati* 'flexible mature bamboo' which can be bent together with some rope to tie the net to the bamboo frame. The bamboo should be six hands long.



67.5 cm

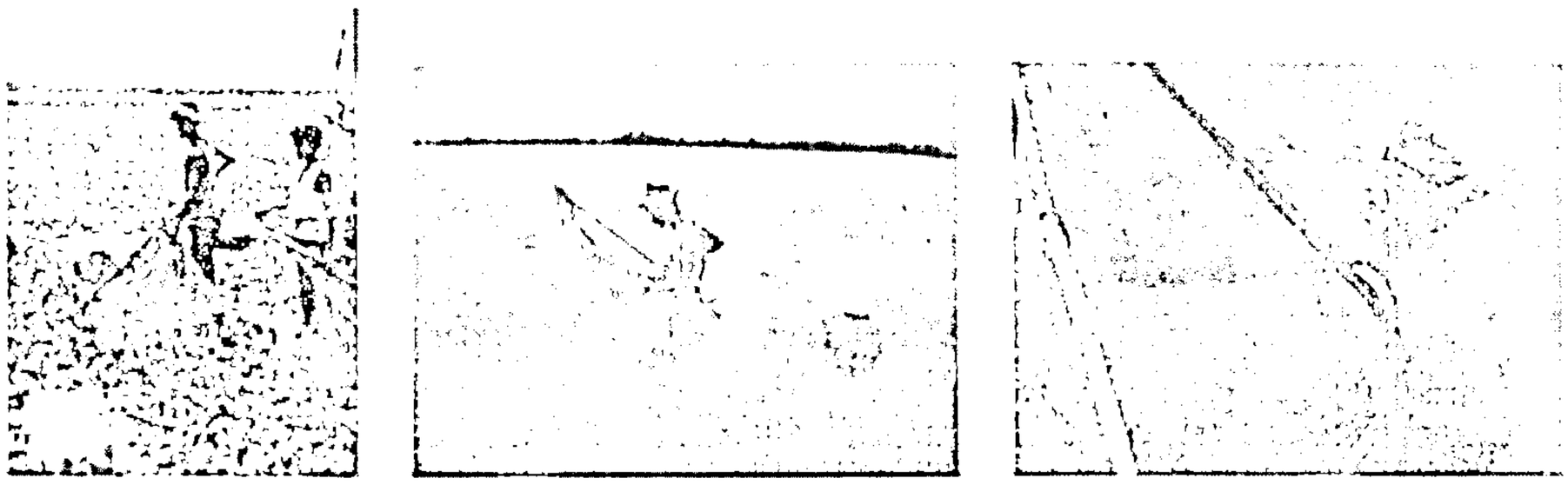
The area where fish *badhe* 'hide' in this net is called the *tong*. The net is named *thela* 'push' because it needs to be pushed along during fishing. It is also called *jali* because of the small holes in the net. It is fairly cheap, costing only forty taka, and is particularly useful for catching *icha* and *tengra* fish. If the net is pushed through the water it is called *doan* 'fishing' and if it is lifted up under water hyacinth then it is called *chara jali* 'fishing'.

Photograph:6.4 group fishing with *jali* 'net' during the dry season



One person can handle the net. Sometimes fishermen go in a group of twelve or more to fish with it especially when the water level reaches below the waist. Each carries a *jali* net and has a *dula* (a round basket made from bamboo).

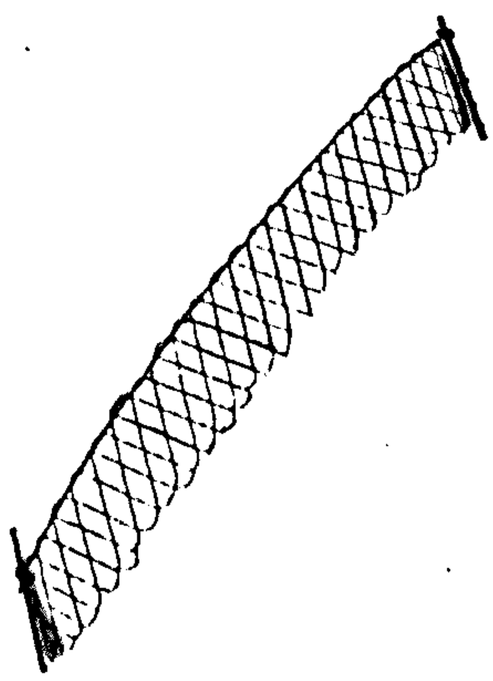
Photograph: 6.5 different fishing activities with *jali* 'net' in the *beel*



At first the fishermen proceed through the water in a row, then they create a large circle and place their nets at the bottom of the *beel*. They shout (*jahur dewa*) in a chorus and close the circle to frighten the fish to gather in the middle of the circle. After closing the circle (*agar dewa*) they take the fish by hand from their nets and put them into their *dula* 'basket'. They fish in this way from the month of *Falgun* to *Baishakh*.

Local name:*Far jal*

This net is similar to the *current jal* but made of nylon with a larger gauge. It is used only to catch large fish such as *nura feka* and *mrigel*. One person can operate the net, using it from a boat in the same way as the *current jal*.

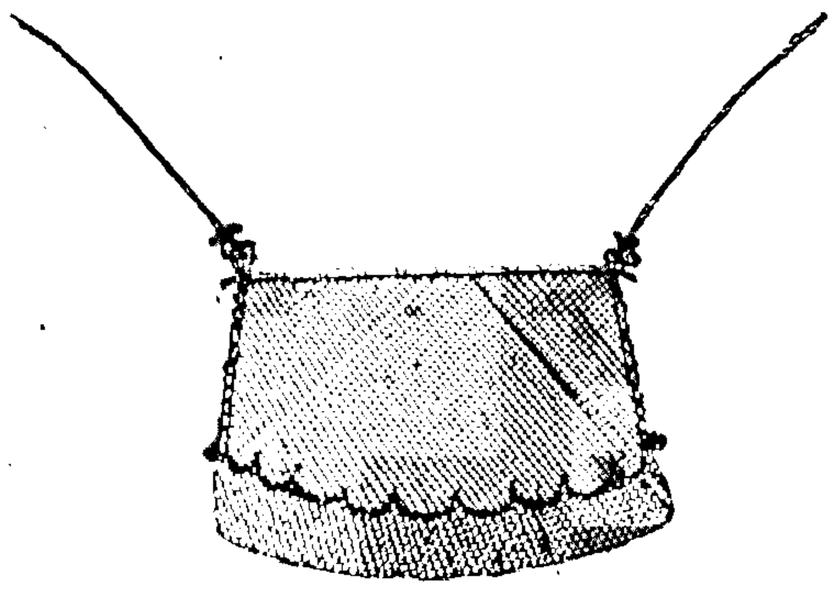


1500 cm

The *far jal* does not catch many fish because larger ones are few in numbers. It is three hands wide but the length is not fixed as fishermen decide on different lengths. This net is put vertically in the water. It is used in ponds or *beel* but not in the river.

Local name: *Moijal* a

The word *moi* means ladder. The *Moijal* is used in rivers; it is drawn over the riverbed like a ladder[3] levelling the soil. The net is 80-90 hands long and two hands wide. It is made of nylon string and costs around 1500 taka. Holes in the net are similar to *jhaki jal*. Each hole is one half square inch in diameter. Two large ropes are attached to the two corners of the net. Four people are required to use the net; they work in pairs to control the two ropes. No boats are used; each pair, on opposite sides of the riverbank, haul the net along. The net drawn from the *ujan* 'upper edge' of the river to the *vati* 'low line' (downstream). The net is drawn over a distance of 1km which takes around half an hour. Then one of the pairs of fishermen cross the river, joining the other two, and closes the net. The catch is then hauled in.



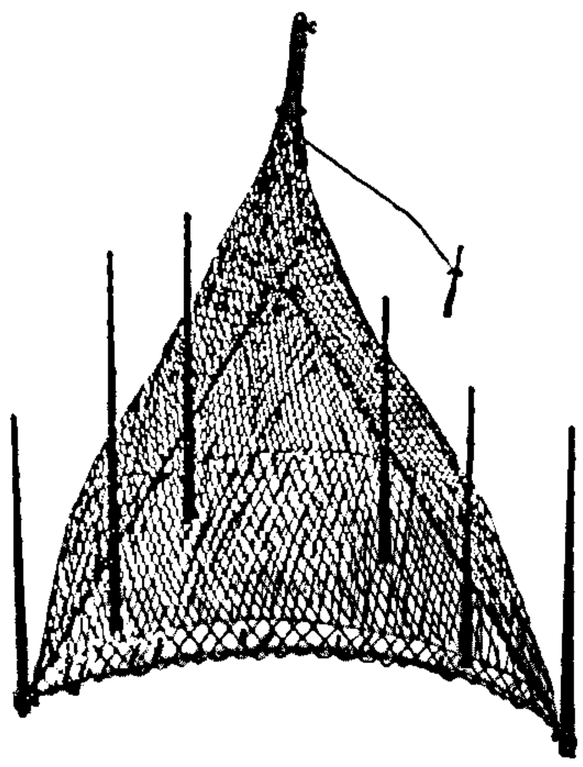
1157.14 cm

[3] A ladder is a wooden agricultural instrument dragged across padis to level the soil.

Fish like *tengra, puti, golsha, baim, guji* and *kaina* are easy to catch with this net. It is used in areas of calm water and not rivers with a strong current. It used by the both Hindu and Muslim fishermen. It is used at any time over the twenty-four hour period. Fishermen start to fish after four o' clock in the morning and continue all day. Compared with other nets the *moijal* can catch large amounts of fish.

Local Name: *Suta Jal* or *thui jal*

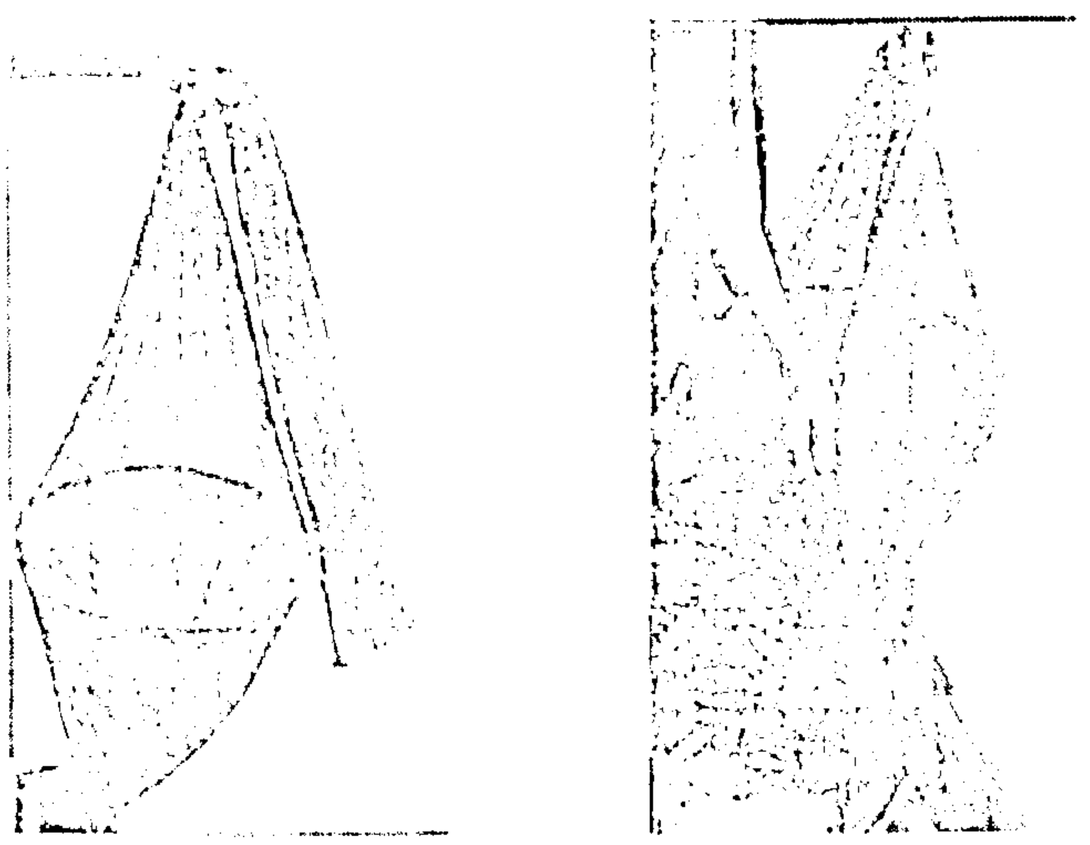
This net is used in the *srot* 'current'. It is named *suta jal* following the local word *sot* meaning current. Some people also call it *thui* . It is made of nylon string. It is more than 130 hands long. The shape of the net is triangular; it is similar to the *khara*. Two converging rows of small bamboo poles are used to hold the net on the riverbed, which follows the saying *thashi diye rakha* 'keeping tight'. The process itself is called *tana dewa* 'tightening', because of the way it is tied tightly to the poles. The gaps between these poles are 14-15 hands.



1560 cm

The net is permanently sited in the water when the monsoon season arrives. It can only be used in this season when strong currents force the fish into the net. At this time it is used twenty-four hours a day. The net is orientated with the open part of the net facing up stream. The majority of the net (*pahil*) is around fifty hands in length. It has large holes around 1.5 inches in diameter. The remaining part of the net is some thirty hands long and tapers to the end. This part of the net has 'small holes' (*ghon*) and catches the smaller fish. At the end of the net is the *tong*, where the fish accumulate; it is round in shape.

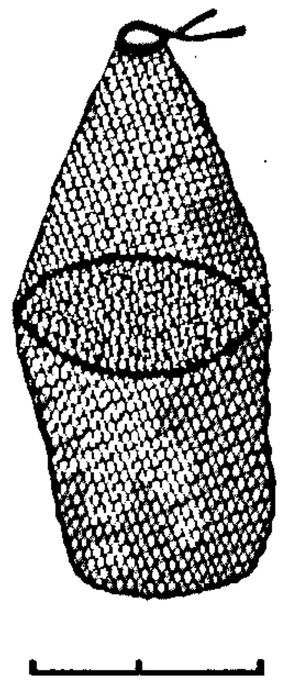
Photograph: 6.6 *tong* of the *suta jal*



A bamboo pole is used to hold it open in the water. A boat is always moored to this pole, from where a fisherman can constantly check the *tong* for fish, which is called *Chara dewa* 'bringing up'. The *tong* is hauled out of the river by a rope. Due to the strength of the current strong jute ropes are used with this net. This net is useful for catching fish like *kajuli, chapila, jhatka, icha, ghora kata, gutum, chanda* and *ghaira*. The cost of the net is 10-15 thousand taka.

Local name: ***Gainja***

This is a keep net used for holding fish after they have been caught. A bamboo *chaki* 'ring' or frame is tied in the centre of a tube of net.



The net is somewhat thicker than that used in the manufacture of other nets. The *Gainja* is placed in the water which helps to keep the fish alive. It is unsuitable for some fish like *boal* because their fins become trapped in the netting.

6.3.2 *Koli juger mach mara* 'fishing of current period'

This idea regarding the use of the gear refers to the Hindu cosmology. According to this idea, time is divided in to four *juge* or 'eras' which are; *Shotto*, *Ctreta*, *Dapor* and *Koli*. Of all these eras the *Koli Jug* is chaotic. No one knows what might occur during this time because it a time of mystery and disorder. People use the word *koli* to express something which is very chaotic[4]. So, when people say *koli juger jal*, it means they are expecting something bad to occur from the use of these gears (or rather their use is linked to these bad times). Hindu

[4] The same idea of *Koli jug* is also evident in Weeratunge (2000) as he found same belief existing among the indigenous people in Sri Lanka. According to him:

> " the consensus among believers in South Asia appears to be that the world is currently experiencing the descending phase of a *kaliyugaya*. This means that the world is in a state of chaos and disintegration, nature is in disorder, and human beings are full of vice." (p.258)

fishermen are also gradually getting used with these gears, but the elderly people still consider it a catastrophe for the

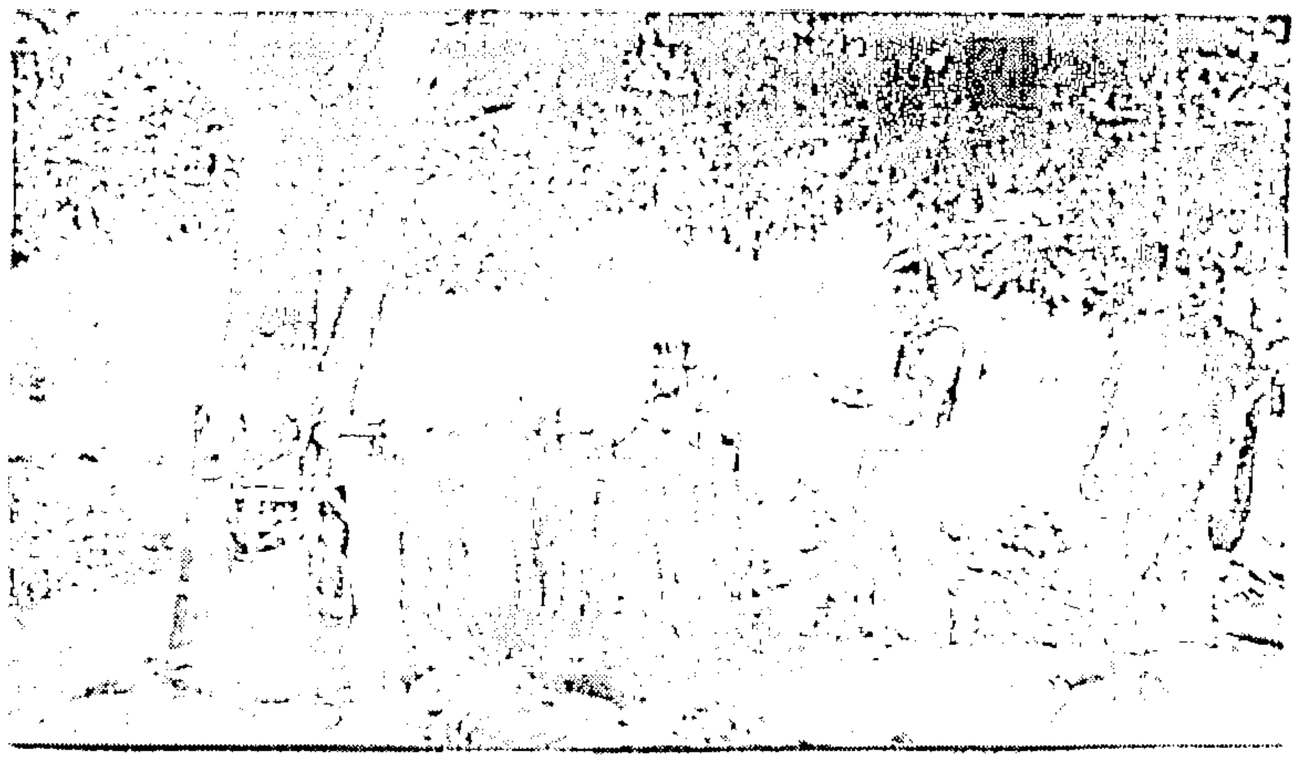
fish stock. Such fishing remains a completely market driven activity. All fish traps are also included in this category.

Figure: 6.2 Fishing gear used in the current era

Local name	Main user	Water body	Fish caught
Berjal	Muslim and Hindu	*Beel* and pond	All fish
Dhorejal	Muslim	*Beel*	
Current jal	Muslim	*Beel* and river	*Tengra, puti, taki, shing, goja, magur, kai, nura feka.*
Chechi jal	Muslim	*Beel* and river	*Chapila* and *jhatka*
kathi jal	Muslim	Beel and *river*	*chela.*
Dear or *chai*	Muslim	Beel	All small fish
Thui	Muslim	Beel and *river*	*puti, baila, tengra, khalisha, koi taki*
Baina puti or barki	Muslim	Padi chawk	*Darkina, chata, tit puti*

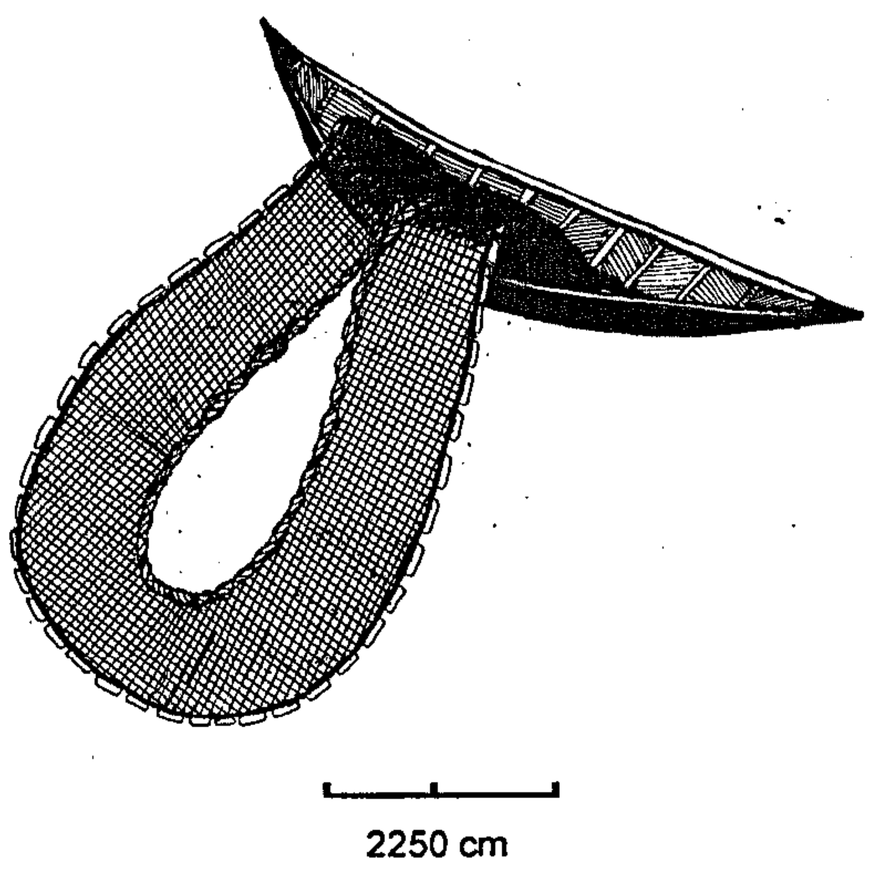
Local name: ***Ber jal or khuiya jal***
The *ber jal* or *khuiya jal* is a net 200-250 hands of long and 15-18 hands of wide. This the largest of the nets, its closely concentrated holes form a *ghono paha* 'fine mesh.' All types of fish (both small and large) can be caught using it. Fishermen use this net all year round, mostly in ponds and the *beel.* During the monsoon, fishermen trawl a large area (*gheron deya*) with it, while in the dry season they use it to fish in the *katha* 'refuges'.

Photograph: 6.7 Sewing different parts of the ber *jal*



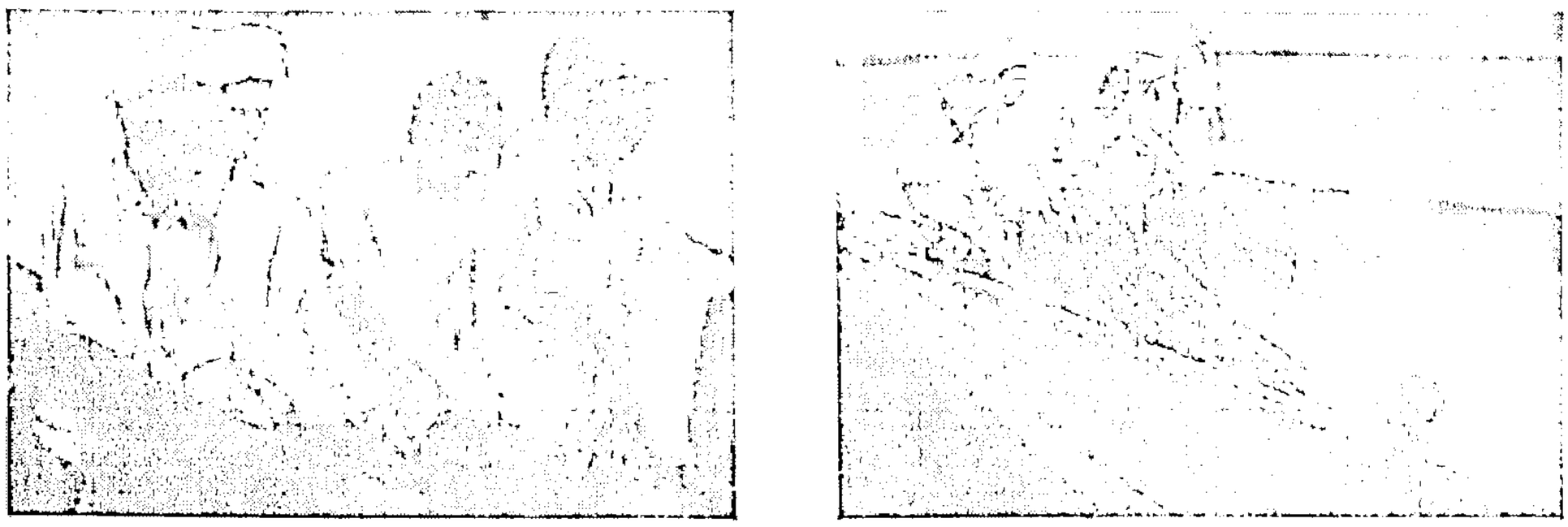
They use it in ponds from the month of *Kartic* to *Magh*, when water levels have declined in the river and *beel*. During the *Poush*, *Magh* and *Falgun* when water levels are low fishermen use the net to fish in the *katha*. In the rainy season it requires 8-10 people to control the *khuiya jal*. Fisherman start with the net folded in the boat. The *shola pair* (upper edge of the net with cork floats) and hem of the net are stored on the *aga nao* 'bow of the boat'; the *gura pair* (lower lead-weighted edge of the net) is kept on the *pacha nao* 'stern of the boat'. One person stands either in a boat or in the water and holds one end of the net in his hand. Other fishermen in a second boat feed out the net while they describe a large circle, coming back to the person in the water where they receive the *kanir kachi* 'rope' that is tied to one corner of the net. Someone then throws the *gerapi* 'anchor' into the water to keep the boat still and then they pull in the net. Whilst pulling it in, the *shola pair* is held by men in the bow and stern of the boat and the *gura pair* is pulled up by two men in the middle of the boat. The person in the water helps to keep both sides of the *gura pair* together. A further two persons pull the *kush* 'hem' of the net up and over the boat and then release it. All the fish

and other material are gathered in the *kush* and the men sort through them. One person with a bamboo stick keeps the *shola pair* high out of the water so that the large fish cannot escape from the net. They finally release the anchor and prepare the net again for another *khew* 'cast'.



In the *uinna mash* 'dry season', from *Agrahayan* to *Baishakh,* fishing with *ber jal* is different. They fish in the *katha* 'refuges' in the *beel.* It requires fifteen to eighteen people to handle the net. They use two boats, one larger than the other. About fourteen of them man the larger boat, the other four taking the small boat. To begin one person goes into the water with a length of bamboo called the '*doa*'. He positions the bamboo so that it stands up straight in the water. They tie one end of the net to this bamboo and push the *gura pair* into the mud at the bottom of the *beel.* As many as eight men are in the water to anchor the *gura pair* in the mud.

Photograph: 6.8 Pulling *ber jal* on the *beel*



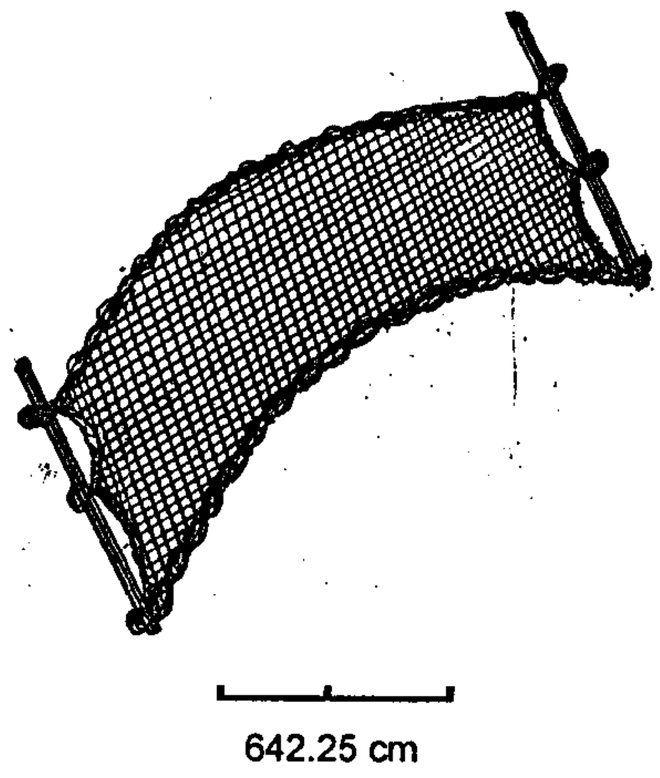
The fishermen hold the *shola pair* up to stop the fish jumping from the net. Elderly men working on the boat hold the *shola pair* high and clear away most water hyacinth from over the refuge. It is important to leave some water hycinths otherwise all the fish will swim away. They collect some of the water hyacinth into a *gola* (a large basket made of bamboo, used to store paddy) and place it in the *katha* to provide shelter for the big fish. The fish in the *katha* hide in the *gola*. The men pull out all the tree branches from inside the *katha* and use the *jhahi jal* (see above) to catch the fish. Hence for this process two nets are used. If they tried to trawl with a *ber jal* net all the large fish would escape. Following this process, nine or more people go into the water and start to pull in the *kachi* 'rope' of the *gura pair* with their toes. Those on the boat pull in the *shola pair* and start to fold it together with the *gura pair*. After pulling in the net, they open the folds and collect the fish.

Local name: *Dhore jal*

This net is similar to the *ber jal*, made in the same way with holes the same size.

The *ber jal* is *feric* 'wider' and *lomba* 'longer'. The *dhore jal* net is 40-50 hands

long and five hands wide. It takes two to five people to handle this net. There are two *khotha* 'poles' on the two sides of the net which help to keep the net anchored to the soil under the water. One or two of the fishermen will

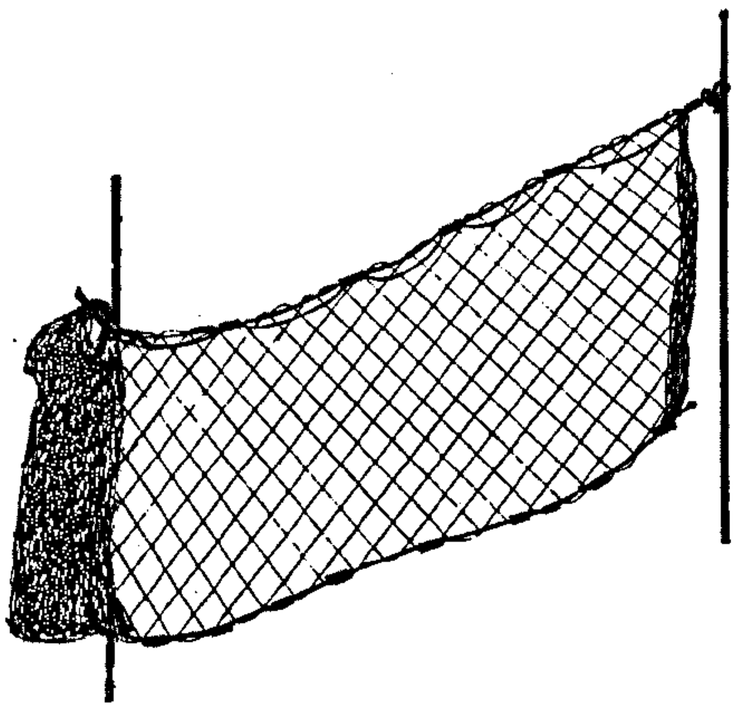


642.25 cm

pull the net while the other two keep a firm hold of another part of the net in the boat; another person drives the fish into it. They use this net in the month of *Chaitraya* and *Falgun*, at the start of the *uinna mash* 'dry season'. It is only used in the *beel*.

Local name: ***Current jal***

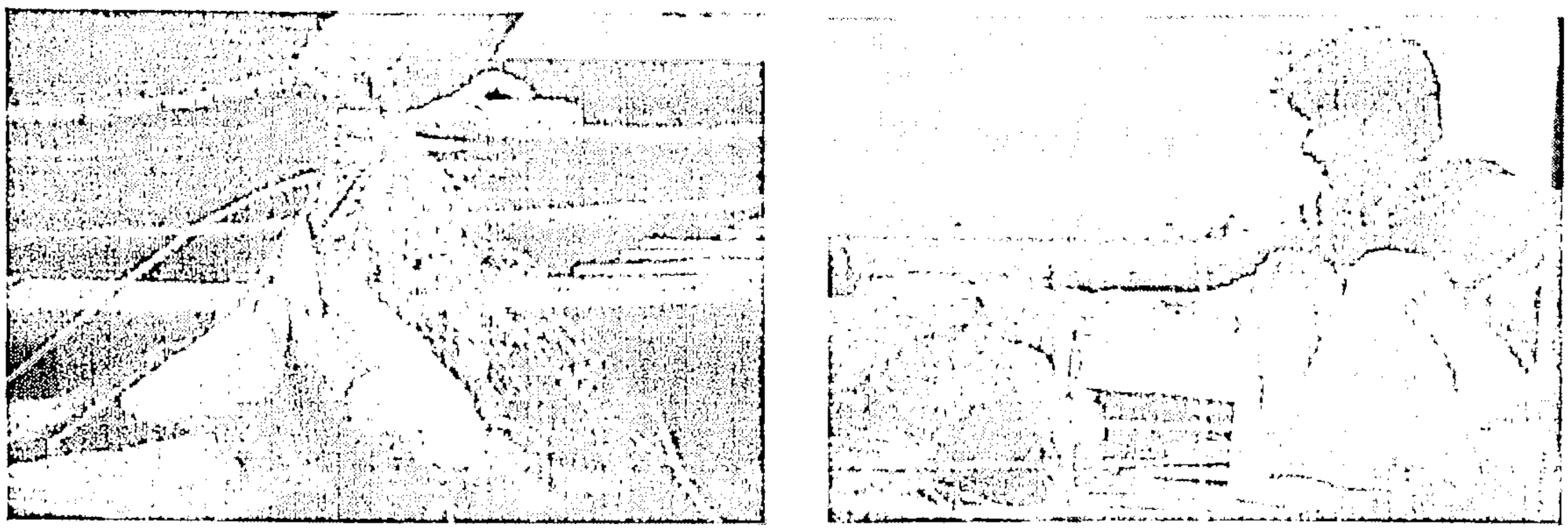
The *current jal* is so effective in catching all types of fish it is devastating for fish stocks and for this reason it has been banned by the government. It is made of clear plastic string so fish cannot see it underwater. According to some fishermen, fish cannot escape the net because they become sort of electrified, which is why they call it *current jal*. It attracts fish particularly in the month of *Kartic*. It is very easy to use and one person can handle it. He spreads the net out for 200 to 300 hands, and comes back after a few hours to collect it up and fetch the catch.



3600 cm

The net catches fish like *tengra, puti, taki, shing, goja, magur, kai, nura* and *feka*. It can be used in the *beel* and river during the dry season and on flooded and cultivated land during the monsoon.

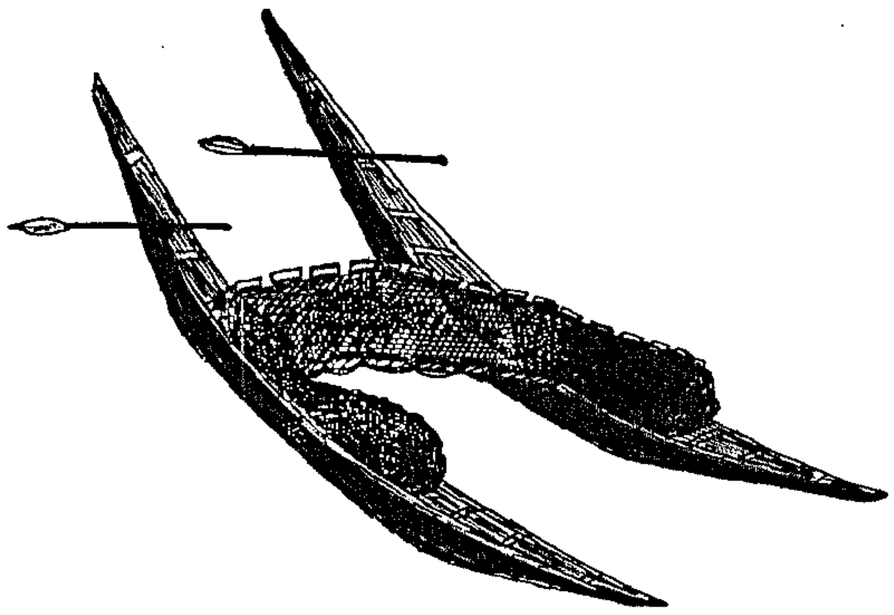
Photograph: 6.9 catching a *rui* fish with *current jail*



The lower edge of the net is weighted with *shisha* lead balls to keep it in touch with the bottom of the *beel* and the upper edge of the net has *shola* 'corks' tied along it to keep it afloat and straight on the water. When fish try to swim through the net they are trapped inside the *paha* 'hole' and cannot escape.

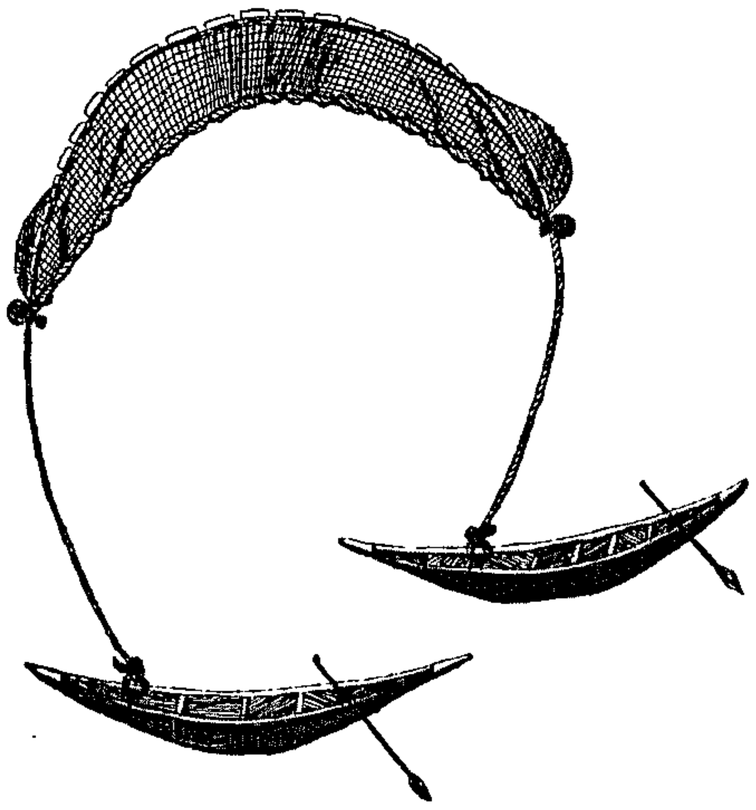
Local name: ***Chechi jal***

The net is similar to the *khuiya jal*. It requires two boats and around 15 people to control the net. It is only used for fishing in the rainy season and is useful for catching fish such as *chapila* and *jhatka*. Fishermen use it in the *beel* and the river where there is no current.



1928.57 cm

They use it from the month of *Sraban* to *Magh*. It requires a large area of water for when the fishermen use the net (*ghir dewa*) they release from each boat 150 hands of net with *chit kachi* 'rope attached to the top edge of net'. The *chit kachi,* they say, drives fish towards the net.

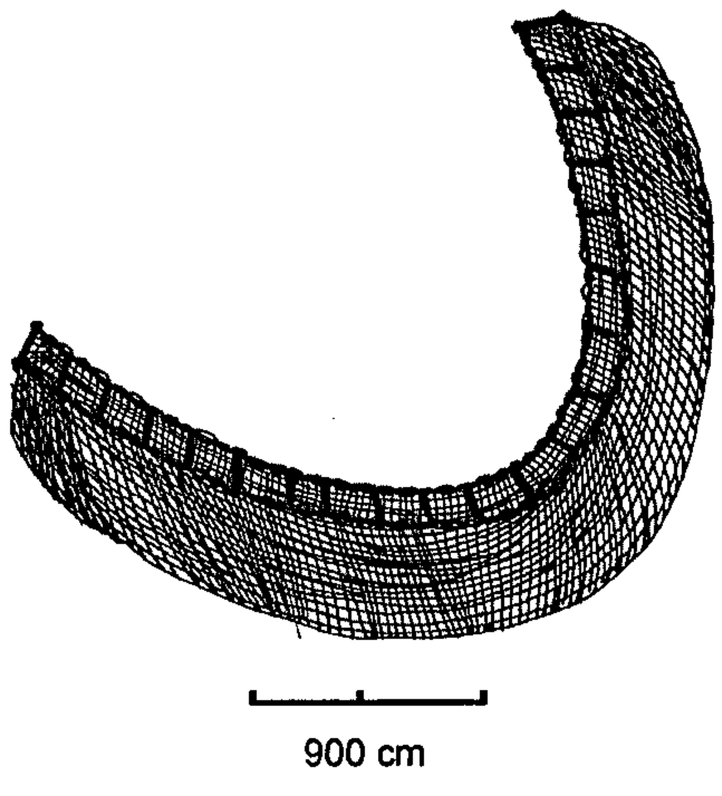


1928.57 cm

The net is carried on the *pacha nao* 'stern' of the boat and the *aga nao* 'bow' of the other with four people on each boat holding it. Others punt the boats fast. Narrow boats are best as they go faster. Each fisherman has his own *logi* 'long bamboo cane' to hand with which to punt the boat. The fish are caught in the middle of the net and after trawling for a period of time the fishermen stop and pull the net up on to the boat and release the fish into it.

Local name: *Kathi Jal*

This net is made of small pieces of *berjal*. A few *kathi* 'small pieces of bamboo' are used to shape the net, and so it is called *kathi*. It is more than sixty hands long and requires two people to handle it.



The net used to fold like *gamcha* 'local towel' while a number of bamboo lengths passes through the both ends of the net. It is used all year, catching large fish in the months of Ashin, Kartic and Falgun. It is very effective for catching fish like *chela*. The net cannot be used in heavy water because the users cannot move it along the river or lakebed. Two people move with the two ends of the net through

the water. The net takes the shape of a *Gamcha* while moving. After a short while both ends are closed and hauled out of the water catching fish in the middle. This net is used during the night.

Local name: ***Dear or chai***

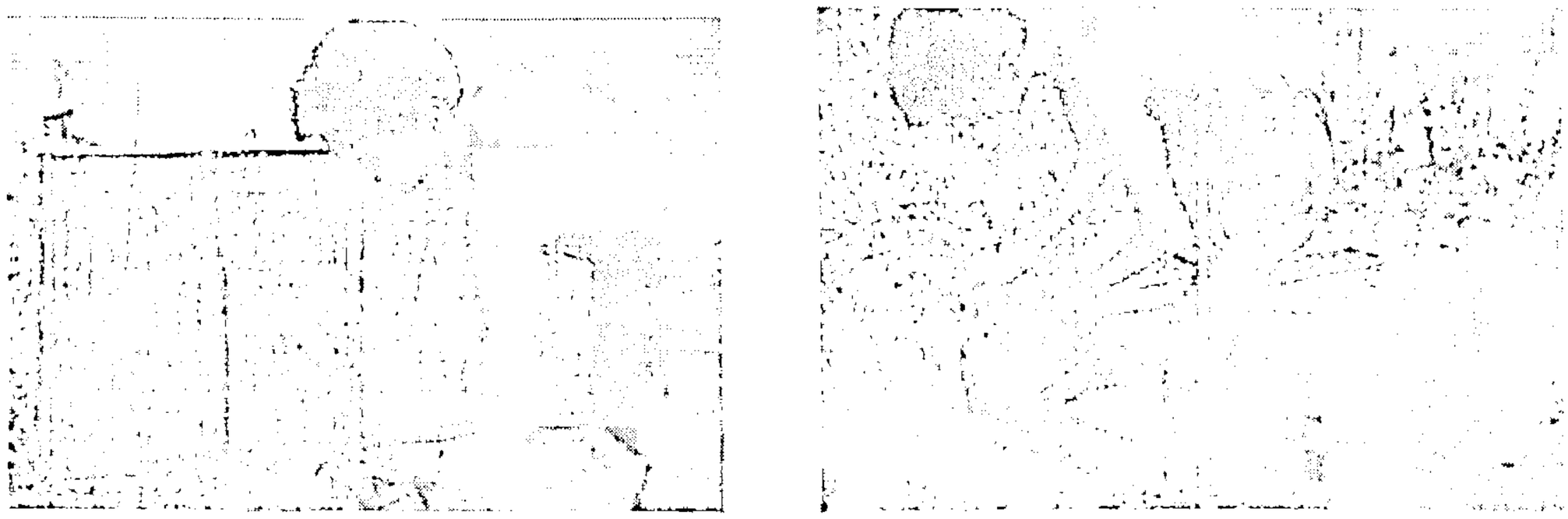
This trap is like a cage. It is made of bamboo lashed together with nylon string. The place where fish enter is called the *mukh* 'mouth'. Fishermen build some *bandh* 'barricades' with *kada* 'clay' and put the *dear* in a way that allows water pass through it. Fish can only enter through the *mukh*. Fishermen put some smashed snail as the bait.

Photograph: 6.10 Bating and placing small traps

36 cm

Size varies. It has a mesh inside 1-2 hands long then it also has five to seven *dorja* 'doors'. The door remains close to prevent their escape. The fishermen collect the catch from the trap through the doors.

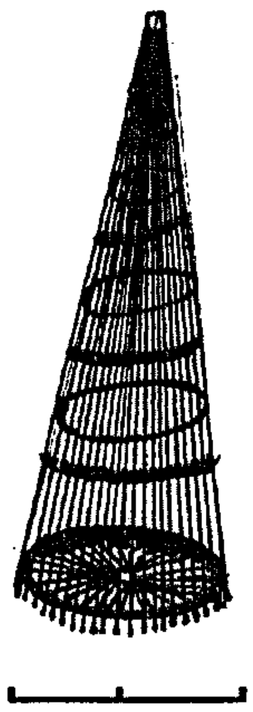
Photograph:6.11 Placements of big traps



It is not used to catch large fish, being small. The cost of the *dear* 'trap' varies according to size. It is available from fifty taka through to 120 taka. Only Muslim fishermen use it in the *beel*.

Local name: *Thui*

People call this trap *thui* because it seems to be *thush* 'empty'. It is two and half hands long. The upper end is narrow and the lower is wide. The head of the *thui* is not more than six inches and is circular shaped. It requires some pieces of bamboo and string to make a *thui*.



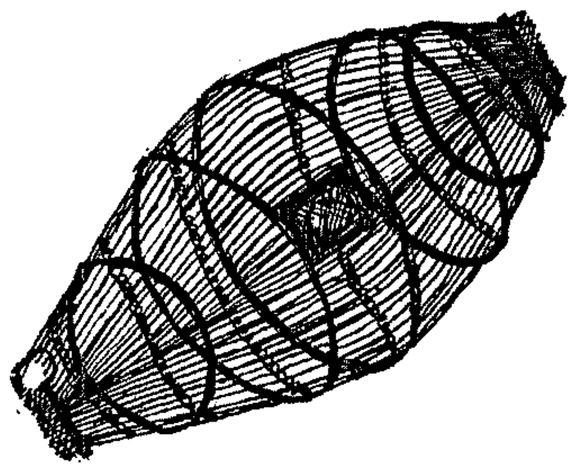
40.90 cm

Three pieces of bamboo are taken and number of cracks created in them by putting pressure on each piece so that it produce a few *shola* 'thin fork'. More than 50 *shola* are put around three bamboo rings of different sizes tapering to one end. Each *shola* is tied to the bamboo rings with string. At the lower end of *thui*, there is another bamboo ring called the *per* which is fixed to prevent the fish from escaping.

People use this trap during the months of Ashar and Sraban and from Kartic to Falgun. When the water runs from higher to lower land during the Ashar and Srabon it is placed on the *ail* 'divider of plots' which allows the current to flow through it. It is used like *dear* trap at this period. It catches more fish during the night. If there are many fish it has to be hauled in some four or five times during the night. In times of few fish it is left overnight. It catches fish like *puti, baila, tengra, khalisha, koi* and *taki* in the months of Ashar and Sraban. In the months of Kartic and Falgun, fish like *baim* remain in holes inside the riverbed and *beel* and are caught with *thui*. After confirming the presence of *baim* fish in a hole first one has to check how many *mukh* 'mouths' the pit has. If there are two 'mouths' one of them should be covered with a hand and the *thui* placed over the other one. One should press the *thui* down and pump on the pit with hand as this process brings the *baim* fish in the *thui*. When fish enter the *thui* they create a noise The door on the upper end is used to get the fish out. Non-fishermen use it.

Local name: *Baina puti* or *barki*

It needs *bash* 'bamboo', *shuta* 'cotton string' and *guna* 'steal wire' to make a *baina puti*. At first a piece of *torolla bash* 'soft bamboo' (not more than one and half hands long) is taken and broken into narrow and long pieces with a chopper. Each narrow stick is called a *shola* 'fork'. Several bamboo rings are set between the *shola* as a frame. The ring in the middle is largest and gradually others decrease in size towards the ends. In the middle of the *baina puti* a *khop* 'square hole' is made by removing *shola*. This *khop* is covered with a few more *shola*, and the gap between each *shola* is bigger than the rest which allows fish to get in. This is called *par*. It is fixed at an angle to allow fish to get in the *baina puti* but not out. It is about three hands long.



49.09 cm

Usually when water moves from higher to lower land across the padi *chawk* then it is placed on the *ail* 'padi boundaries'. Fisherman put some clay to block the holes on the sides through which they collect the fish from the *baina puti*.

It is used in the months of Ashin and Kartic. It is useful for catching fish like *darkina*, *chata*, *tit puti* and other small fish. Non-fishermen use this trap.

6.3.3 *Shokher machmara* 'non-professional fishing'

There are a few fishing gears in Charan, found infrequently, that are used only for amateur fishing. Despite being used for non-professional fishing, these gears require both outstanding skill and knowledge in order for one to fish with them. These gears are used by the non-fishermen and are not used on a regular basis but people do use them occasionally when they have no other work to do. This type of fishing either helps people to maintain their subsistence or to catch fish for their own consumption.

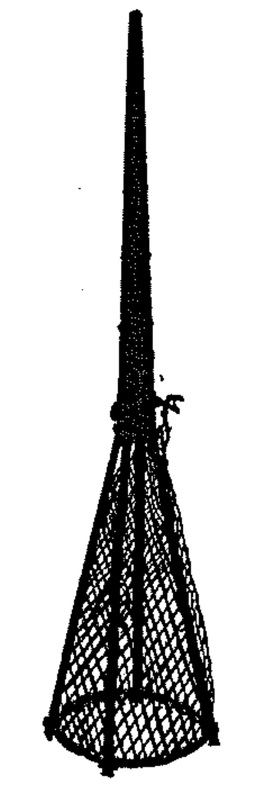
Figure:6.3 Gear used by the non-professional fishermen

Local name	Main user	Water body	Fish caught
Chabi Jal	Muslim farmer	*Beel and* river	*gazar, boal, guja kata, baush, rui*
Chak Jal	Muslim	*Beel and river*	*shol, gazar, shing, magur*
Dolna	Muslim	*Beel and river*	*boal, koi, rui, katla, fali, mrigel karfew*
pol	Muslim farmer	Beel pond	*taki shaia veda*

Local name: *Chabi Jal*

The word *Chabi*[5] locally means to 'press on the ground'. This net is round in shape, and is fixed with one end of a *boura bash* 'soft and thin bamboo' called *Kurra* which is five hands in size. It is about seven hands long including the handle. The *tong* 'where fish gather' is circular and gradually tapers to the end. It is attached with a rope and tied to the bamboo pole. The lower end of the bamboo pole is divided into four parts and a *beri* or *boila* 'ring' used to keep the mouth of the net open. Holes in the net are more than one to three *angul* 'finger' long.

[5] Literal meaning is key but the local meaning is totally different. There are many such words that have different meanings in Charan.

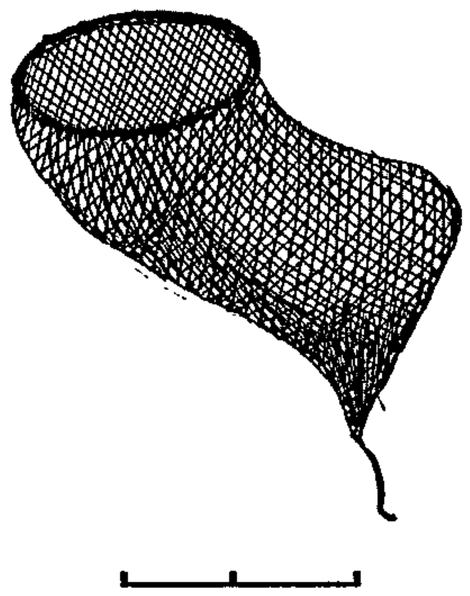


90 cm

This net is used during the monsoon in the deepest parts of *the beel* or river where no other nets are used. The net is used by only one person, who swims and dives to find fish. When he sees fish he thrusts the net down vertically onto the riverbed trapping the fish. A movement of the net confirms the fisherman of a catch. At this point the fisherman dives down and releases the tong and brings the net up with the catch. Fish like *gazar, boal, guja kata, baush, rui* and other large fish are caught with this net. Fisherman trap fish by placing the net over holes and crevices on the riverbed. Muslims use it.

Local name: *Chak Jal*

The word *Chak* means 'ring' in Bengali. The net is fixed with a *chak* 'ring' made of bamboo. A square piece of net is made into a tube. One end is tied, the other end is attached to the *Chak*. This creates a net that is conical in shape.

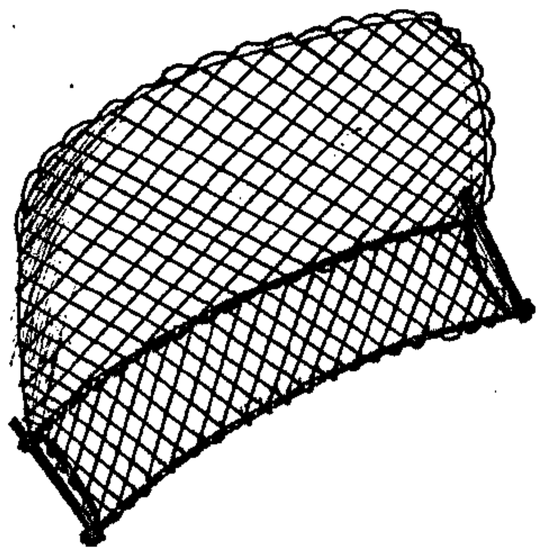


54 cm

This net is used in both *beel* and river. Fish that live in the muddy clay deposits on the riverbeds are caught with it. It is used in the months of *Kartic* and *Chaitra*, in the dry season when the water level is very low. It is used by people fishing with their hands. They tie the net to their waist while searching for fish in the clay. They locate fish with their hands and then quickly catch them with the net. Fish like *shol, gazar, shing, magur* etc. are caught with it.

Local name: ***Dolna***

The word means cradle. This net is 7 to 8 hands long, and made of nylon string. The net is fixed at either end with two *dolna* or *lathi* 'sticks', each 2 ½ hands long. The holes in the net are large at 1-½ inches. It is used to catch large fish. It requires two people to pull the net. The *tong* 'where fish gather' is large at, around 3-4 hands long. This net is used in the dry season. The length of net is too short to fish during the monsoon. It used in shallow water where people can walk.

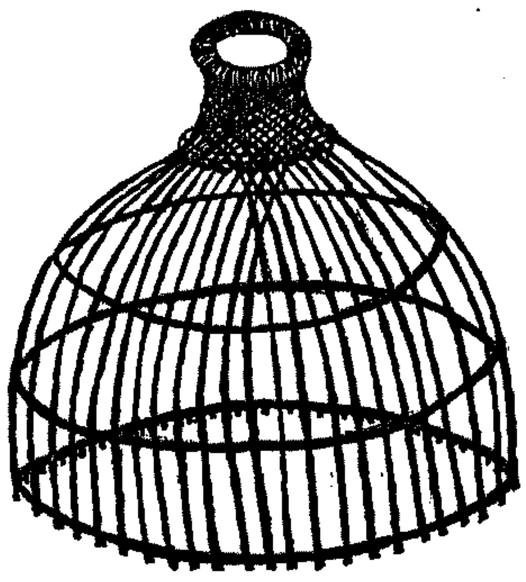


130.90 cm

It is used in the *beel* and river. Two persons hold the net by the bamboo sticks and walk through the water. When a fish enters the *tong* of the net it creates force which follows the local word *chatimara* 'leaping around'. They bring the bamboo sticks together to keep the fish inside the net. Fish like *boal, koi, rui, katla, fali*, *mrigel* and *karfew* are caught with this net. Hindu fishermen do not use this net, only people from non-fishing backgrounds it.

Local name: ***Pol***

It is a bell-shaped fishing trap made of bamboo. The bottom of the trap is open and has a *choto mukh* 'small mouth' at the top. People also use *pol* to restrict the movements of their chicken. A person has to press it to the bed in muddy water and put one of his hands through the *mukh* 'mouth' to catch fish in it.



230

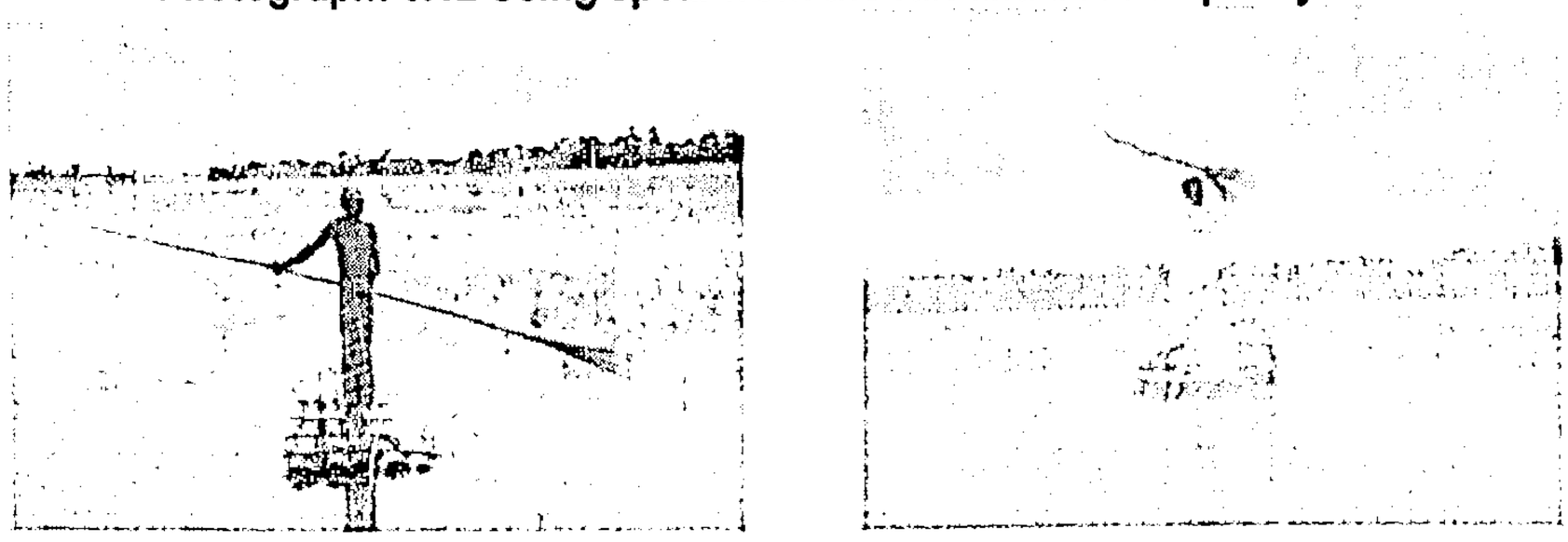
45 cm

It is used during the *uinna mash* 'dry season' in shallow water. Villagers used to go group by group to the *beel*, river and pond to catch fish with it. Fish like *taki shaia veda* gets caught in it. It costs two hundred taka.

6.3.4 *Khuchra machmara* 'miscellaneous fishing'

This relates to fishing carried on by people an irregular basis. Users of these kinds of fishing gears are non-fishermen. Women and children are also to be found involved in some of these fishing activities, which are carried out by them for their own household consumption. A wide range of fishing can be put under this heading, including *borshi baoa* 'angling', *koch borshai machmara* 'throwing something' (spear fishing) and finally *hat diya machmara* 'fishing with your hands'. Beckerman (1991) found that among the Bari of the Maracaibo basin, spear fishing is a major group activity. This shows that things can change from place to place, people to people and in different environments.

Photograph: 6.12 Using spear from the raft and boat on paddy field



The Hindu fishermen were not found using these techniques. According to them to hurt the fish is compared to doing something against their deities. Children

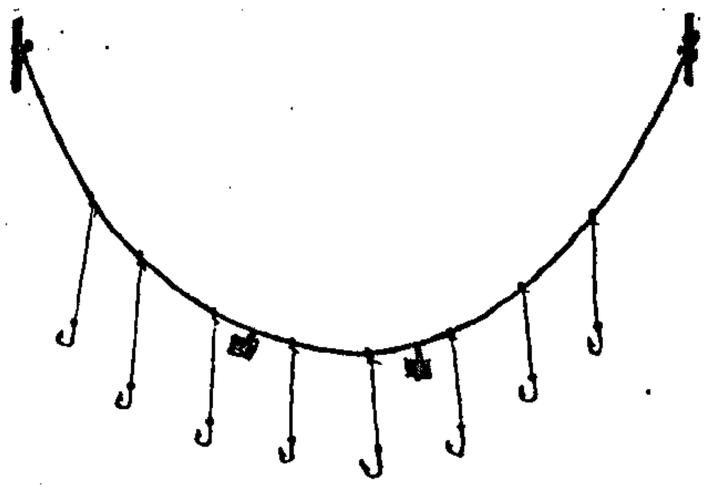
use these gears in the *beel* and river to support their family. Women are also found angling in ponds.

Figure: 6.4 Gear used in miscellaneous fishing

Local Name	Main user	Water body	Fish caught
Duba dauna	Farmer (Muslim), children	River	*boal*, *kawna*, air, *baim*, *ghaira*, *bacha*, *baghari*, *ritha*, *tengra*, *golsha*, *pabda*, and *fali*
Khutta borshi	Children, women	River, pond and ditch	*Puti*, *tit puti*, *tangra*, *golsha and baim*
Nal barshi	Children	*Chawk* and *beel*	*Puti*, *baim*, *magur*
Jiola borshi	Farmer children	*Ditch*, *chawk*, *beel*	All jeol fish
Juita	Muslim	Padi *chawk*	*Rui*, *katla*, *gozaR*
Taota:	Muslim	*Canal and* beel	*Shail*, *gozar*, *magur*
Thuri Koch	Muslim	*River and* beel	*Mrigel and katla*
Foska or *koch*	Muslim	Chawk *and canal*	*Rui*, *katla*, *p uti*, and *taki*

Name: *Duba dauna* 'sunk hook'

The word *duba* means to 'merge with the water' and *daona* means hook. The trap consists of a nylon line with a few hooks and two *khotta* 'corks'. It is used in the river. The length on the nylon line is determined by the width of the river. For example, if the river is 200 hands wide then it requires 250 hands of line so as to reach the required depth. Attached to the main line there are smaller lines with hooks attached to the ends.



3750 cm

These lines are around one or two hands in length, spaced at intervals of one and a half hands. The hooks are baited with *kechu* 'earth warm' *shamuk* 'snail' *icha* 'prawn' *murgir bhuri* 'chicken offal' etc. The hooks are checked every one to two hours for fish or to replace bait. It requires two persons in a boat to lay the *duba dawna*. It is used from the month of Vadro to Agrahayan to catch fish like *boal*, *kawna*, air, *baim*, *ghaira*, *bacha, baghari, ritha, tengra, golsha, pabda,* and *fali* because these fish are fond of those baits.

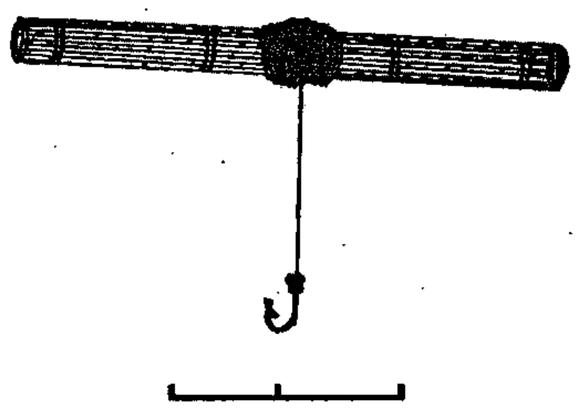
Name: *Khutta barshi* 'hook used with cane'

A length of nylon string with a hook on one end and the other end attached to a thin and flexible bamboo cane called a *kanchi*.

A small piece of cork called *patta kathi* (wings of peacock) is tied to line about the hook to act as a float, so when a fish takes the hook it sinks into water. The *kanchi* is then *khutta mara hoi* 'pulled up suddenly'. It helps catch fish like *Puti, tit puti, tangra, golsha* and *baim* in ponds, ditches and rivers.

Name: *Nal barshi* 'hook used with bamboo pipe'

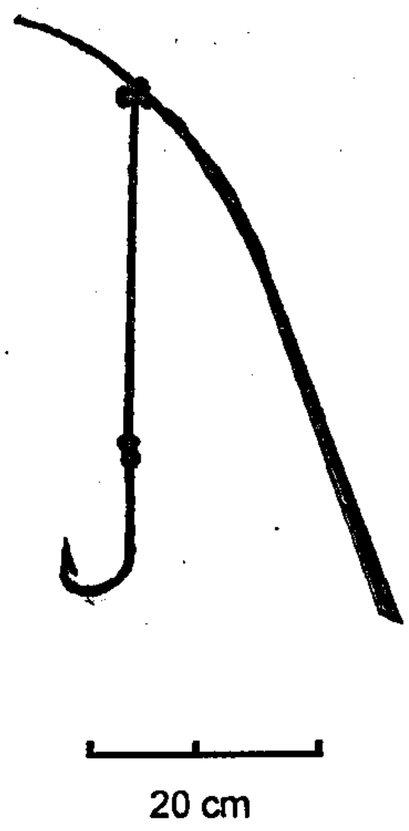
This comprise a hook tied to a bamboo pipe called *nal* which is left on water above *jangla* 'aquatic vegetation'.



The hook is baited with on *chera* or *kechu* 'earth warm' and tinny *icha mach* 'small prawn'. Fish take the food and are unable escape. The next the user collects the catch. It caches fish like *Puti, baim, magur* from the *Chawk* and *beel.*

Name:*Jiyola barshi* 'hook used to catch *jeol* fish'

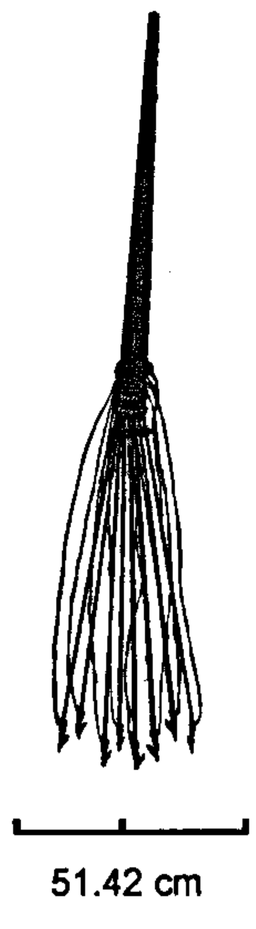
People use *Jiola borshi* to catch fish like *boal, gojar* and *shoil*. The hook is similar to *khutta barshi*. People leave it on the bank of the *beel* or river together with frogs or some small fish as bait to attract large fish.



The word *jeol* refers to fish that can survive for sometime when taken out of the water (see fish classification discussion).

Name: *Juita* 'Tied with string'

This is a kind of harpoon. It needs a length of bamboo, a few sharp spokes of iron and some string to make it. It is called *juita* because the *fali* retail points are tied with *juti* 'string' to the *Kura* 'bamboo handle'.

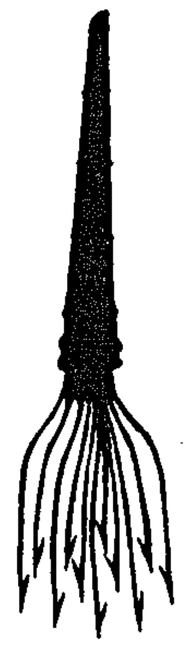


51.42 cm

All the *fali* have *ulta fal* 'sharp hooks' at the end. Each point is more than one hand long. It is used to catch heavy fish like *rui katla and gozar.* Fish cannot wriggle off it because of the hooks. Non-fishermen use it. It is used on the *padi chawk.*

Name: *Taota*

It is another harpoon-like implement. It required a *torolla bash* 'matured bamboo' and twelve pieces of narrow metal rod, 10-12 inches long and sharpened at one end.

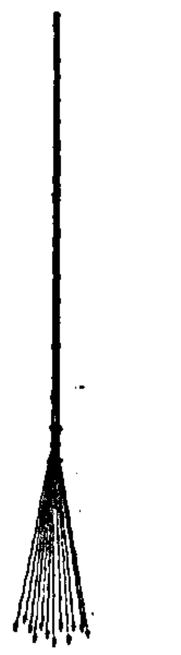


75 cm

Then these rods are attached in a frame and fixed with the *kura* 'bamboo handle'. It used from the month of Kartic to Poush. It is useful at that time of the year to spear fish like *Shail, gozar, magur* that stay in the mud. It is used from a boat in ponds, canal, and *beel*.

Name: *Thuri Koch*

This is another harpoon. It requires a length of bamboo and a few metal prongs and some steel line. The bamboo, 1½ hands long, is split into sixteen pieces to each of which is attached a *fala* 'point'. The spikes number are 12, four are in the middle.

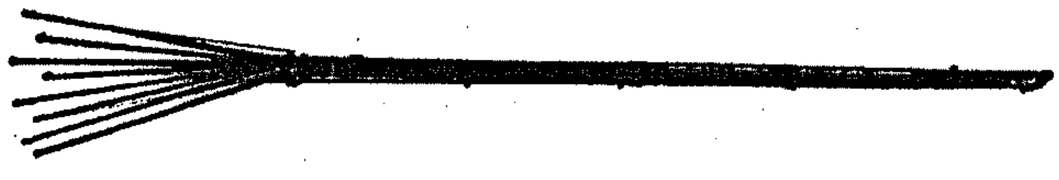


75 cm

This harpoon is used from the month of Vadro to Kartic, when fish come to feed on weeds and molluscs at the upper edge of rivers and *beel*. It is used from a boat. One person handles the boat slowly while the other watches for movements on the water surface or in the in weeds. It costs 60-70 taka to make a *thuri koch*. There is another kind of harpoon called *koch*, which is similar to the *thuri koch*. The points of the *koch* are longer and thicker than those of the *thuri koch* and useful to catch heavy fish like *Mrigel* and *Katla*.

Local name: *Foska* or *koch*

This is a sort of harpoon has sharp pointed skewers for catching fish, comprising several sharp iron blades attached to a length of strong bamboo. Each of the sharp spikes is called *fala*. It is used during the rainy season. It is only useable when the water is clear.



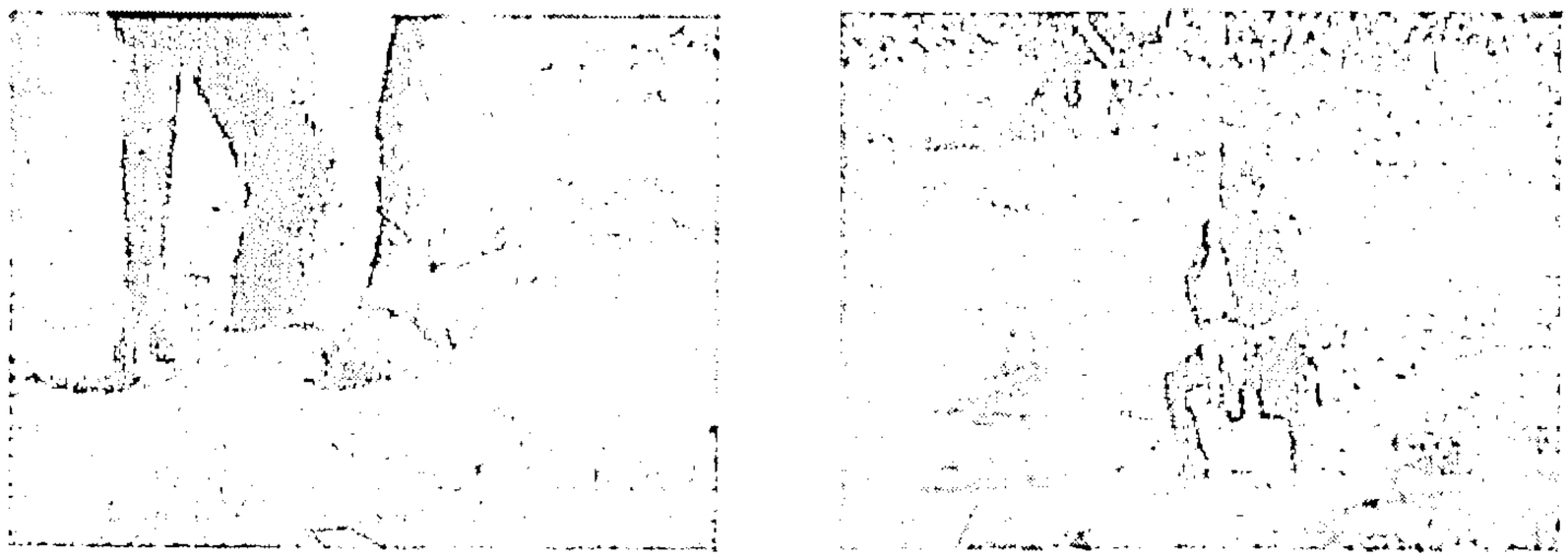
Rui, katla, puti, and *taki* fish are taken with it. It is used when fish come to the surface in search of food. Not only fishermen but also farmers use the *faska* to catch fish. People use it around the paddy fields. It is necessary to judge the position of the fish. *Nishana* 'aim' of the user should be very accurate.

6.3.5 Fishing by hands

While the use of the hands plays a role in all kinds of fishing, to catch fish by only using hands is difficult. There is a person named Ahsan in Charan who has outstanding knowledge in this technique. He has provided all of the drawings and illustrations in this present chapter. There are only a few people like Ahsan in Charan who rely mostly on using their hands to catch fish. Such people have a vast knowledge about the fishes' behaviour, enabling them to apply different techniques. It is a common phenomenon in the village that people belonging to different groups have learnt various techniques for fishing. These people may not be professionals but it helps them to maintaining their subsistence. They use these techniques and their knowledge to fish occasionally. According to Ahsan:

> The common tendency of all fish is to swim against the current. If someone stands opposite the current it becomes turbulent, the local saying for which *awar dewa*, literally means 'making a whirl'. This technique works well in the river and attracts fish such as *Kawni, Tengra, Guja* and *Kata*. In any body of water which is quiescent the fisherman create artificial conditions in order to attract the fish. They churn the water with their hands to create an environment suitable for attracting the fish.

Photograph: 6.13 Catching fish with hand



One should have the knowledge of fish behaviour as different fish behave in different ways. For instance, the *Shing* fish is very cunning as it will swim faster if sees any movement around it. As it always prefers turbid

water fishing for it requires a technique called *Paragati,* 'stepping on the mud', to create the said environment. One has to step frequently on the bed of the water body in order to attract the *Shing* fish. The person should not become scared, as he knows this fish can attack with its *bishacto kata* 'venomous fin', which produces unbearable pain. Instead he should press the fish on the mud with force as soon as it is seen which scares the fish. The frightened fish pretends to be dead and comes easily to hand. The *Baim fish* is also very difficult to catch by hand. They stay inside the holes on the riverbed. One has to observe carefully how many entrances each hole has. If there are several *mukh* 'mouths or entrances', then all except one entrance should be covered by using ones legs. The person then has to put his hand inside of this hole to catch the fish. The fish will always create a huge force in order to try and escape from the hand, referred to locally as *jor-jobordosti* 'creating force', and while doing so it becomes tired. It is not wise to try to catch this fish on its tail, as it is very slippery. One should take some sand in his grip from the riverbed before catching it. *Guja* is a foolish fish, as it only requires an *awar*, 'artificial whirl', made in the water in order that it may be caught. The *Tengra* fish is also always attracted by an *awar*. The *Boal* is very difficult to catch by hand as it moves like a ship. There is only one way to catch it by putting it down on the water body bed with huge force.

6.3.6 Fishing organised by 'Part-time fishermen'

This sub section, describes different types of fishing organised by the part-time fishers and how their fishing activities differ from those of traditional Hindu fishermen. Some Muslims from neighbouring villages come to fish in Charan *beel*. They are not involved in regular fishing. This includes a range of fishing activities conducted by people of different backgrounds in the community. Many of these fishermen come from a *para* called Ghaturia bari, in the neighbouring

village of Jainabari. People in this *para* are very poor. They pull rickshaws and work as agricultural day-labourers. In recent years these people started coming to Charan *beel* to fish during the monsoon. They have no big nets and use banned items such as the *current jal* 'fine meshed net'. They also use *thela jal* 'nets' and spears to catch fish. More than 20 households depend on this fishing during the rainy season. They are not involved any group fishing. Some Muslims also come with *berjal* 'nets' from the villages of Fulbaria, Kokdohora and Utrail.

Fazlu, a seasonal fishermen of Charan, along with his team fish with a *berjal* 'net' from a boat in Charan beel. They start fishing in the month of Ashar and continue up to the month of Poush. He has been fishing here for the last fifteen years. According to him, he is very poor as he owns very little land. He survives mainly by sharecropping. In the rainy season all of his land goes underwater, and as he is unable to farm his family faces hardship. This is why he and some of his fellows started fishing for six months of the year. He takes 25% from the daily income of the boat and rest of the money is distributed between them in eight parts. The boat and net each cost him 20,000 taka. Members of his fishing team are not relatives. They are also day-labourers and their families face the same problems. The same people may not fish with him every year, which differs from the customs of the Hindu fishing teams.

Jamal has the same problems as Fazlu. He is a Muslim fisherman from Charan, and a day-labourer, he has no other choice, except to fish during the monsoon. He has been fishing in Charan *beel* for the last ten years. Before that he was solely a day labourer. He has not inherited any land from his father, as his father was brought here as a day labourer. (He is a Miah and all Miahs are brought in this village as tenants, see 8.4). The volume of agricultural work is not the same throughout the year. The harvest and the planting periods are the best times for the day-labourers, as far as the work availability is concerned. In other seasons he has less chance of finding work. During the monsoon he started to search for some alternative employment. He approached the Hindu fishermen and asked if he could join them. The Hindus were hesitant to have any Muslim as a fishing partner, due to their religious and social differences. But fishing being treated as the work of outcaste people they, gradually, accepted him as a *vagi* 'partner'. He joins the Hindu fishermen in the month of Ashar and continues until the month of Agrahayon or Poush.

A few Muslim boys search for opportunities to earn money and are involved in some fishing activities. There is a small *beel* called Lakhi Proshad beside the main road in Agcharan. When the water recedes from the *beel* to the river it brings many fish. At that time these boys block the water by making a small dam on the canal through which the water drains out. A Hindu fishermen called Nilkomol and his son used to fish in this *beel*, but not nowadays. Mona, a former *mastan* 'thug' who claimed to be wealthy enough not to need to fish, was also

involved in constructing the fish dams, until three years ago when needy Muslims arrived and drove the local people away so depriving them of fish. The boys were asked not to return but they challenged the villagers' ownership. Then Mona and other villagers became involved in a dispute. The Muslims were needy, as they have no other resources. Mona and the villagers drove out the boys and constructed the fishing dam. This should be done in the month Kartic when the water retreats to the river. Fishing then continues until the month of Poush. The fish caught are sold in the Balla Bazar. At the same time the villagers get fish free from the fishermen. The villagers claim it because they own the land inside this *beel*. The dam costs less than one thousand taka to construct. They erected a tent close to the dam and all the shareholders stay in the tent on a rota basis, to protect the dam and stop others fishing there illegally. By the close of the season they will have sold fish worth thirty to fifty thousand taka.

In this chapter, the details of different fishing techniques were described; it did not describe, however, how the fishermen obtain access to the different water bodies in order to apply these fishing techniques. The following chapter is an attempt to explain the access arrangement to the fishing spaces which should provide us with a clear idea of how this fishing technology relates to present social issues.

Chapter 7

Access to Fishing Waters

7.1 Introduction

A community's past experiences and achievements inform present day knowledge. People's experiences and interaction with other social groups needs to be analysed carefully to know who they consider friends and enemies. Most of the time, people's collective experiences, influence them when judging present events. Dealing with a small group of Hindu fishermen it is important to see how they cope in the wider society. The present chapter is an attempt to examine different barriers Hindu fishermen face regarding access to local fishing rights. The history of the lease system and State imposed changes in the rules, will be discussed. Local people's history of their access to fishing rights and the role of the fishermen's co-operative will be explored. Accounts of some incidents involving fishermen in their everyday life dealing with different interest groups will be presented as case material. The role of an NGO, a new local interest group which aims to help the poor by targeting the fishermen, will be assessed. How people have access to the ponds will be also examined.

The main aim of this chapter is to explore the complex access situation to the *beel* to inform that the scientific interventions cannot solve the problems of the poor. Some cases of NGOs are included here as evidence of this fact.

7.2 Access to Pond

Fishing in the river and the canal has always been free to the fishermen. There are certain rules they have to follow but the people of Charan are free to fish in surrounding rivers and canals without paying any tax to anyone. These waterbodies dry up during the dry season resulting in hardship. However, all ponds and ditches are private property. There is no common property right there (Pokrant *et al*:1997, Manuel: 1978).

The ponds are inherited according to the Muslim property rule. This rule dictates that whereas a boy can inherit a full share, a girl can claim only A-Half share. Usually, girls do not take anything of their paternal property when they go to their husband's house. It also costs a great deal of money for the bride's father to arrange a marriage for the daughter as sometimes they have to give a large dowry to the groom or his family. So the girls leave their share with their brothers to compensate for the economic pressures that the family had encountered when arranging her marriage. This varies from family to family according to their economic status. If a girl is pressurised by her husband's family to claim her property from her parents, then they do it, unwillingly. It was evident that the eldest son in many families gets ponds as his share of the property. In most cases he is taking on the responsibility for the family after the death of their father. Due to his contribution to the family property, his father's ponds are not claimed by the other family members in order to compensate or to help him to make extra money through pond culture.

In Charan, some pond owners were already trying to cultivate fish in their ponds without consulting with any fishery expert. They try to follow what other people in other regions do when they cultivate fish in their ponds. Although the environment in the Charan ponds is not conducive to fish culture, nevertheless people are motivated to try. A group was formed among the villagers to start a joint venture in fish culture. They rented seven ponds from their owners, on a yearly basis. The villagers call it 'lease system'. Each year they are supposed to pay 10,000 taka for each pond. The rent also varies according to the size of the pond. The village group installed a water pump to supply the water to the pond during the dry season (the physical environment in the pond was discussed in Chapter 4.3.4). The people who introduced the fish culture bought fry and arranged for labour to maintain their business. The labourers levelled the soil inside the pond and feed the fish. Most of the time the partners used to prepare the food for the fish. If the pond was close to any member's house then their wives or sisters would feed the fish. Whenever it is necessary to catch fish, pond owners employ fishermen who come with their nets to catch fish (see Chapter 8).

There is a committee in Charan who takes care of the graveyard and its property. The committee controls two big ponds which were donated to them. Fish culture was introduced to this pond in order to raise funds for the graveyard. Shah and Townsley (2000) found in the village of Bhatara, District of Manikganj, that people have four systems of pond tenure. These are called the 'share

system', *kot* 'contract' system, 'lease' system and *dowani* 'two parts of one taka' system. In Charan, people only follow the lease system.

7.3 Common Property and access rights

Regarding access to fishing waters, the situation varies from place to place. In many societies fishery resources are considered as a common property resource (Acheson 1981). There are many places in the world where fishermen can fish where they like and fish resources have no ownership. On the other hand, in other societies fishermen have established fishing rights which may also involve control over the 'fishing space', and not only the resource. In these societies fishing rights are controlled and fishing territories are not a common property resource.

McGoodwin (1990:112) interpreted fishing access in two ways: one he named 'a passive means of indigenous regulation', and the other where fishing societies controlled fishing resources through ritualised or customary patterns of behaviour. He believes these both play a positive role in conserving fish resources.

> High on the list of passive means that help to prevent over harvesting or severe competition is simple inability: A-Human population too small to do much damage. (p.112)

This situation clearly does not apply to heavily-populated Bangladesh. Ahmed *et al* (1997) argue that among the Bengalis for conservation too, regardless of population:

> Traditionally the low caste Hindus practised full-time fishing. They developed technologies and adopted them, which served to protect the resources. (p.237)

Ferguson and Derman (1995) stated that in a growing number of cases throughout Africa, communities' resources are exploited by outsiders, the continuation of local cultures and livelihoods is seriously threatened. In these cases the communities, or community members within them, find themselves powerless to prevent the expropriation of the resources over which they previously had legal or customary control. According to them, the outrages of the outsiders leads not to human rights violations, but rather to dispossession combined with an authoritarian political context. The fishermen community of Charan is also facing the similar consequences.

Changes occurred in common property rights in fisheries in Bangladesh during the past. There is an attempt to describe condition and changes attached to the situation from the historical past. The fisheries and other food and non-food resources are traditionally regarded common property in Bangladesh (Ahmed:1997). The access rights are more or less open to all members of communities living in and around flooded areas. This is a very simplistic explanation and it does make clear the limits of access. However, Pokrant *et al* (1997) explored the access situation to fisheries from the period when Bengal

was undivided. He discovered that the position of Bengali fishermen under the British was shaped by legal changes in the 18th century, related to the permanent settlement, which was introduced in 1793. The main aim of these changes was to support the indigenous estate holders and local rulers, the Jamider, who were given the authority to collect a *jal kar* 'water tax'. He says that these rights were established on non-navigable rivers, the *beel*, ponds, *haor* and tanks. This system gradually replaced the toll customs, where fishermen used to give some fish to the representative of the Jamider to access the fishing waters. A leasing or contractual system subsequently emerged. Toufique (1997, 1998, 1996) examines the causes behind the failure of the fishermen to establish property rights over fishing grounds in the inland fisheries of Bangladesh. He concludes that property rights were eventually transferred to socially powerful agents, the *ijaradar* leasees, who are not members of the fishing community. Pokrant (1996), concerned about state regulation of open capture inland fisheries, thinks that since 1793, it has been directed largely to the protection of rentier and commercial non-fisher interests.

According to Pokrant *et al* (1997) the leasees were local well-to-do farmers, unlike the Jamider, and were able to exercise better control over the labour process of fishermen. Some direct leasing of *jalmohal* 'water bodies' to fisher *ijaradar* 'leasee' were also evident but were of lesser importance than the non-fisher *ijaradar*. Direct access to certain waterways by the public is through the State, which own the navigable rivers, tidal estuaries and rivers, running through

certain forest areas. There was also growing private control of waterways and waterbodies. The State took over public water rights attached to the estates of Jamider by the state to those who failed to pay the fixed revenue imposed on them through the Permanent settlement. The private users either bought or leased the *jalmoal*. Furthermore:

> .. private and public control of waterways and waterbodies expanded ... at the expense of a third form of access based on customary rights to the product s of water held by fishers and farmers. Conflict between fishers, private leasees and government over water access was common throughout the ... period and was the subject of a number of court cases. (Pokrant *et al* : 1997, p-32)

After 1793 the leasing arrangements became more complex and varied from site to site. Pokrant refers to the earliest published survey by Buchanan-Hamilton (1877) for East India Company between 1807-1813 on such leases and organisations of fishing in undivided Bengal. Pokrant thinks Buchanan and Hamilton's survey made it clear that many of the features that persisted through-out the colonial period, and which existed in other parts of Bengal as well, were founded in the early years of British rule. It includes a fixed system of short-term leasing arrangement between Jamider and *ijaradar*.

According to the authors, Buchanan Hamilton's material covers only selected Districts of what was then Greater Bengal. They place emphasis on the important District of greater Mymensingh when referring to the accounts from the later part of the 19th century up to the 1940s. The present District of Tangail was

formerly a subdivision of the greater District of Mymensingh. So the description of the Greater Mymensingh fisheries also included Tangail (the present study area). In the District of Mymensingh a similar variety of leasing arrangements, to that of Buchanan and Hamilton's time, was evident. According to the authors, fishing was conducted in rivers and the *beel* by professional fishermen such as *kaiboto* and *jhalo*. They formed two and half per cent of the total population.

The *ijaradar* who leased river blocks from local landlords was paid taka of between one to five a boat if the fishermen fished in smaller rivers. The *ijaradar* were both from fishing and non-fishermen communities. In the case of fishing in the *beel*, *sharder* 'headmen' of the fishing castes leased the *beel* and each season arranged for the importation of number of fishermen and their families, who set up a camp on the banks of the *beel*. Each of these fishermen used to get 80 taka for a season and his wife received 40 taka for cutting up and drying the fish. The headmen of the fishers invested huge amounts of money in order to pay the wages of the fishermen, buying nets and boats and providing housing for the fishers, as well as making pay-offs to the Jamider's agents. These leases were yearly and had considerable risks attached to them for they encouraged over-fishing which was a common complaint in the official reports. It was assessed in many parts of Mymensingh that the fishers received only thirty per cent of total value of their catch. The Jamider and *ijaradar* got forty percent and the trading intermediaries, called *nikari*, had thirty per cent. According to the authors, *ijaradar* made the most of the profits from the leases.

During the pre-British times the fishers' and the farmers' had certain 'customary rights' to fish, which was continued in the British era. Gradually, the growth of state-approved capitalist property rights in water improved by the public ownership of the certain water-bodies, but the right that the fishers and farmers had enjoyed before the British rule came under pressure. The introduction of Jamiders wide ranging property rights over cultivable land, pasture, forests, fisheries, ferries, markets and roads allowed them to harm the fishers' and farmers' traditional rights.

According to Ali (1997) The system of ownership and lease settlement of water bodies in East Bengal continued after the partition of India in 1947 when it became part of Pakistan. The Government of East Bengal abolished the Jamidary system and acquired rent-collection rights in 1950 through the notification of the State Acquisition Tenancy Act 1950 (East Bengal Act XXVIII of 1951). The Revenue department of the provincial government of East Bengal acquired the ownership of *Jalmohal* and their management. The collector-cum-District magistrates started dealing with the *jalmohal*. The District magistrate or the District collector, presently known as Deputy Commissioner, was the chief representative of the 'Crown' during the 'British *raj*'. Later, they served under the Government of the country and this system is still existing. There is an additional Deputy Commissioner (ADC) in the district to support the Deputy Commissioner to deal with the revenue matters, which includes the revenue management of the *Jalmohal*. There are a number of staff such as Deputy Collector, Assistant

Commissioner of land, and *tahshilders* 'authority of small territory', working under the ADC revenue to organise the system. The management leases out the *jalmohal* every year and the perennial *beel* for three years. An open auction used to be organised after the conclusion of previous lease terms as the objective was to earn revenue for the government. The minimum revenue, prior to the auction was fixed according to the average of the previous three terms rent. The average rent was increased by ten percent more than the base auction price.

According to Ali, from the 1950 to 1965, anybody could participate in the auction to bid for the *jalmohal* lease which involved many non-fishermen rich and influential *ijaradar* in this business. In the late sixties, the Board of Revenue gave preference to the fishermen's Co-operative societies by making lease settlements in order to help the poor fishermen community. After Independence, the Government of Bangladesh decided to restrict the *Jalmohal* auction only to the registered fishermen's co-operatives. As the given scenario:

> These new societies also obtained registration from the co-operative department. The sole object of all these fishermen's co-operatives... was to secure lease of *jalmohals*. Most of the co-operative were organised and formed at the behest of the traditional non-fishermen *ijaradars* of the past, who provided necessary financial and other support to their patronised societies. The reasons for such patronisation was to secure control of *jalmohals* by the traditional non-fishermen lease holders using the patronised co-operative societies as the front organisation. (ibid:129)

This is why the co-operatives who secured the leases started to sub-lease the *jalmohal* over to their 'respective patrons'. Despite other temporary amendments up to the period, in 1991 further changes in the method of *jalmohal* leasing were

announced. The important features of the changed procedure were: the auction for *jalmohal* lease was discontinued and it was replaced by a tender committee headed by the DC, along with ADC revenue, District fisheries officer, District Co-operative officer and Deputy revenue collector as the members of this committee. According to the new rule, the tendering was restricted to the fishermen's co-operatives and the lease of the *jalmohal* had to be settled with the fishermen Co-operative, who made the highest offer of lease money. There was another small amendment made later in 1994, but there was no major change in the system. This is the scenario of leasing arrangements by Government ruling which has been commonly applicable all over Bengal from the historical past right up to the present time.

7.4 The present situation

The situation in Charan *beel* represents the scenario of the fishermen's fishing rights in all Bangladesh. Presently, the fishers' access to fishing waters in Bangladesh is complex due to the involvement of different interest groups. According to Wood (1994), the experience with group access to water-bodies has revealed the presence of other vested interests. Sometimes they have created fictitious groups of fishermen or businessmen in order to gain access to fishing rights. Sometimes existing groups have been penetrated by the 'henchmen' of such businessmen. Furthermore:

> The allocation of a peppercorn lease to a group may have been achieved by the successful networking of such businessmen with district...officials. Where the groups has

> no prospect of acquiring boats or nets, they are then obliged to contract 'professional fishermen'/ local businessmen (if they are not already connected to the group) to undertake the actual fishing. As noted above, the labour fishermen may belong to a different communal group anyway and it is not clear to what extent the performance of these activities are socially segmented. (pp-394-395)

This situation in the Bangladesh fisheries is common to many present day fisheries all over the world. Hardin (1968) put forward the theory of 'tragedy of commons'. The contradictions between individual and system interests is posed by it (McCay and Acheson 1987). This emphasises the problems in common property where there is free and unregulated access to scarce resources. Berker (1987) explained Hardin's parable as he thinks it can be formulated for fisheries. On a waterbody where fishery is profitable, all participating fishermen as rational beings want to maximise their profits. Then the effect of over fishing will be shared by all fishermen, as each fisherman is interested in increasing his fishing effort, and as a result 'freedom in common brings ruin to all'. With reference to Stillman (1975) and O'Riordon (1976) Berkes mentioned three conditions which will bring about tragedy in commons cases, these are:

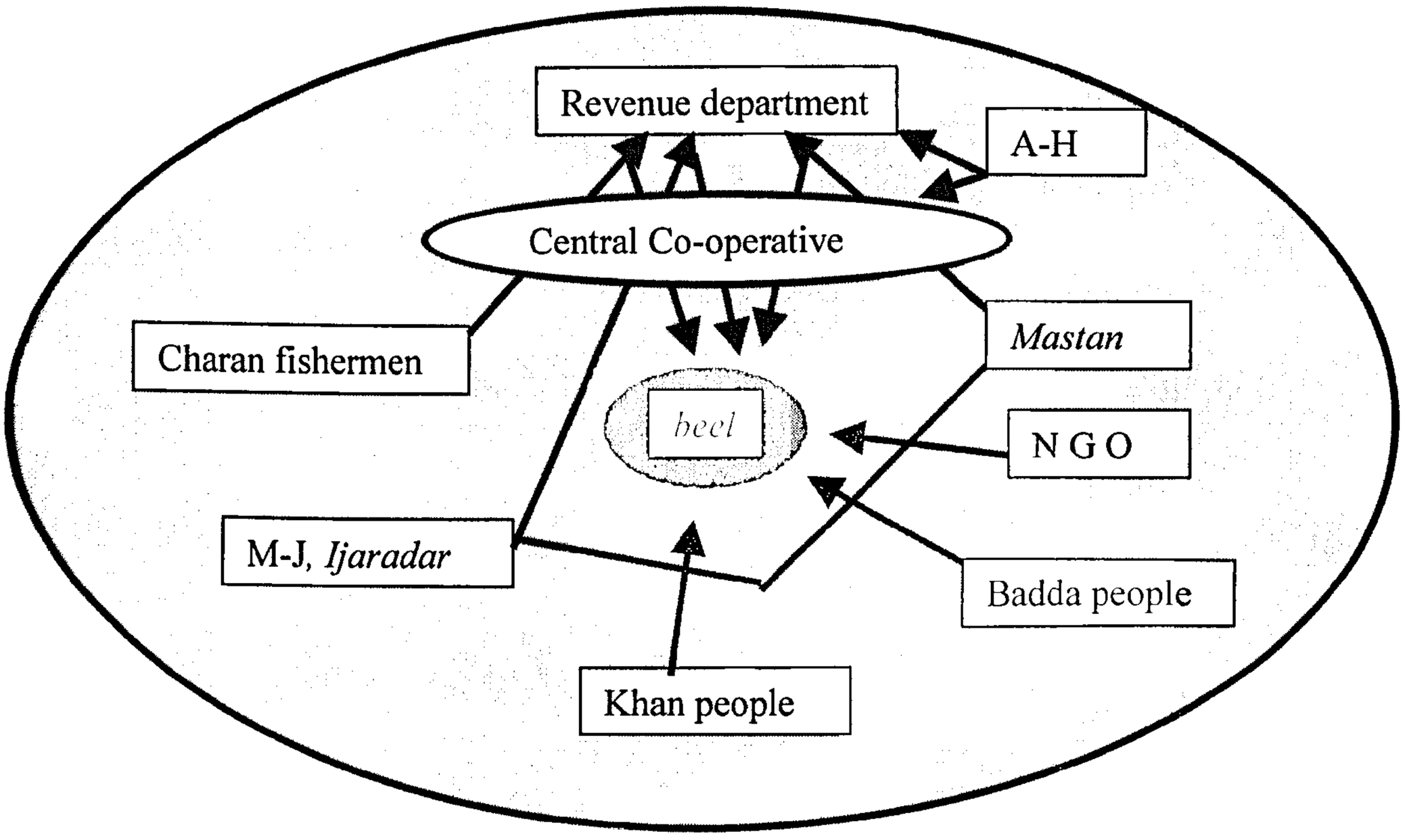
> 1)The resource must be owned in common by a group of people ....must be freely open to any user. 2) ...Individual must be able to pursue self-interest as opposed to collective good. ...users are maximising their short tem gains without regard to long-term validity of the fishery or the welfare of their community. 3) The resource must be used so intensively that the rate of exploitation exceeds the natural rate of replenishment of the resources, that is, the harvest exceeds sustainable yields. (p-137)

McGoodwin's (1990) arguments on the context of the world fisheries make the case of Charan *beel* fit into this theoretical model of the 'tragedy of commons'.

He also attached the main problem in many fisheries with their status as common property. The tragic consequence is that more and more competitors enter a formerly profitable fishery (Leal 1998). Fish stocks, and consequently, revenues decline. Thus it applies to the present day in Charan *beel* and involvement of different interest groups in the *beel* fisheries.

In the context of Charan, in order to form a better understanding of the position of the different interest groups, which are confronting or uniting with each other in order to have access to the *beel* an illustration is proffered (see also figure:7.1). The fishermen's Co-operative in Charan has a genuine claim to the *beel*, as they followed the lease procedure arranged by the proper authority, i.e. the Revenue Department of the government in Tangail. The second party is the *ijaradar* 'leasee' but they have no legal, or institutionally recognised, right to the *beel*; they obtained their access by manipulating the lease procedure. M-J is an example of *ijaradar* in the context of Charan, who is very exploitative to the Charan fishermen. Another newly emerging *ijaradar* are the *mastan* 'thugs' who are the rival group to M-J and, also, much more exploitative of the fishermen. At the district level there are other gatekeepers who manipulate the lease procedures and support different *ijaradar*. These types of people are found in the Central Co-operative in Tangail. This Co-operative is supposed to be controlled by the representatives of the local Co-operative at the periphery.

Figure: 7.1 Position of different interests group around Charan *beel*



In the whole Tangail District the number of fishermen's Co-operatives are about 42, which are linked to the Central Co-operative in Tangail, but, unfortunately, occupied by some fish businessmen who are notorious and involved in different social crimes. A-H is an example of this type of character. The role of the Central Co-operative is to assure the fishing-rights of the Co-operative on the peripheries, by helping them to deal with the Revenue Department. In reality, it also exploits the fishermen in order to support the non-fishers. Another group is formed by the people from Badda village. They are not party to the Revenue Department and do not care who are the leasees. They get access to the *beel*, directly, by using force. The Khan people of Charan also play a similar role, when they claim their right to the land inside the *beel*. An NGO which wants to

intervene to change the physical environment of the *beel*, is also involved in the competition for access. These are the positions of the groups which has made the access situation very complex for the fishermen of Charan and also made the 'tragedy of commons' issue very applicable to the situation in the *beel*.

7.5 The experiences of the Charan fishermen

In different eras fishermen's access to Charan *beel* has changed as related above for Bengal. During the British era, when the grandfathers of elderly fishermen of Charan were alive, they used to pay a tax to the Jamider[1] of Karotia, Fulbari and Pakulla. The Jamider was the owner of the land and water and he was supposed to receive the *najar* (tax in kind which may be small but is a symbol of obedience). Some of the fishermen only paid two taka as *salami*[2]. Whenever the Jamider came to visit the *jal mohal* 'water estate' the fishermen used to leave some fish with his representatives. It was taken for granted that they would show their respects to the Jamider in this way. The Jamider was 'happy' to see that people were obedient. In the Pakistan colonial period this arrangement changed. The Government started to acquire Jamider properties forty years ago, and Jamider families lost their total control over the *jal mohal*. The Government claimed the *das ana* (ten parts of a taka, a taka consisting of sixteen *ana*) and the remaining *chai ana* (six ana) were owned by the Jamidar. It was easy for the fisherman to go to the Jamider, as they knew him. On the other

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[1] Word *Jamidar* refers to feudal lord. In all exiting works Anglo-Indian dictionary is followed where the word spells *Zamindar* and it is A-Hindi word. The word Jamidar is purely Bengali and people of Charan also pronounce it in this way.

[2] It is derived from the word *salam*. *Salam* is a kind of greetings among the Muslim. When it used amongst the patron and clients then it has different meaning. *Salami* is accepted as a sign of obedience of the client to his patron.

hand, during the Pakistan period they did not bother to go to the Government for leasing purposes. People in the administration did not show any interest in the *beel*. The Jamider was given less than 300 hundred taka which was enough for them to establish their claim on the *beel* each fishing season. Then the government started controlling the *beel*. It showed preference to the fishing communities at first.

Things went unchanged for the next few years. After the liberation war of 1971, further change occurred. The Government claimed *sholo ana* (full ownership) of the *beel*. It established a rule for the lease of the *beel*, to ensure that genuine fisherman got access to it. The Government announced that there should be a Co-operative organised by the full-time fishermen which would preserve them the right to lease the *beel* (Fisheries Act 1972). Acheson (1981) argues that the increased Co-operative movement all over the world is the outcome of the policies of international and governmental development agencies. It was seen as a solution to the problems of small-scale fisheries. (See McCay 1980 who relates fishing Co-operatives with the conservation of fish resources, in New Jersey).

The traditional fisherman of Agcharan formed the *Agcharan Motsojibi Somobaisamitee* 'Co-operative for the Fisherman of Agcharan' in 1972. It was registered with the Ministry of Livestock and Fisheries in 1973. Shunil kumar Das, Chan Mohon Das and Khushi Mohom Das were the main organisers of the

Co-operative, formed to establish the rights of Hindu fishermen. In the beginning, more than A-Hundred fishermen took out membership of the co-operative. All members came from the traditional Hindu fishermen. Since then, not a single person from the Muslim community has obtained membership of the co-operative. In Charan, the fishermen were asked to pay a sum of money through their Co-operative. A common fund was created to support access to different water bodies. Officials from the fisheries department came to make the members aware of the rules. Shunil Chandro das was elected the secretary of the co-operative and Chan Mohon the president. The government provided some support for the fishermen through the Co-operative. Members of the Co-operative used to receive cotton to make nets and money to buy boats. From the beginning the co-operative played an important role in assisting Hindu fishermen to obtain their fishing rights. The secretary, Shunil, was an efficient man who knew the rules and regulations of the fisheries well having good relations with people in the central Co-operative in Tangail. He was very courageous and was prepared to argue with anyone even though he belonged to the minority. In his lifetime no one interfered in Charan *beel.*

Unfortunately, when Shunil died in 1996 the fishermen became politically weak, due mainly to none of them being formally educated and able to deal and bargain with the government and other interest groups. The fishermen's Co-operative failed to retain their subscription and so it was difficult to participate in the bidding sessions for leases. The Co-operative became ineffective. Nirmol

Chandro is its present secretary, but has no influence at the district level. Consequently most of the fishermen have little regard for the Co-operative's functions. They stopped paying their monthly dues to the Co-operative; they are now driven by self-interest rather than the common good.

The fishermen say that few Muslims fishermen were involved in fishing during the Pakistan period. After liberation they tried very hard to form a co-operative of their own, but it was not approved by the Government. Then they tried to join in the approved Co-operative but failed again due to objections by the traditional fishermen. In Charan *beel* most of the Muslim fishermen come from the neighbouring village Badda. They terrorise and attack the Hindu fishermen. The traditional fishermen have lost their control of the *beel* as non-fishermen are using force to enter it. Uncontrolled fishing is destroying the fish resources.

The Charan fisherman obtained the *ijara* 'lease' of the *beel* through the newly formed co-operative in 1973. The Government was strictly following the claims of genuine fishermen. There was no chance for Muslim fishermen to make any legal claims. Seven hundred taka were paid to the revenue department at the District level. The amount has been increasing every year and for the year 2000 they paid more than fifty thousand taka an over seventy times increase. Bancha ram Das, president of the co-operative stated that:

> When I was young only traditional fishermen were the users of the fishing spaces. If any one from the Muslim community came to catch fish they used to be *bandh*

'excommunicated' by the *somaj* because it was polluting work. But nowadays Muslims are heavily involved in this occupation.

In 1973 the government announced no one else could take a lease in the *Jala* or *Jal mohal* 'water body' except for the co-operatives of genuine fishermen. So the co-operative was formed to fulfil the requirement to secure the lease of the *beel* in response to the announcement by the government. There was also another nation wide Co-operative for the fishermen which helped the local co-operatives to get leases in the *beel*.

> But in last three or four years some *mastan* and *Gunda-badmaish* 'thugs and bad doers' have started to demand illegal *chada* 'rent' from fishermen when they found that this activity was profitable. Paying the extra money to the thugs the situation collapsed for the traditional fishermen. Now those 'terrorists' are scaring the fishermen. For instance, M-J of Pachcharan, used force to obtain part of the lease of the *beel* with the fishermen. He is pressurising everyone using the *beel* in the Pachcharan region for money. M-J swears at the fishermen which they consider to be shameful.[3]

After independence, the Government of Bangladesh announced that only those who are possessing *jal* 'nets' could be the users of the *jala* 'water body'. It introduced a popular saying *jal jar jala tar* 'net owner is water body owner'. Although this was an effort on the government's part to protect the real fishers' interests, the real fishers' were too poor to have a net and boat. So, this rule actually benefited the *mohajan* 'owners of the boat and net' and the moneylenders.

The situation in 1997 was explained by a fisherman when the Agcharan Fishermen's Co-operative was in control of half of the *beel*. Only one year earlier the Co-operative had been in control of the whole *beel*. He saw how the people of Pachcahran gradually occupied the *beel*. At first they took away *dui*

ana angsha (2/16) of the *beel*. Gradually, they took away more, controlling the *shiki angsho* (1/4) of the *beel*. According to him the traditional fisherman are not only losing their fishing rights in the *beel*, they are also being driven off their land.

It seems that Hindu fishers are victimised not only in accessing the *beel*, but they are also under threat from wider society. According to the fishermen, many of the Khans in Agcharan are 'invaders'. During the partition period in 1947 and India-Pakistan war in 1965 most Hindu people, including fisherman, fled the country which was fortunate for the Muslims. During the liberation period some Khans in the village asked the fishermen to leave the country. After 1947, these Khans said," Go to India, this is Pakistan now, no Hindu has any right to stay here". After that most of the Hindus fled leaving their houses, land and properties behind. Formerly, there were more than three hundred and fifty Hindu households in the village. All castes present were affected not only the fishermen. Now some Khans have occupied all the former Hindus property.

Soon the most influential person in the village had forcefully occupied A-Hindu person's house without paying any compensation. Another Khan also took away a piece of land from a fisherman. A *chawk* besides Charan beel, called *jaila ghat* (approach for the fisherman), was also occupied by one of the prominent Khan. A fisherman explained how he was driven away from his house few years earlier. The sister of a prominent Khan then took over his house because he had borrowed one hundred taka and a *mon* (about 40 kg) of paddy from her. Only

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[3] Some persons names are changed in this dissertation so that they cannot be identified.

one year later he bought the same house back from them paying seventeen thousands taka. These influential Khans do not allow people from other villages to come to Agcharan to buy Hindu land. This is because if buyers came in from outside the price of the land would go up and it would ruin their chances of obtaining cheap land. It is clear that Hindu fishermen are having problems as they are in the minority and poor. Events on the *beel* also indicate their low position in the wider society. In the past Khans had been 'torturing' the Hindu people. If one day they did not catch any fish they punished the fishermen by not allowing them on their land (during the rainy season). The fishermen were asked to close their *katha* 'fish refuges'. The largest part of the *katha* inside the *beel* is on *khas* 'common' land. Some of them are on private property of which the worst offenders claim ownership. They demand fish from the fishermen during the fishing period. Sometimes they tell the fishermen not to arrange a *jhata* on their land, and also ask for money. They argued that the fishermen only had the lease of the water so they cannot put any bamboo poles on their land under the water. One of the Khan demanded the *potton* 'possession' from the government of the *khas* lands where fishermen arrange their refuges. The present secretary of the fishermen Co-operative argued with that person that as the government assigned to the *bayanno khada shompotti* 'fifty two plots' as *khas* 'common' land, to be leased by the fishermen in the *beel*, how could this land be owned by him. Later, the secretary of the fishermen Co-operative petitioned the Revenue Department to sort out the problem and this silenced that Khan. According to the government rule when the water level rises above two feet, it becomes

bhashoman pani 'floating water', and is considered part of the water estate. So this person's claim was illegal.

7.6 Role of an *ijaradar* 'lessee' and control of *beel*

As far as the Fisheries in Bangladesh are concerned, it is very important to know about an *ijaradar* (Wood 1994, Pokrant *et al.* 1997; Ali 1997). This section describes how and under what conditions an *ijaradar* grows up in Bengali society. M-j is well known *ijaradar* in Tangail District. Most of the *ijaradar* are non-fishermen like M-j. They are very unpopular as they exploit the fishermen. This is the image of the *ijaradar* in greater Bengali society. It is also important to explore the social backgrounds of the *ijaradar* in order to understand their power-base and its relation to the fishers' access to the fishing waters.

M-j of Pachcharan village started his career as a professional driver, but returned to Charan when he lost the job. Gradually, he involved himself in village affairs and many people in Pach Charan became his relatives through marriage.

How did M-j become involved with the *beel*? Whenever this question is raised, M-j referred to his father's era. M-j's father came to Charan from neighbouring Thana Mirja Pur. The family came to this village as his mother had inherited some paternal land here. For the last forty years he was a resident in the village. In the past, when the Jamiders of Karatia, Delduar, Mohara, and Sawali were the owners of the *beel*, his father used to play the role of a middleman to sort out

people's problems of land claims and dispute with the Jamider's estate. It brought him close to the fishermen of Charan and he used to receive fish from them as they thought he was an important person who could be of help to deal with Jamider regarding the *beel*.

M-j has been controlling the *beel* for the last five years. This right he got from the A.D.C (revenue) who had sanctioned the lease paper in favour of a fishermen Co-operative through an open bid. M-j has no membership of any fishermen Co-operative and he himself is not a fisherman. So how did he manage to obtain this piece of paper? This question has been asked before. He claimed that he had a good relationship with the Hindu fishermen in Agcharan. M-j is a party activist. He is a member of the former ruling party BNP, and as this party has been in power for the last few years no one has come forward to challenge him. The change in the Government in 1996 has reduced his influence in the administration as well as in the Central Co-operative.

7.6.1 Rent for fishing

The fishermen used to pay *khajna* 'rent' if they used the *beel* for fishing. When there are few fish in the lean period then each fisherman has to pay 300-350 taka per month. In the rainy season the amount of *khajna* increases. The rent used to be collected by the leasee. An authorised person from the fishermen's Co-operative or their said 'partner' M-j, collected the rent. For one year, the rent was collected by the *mastan* 'thugs' of Pachcharan as they were the sub-leasee

of the *beel* in 1998. To have a better understanding about the rent collection procedure M-j is the best case.

During the daytime M-j goes out on a boat on the *beel* to collect *joma* 'rent'. He always determines for himself how many boats are fishing in the *beel*, because he does not trust anyone. Before entering the *beel* the fishermen of neighbouring villages of Fulbaria, Kokdohra would inform him about fishing activities. M-j would collect money from the boats and individuals fishing with fishing gear. The money collection is unpleasant because pressure is put on the fishermen to pay the rent without any effort being made to ascertain if they have sufficient catch equivalent to the rent. M-j's partners, the fishermen of Charan, also collect rent on their territory close by. He is always accompanied by two of his followers whenever he goes out for rent collection. He takes them to force people to pay the rent. The fishermen ask him to wait in the Bolla Bazar 'market' until they have sold their catch. There is a restaurant at the entrance of Bolla market, which is always very busy. M-j waits there with his followers as it is a safe place for him to bargain with the fishermen. He goes to the market after lunch and stays there until the evening, drinking many cups of *cha* 'tea', chewing *pan* 'betel leaf' or smoking *biri* 'local cigar' and chatting with his people. All of the people who accompany him are there for a cup of tea or a smoke. When the fishermen come here and pay the rent to him, they bargain and offer tea to M-j try to persuade him that the catch was not satisfactory and that the market was very dull that day, and in this way they try to pay him less money. They usually

fail to convince him and he curses them for trying to get away with paying him less money than he demands.

M-j explained how he collects rent from the fishermen when in control of the *beel*. He watches to see how many boats had been fishing on the *beel* from the month of Ashar to Agrahayan. This gives him an idea of how much money he receives. He claims that he does not misbehave or use any force to collect the rent. He claims that at the end of the season he allows some fishermen to pay less of money if they have had a bad time. In the *berjal* fishing peak season, he asks twelve hundred taka from each boat per month. There are some people who use *curent jal*, who are asked to give only A-Hundred or fifty taka a month. In the month of Kartic when Fishermen start *jhaki jal* fishing they pay fifty to sixty taka a month. For the *moijal* 'nets' fishermen paying thirty taka a day, as they are involved in irregular fishing. He collects only 5 to 10 taka from the people who fish with *jali* net as he thinks they are very poor. Most of the fishermen come with *berjal* from Agcharan, Fulbari and Ghona bari. M-j has twenty five *Jhata* 'refuges' under his control. Most of the *jhata* are on *khas* land. The rest are on the individual's plots. He collects ten taka for every hundred earned from the *jhata* as rent. He stresses that the Agcharan fishermen are his partners. They have decided that each party should collect rent from the same number of boats. If one of them allows an extra boat for fishing, the income is divided equally between both parties It is arranged by the both himself and the people in the fishermen co-operative in Agcharan.

7.7 Manipulation of lease procedures

This section presents a description of this complex lease procedure according to the experiences of the fishermen of Charan. The lease procedure is very complex and lengthy, as it has different phases and many parties can interfere and manipulate things during the development of leasing procedure. One has to know the rules and regulations well to be successful in this business. Few fishermen are aware about many of the rules, as they do not have any formal education. Some middlemen or interest groups try to take advantage of this and manipulate the leasing procedure. An attempt will be made to draw a picture how a *ijaradar* leasee like M-J manipulate things in his favour.

The fishermen of Charan lease of the *beel* from the Revenue Department of the District where they have to buy two schedules 'permits to take part in a bid'. As they are the closest fishing community to the *beel,* Charan fishermen have the highest preference. This system of bidding here is almost like tendering. Each party, wishing to take part in the bidding session, has to buy a 'schedule' with the name of their Co-operative on it. However, before the district authorities get involved in the bidding, clerks and other office assistants claim money for district funds. This money they take from the fishermen without giving any receipt. The bidding is arranged in Tangail, and dominated by local interest groups. The people in Tangail, including the President and Secretary of the Central Co-operative manipulate their position. The Central Co-operative controls forty-two local Fishermen Co-operatives in Tangail. Both Hindus and Muslims, can belong

to this organisation. The secretary from Charan village cannot exercise any influence in Tangail.

There is a Fishermen's Co-operative called *Jogini Motshajibi Shamitee* 'Fishermen's Co-operative of Jogini' in Tangail. It is a fake Co-operative. People are always there to manipulate things in favour of *ijaradar* 'lease' and other interest groups. An old fisherman of Charan thinks *kichu chalak lok* 'some sneaky people' are operating the co-operative there. The secretary of that Co-operative tried to do a deal (back door arrangement) with M-j regarding the *Charan beel*. M-j gave the secretary some *profit*[4] 'bribe' in 1996 and so was able to lease the *beel* for three years[5]. M-j, his brother and other two partners in Pach Charan were also involved in this deal. They kept one of the Hindu fishermen of Charan as their partner and so pretended that the interests of the Hindu fishermen were confirmed in this deal.

Although the Co-operative in Agcharan has the legal claim on the *beel*, the Central Co-operative in Tangail stopped the invitation letter to the Agcharan fishermen's co-operative in a conspiracy with the staff in the Revenue Department to capture the *beel*. The Charan fishermen failed to attend the bidding session, as they were not given prior notice. Officials were bribed and they changed the records according to the demands of their clients. When the

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[4] In the rural areas people use some English words which might not convey the actual meaning.

[5] This agreement would have been valid from 1403-1405 Bengali year.

deal was done the fishermen were told not to go to the Pachcharan part of the *beel* as it was in the control of M-j.

M-j forced the fishermen to accept some money and in this way secured half of the *beel* in 1996. The fishermen were bound to share with him because he is from the Muslim community and the life of the fishermen will be at risk if they do not meet up with his demands. People from Pachcharan including M-j's relatives used to come to the *beel* to get fish but did not pay for doing so. A few people from Pachcharan were interested in sharing the *beel*. When fishermen asked for money they were attacked. The fishermen have not got any police protection or support from the administration. This is why they had to compromise. The Pach charan people, under the leadership of M-j got control of the *beel* by paying a small amount to the Co-operative which is why M-j is on the *beel*. If anyone goes on the Pachacharan part of the *beel*, he will have to pay a tax. In 1997, M-j became very aggressive to the traditional fisherman, collecting excessive amounts of money (*khajna*) and if anyone refuses to pay he is attacked.

The fishermen know M-j has no legal right to control the *beel*. He is a *bodragi manuh* 'angry man', out for his own interests and he manipulates things in his favour by threat and bribery. A-Hindu fisherman worriedly explained the situation after M-j had intervened in the *beel*.

The *beel* is the main source of their survival. If it is leased by someone else, other than the fishermens Co-operative then the cost of fishing will increase a lot. They will not have

freedom to fish. If it is controlled by non-fishermen they will not allow the fishermen to fish in the *jhata*, as they have done for generations. In the past, some Muslims of Pachcharan used to take away fish from the fisherman, destroy their *jhata* and enter the *beel* without paying any rent to the Co-operative. The fishermen wanted to avoid confrontations with the Pach Charan people. They offered them *duiana angsha* (one sixteenth share) of the *beel*. But the Pachcharan people gradually increased their demands and now they have half of the *beel*.

However, things changed in 1997 when the government was changed. The people in the central co-operative started to favour another newly emerged interest group. According to their agreement with M-j and his partners, they were supposed to get fifty thousand taka for the first year, forty thousand for the second year and twenty thousand for the last year to the people in the Central co-operative. The agreement was signed on Co-operative letterhead and was supposed to be valid from 1998, but the Central Co-operative had added an amendment. It said that the year 1405 (Bengali year), as mentioned in the agreement was a typing mistake. It was an attempt to get rid of M-j and to hand over the *beel* to someone else.

7.8 Animosities between interest groups in the *beel*

Apart from the *ijaradar* several other interest groups interfere in the fishing activities of the Charan fishermen in the *beel*. People of the neighbouring village BaddA-Have shown animosity towards the Charan fishermen for more than three or four decades. They apply force and ignore all sorts of lease arrangements

and rules while fishing in the *beel*. They are so powerful and notorious even an *ijaradar* like M-j is also very careful in dealing with them. This section describes a few cases which show how the access of Charan fishermen to the fishing water is interrupted by other interest groups.

There are some people in Badda village who are even more arrogant than M-j and always try to make trouble for the Hindu fishermen when they come to fish in the *beel*. They do not come to fish with *berjal*. These people use *curent jal* and they also put most of the fishing traps in the *beel*. These Badda people do not pay the rent to M-j. According to M-j they are *like lathial bortoner lok* (one kind of rural muscleman armed with sticks). It is their tradition not to pay anything. Somehow he manages to collect some money from them by "speaking sweetly" (*pam potti maira*) and offering cups of tea. In the previous period they were powerful and fond of fighting. They say that the *beel* has been expanding across their land in the monsoon season. So, they think they have a legal claim on the *beel*. They announced that a large area in the *beel* was theirs (from the *joga bari* to the southern part) and spread their nets there. If anyone, especially from the Hindu community, enters their waters then he is cursed and sometimes physically assaulted. Again the poor Hindu fishermen are their victims. They take away water hyacinth and remove bamboo poles from the *jhata* arranged by Hindu fishermen.

In 1999, there was a case where A-Hindu fisherman was beaten very badly. M-j was concerned because he thinks this kind of occurrence will interrupt his *babsha* 'business'. Two years ago they had to call police to control of the outrages of the Badda people. Some of their illegal nets were taken away by the police when they came there M-j agreed that Badda people were a *matha batha* 'headache' for him. His influence failed in Badda. M-j dares not deal with the people from Badda, as he thinks they are aggressive. There is a common saying in the locale, *bagher uporeo tag acheye* 'there are some things mightier than the tiger' which applies to the people of Badda.

The animosity of the Badda people has a known history. It is held that more than twenty five years ago, that the chairman of the Union Council Kuddus Khan cheated the fisherman. He claimed that he controlled the *beel*. According to the fisherman, Kuddus Khan was from the Badda village. He thought that, as the Chairman of the UP, he had the right to control Government property. He introduced fishermen from other villages to Charan *beel*. He told the Charan fisherman not to fish in the *beel*. Once he came with his people and told the Charan fishermen, also, stop *jhata* fishing. The traditional fisherman drove these people away from the *beel* area. The Chairman went to the police station and filed a case against the fishermen. In anger he had filed a case against the fisherman of Charan when he found none of them was paying him *khajna* 'tax'. The case was not only against the fishermen; he put all Hindus' names in it. He filed the case in order to take the revenge. He failed to take away the *beel* from

the fisherman when the court protected the rights to fishermen on the *beel*. After his defeat Kuddus Khan did not try to create any more problems for the fisherman of Charan.

Another episode involved the rich farmers of Badda and Charan pumping water out from the *beel* to provide irrigation for HYV paddy. Ten or more pumps were infringing on the *beel* and pumping during the dry season, reducing the water level drastically. According to the Government's rule no one can take water without the permission of the fishermen, as they are the leaseholders. However, few care about the poor fishermen's rights because the landowners are in the majority and are strong in the village. The fishermen think that if they go to the court, the farmers take revenge by a social boycott or even driving them away from the village.

7.9 Emergence of a new interest group

This section describes the emergence of a new interest group who has taken over the control of *beel* from M-j. This group is much more aggressive and exploitative to the fishermen. There is an attempt to describe their acts, which set a new barrier to the fishers' access to the *beel* and worsened the situation for them.

The new interest group emerged in Pachcharan in 1998. It is comprised of the members of the present ruling party from the *Siddiki bari* in Pachchran. These

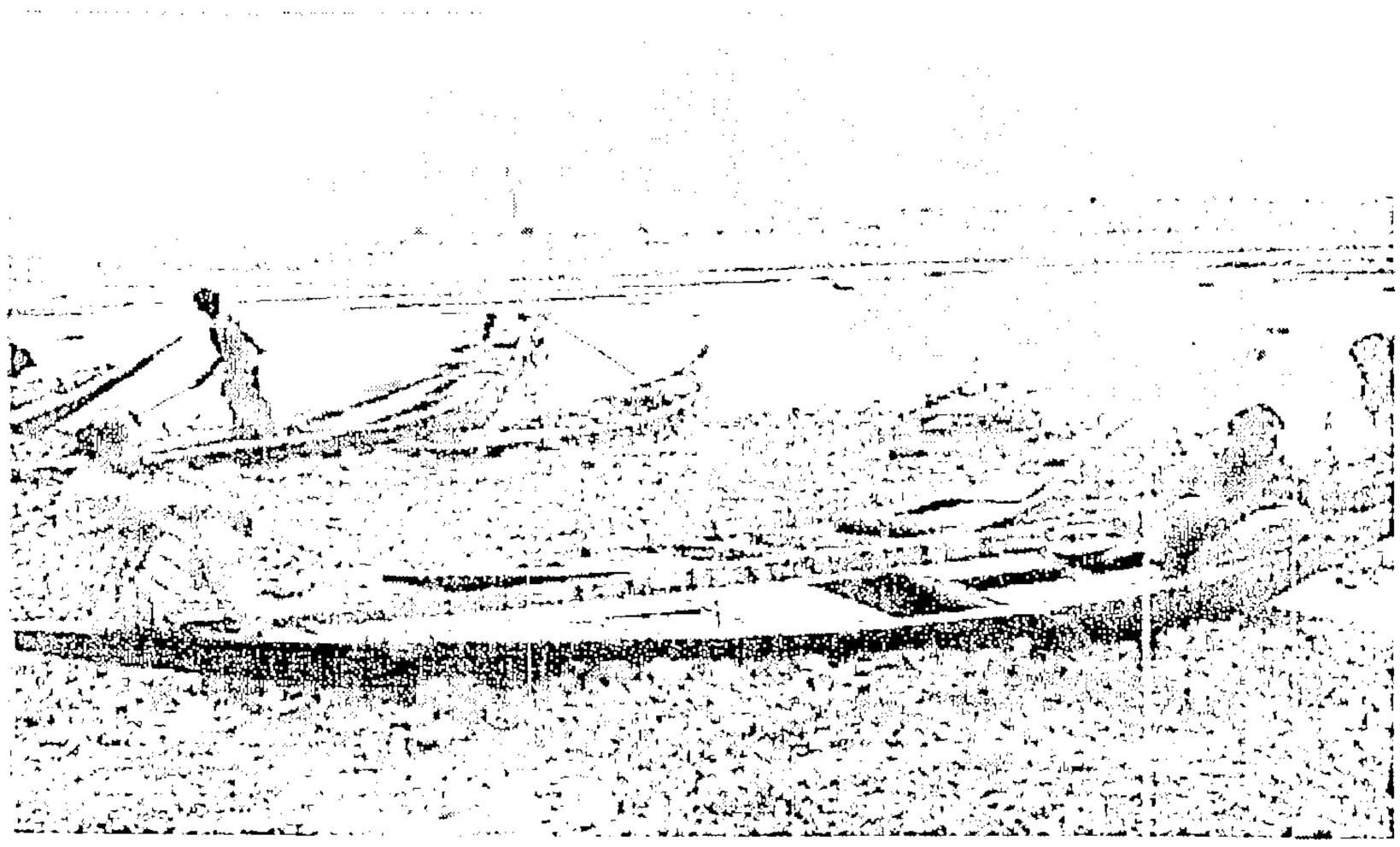
are youths who have not finished their education. They are drug addicts, forcing people to give them money to buy drugs. They obtained a sublease from the Central Co-operative in Tangail. People in the Central Co-operative were thought to have bribed the administration. Administrators at the district level granted this lease to the Central Co-operative ignoring the legal claim of the local fishermen's Co-operative in Agcharan. If they challenge these youths in the court, these administrators will be in trouble. These boys paid twenty-eight thousand taka for the sublease (It is an illegal arrangement, not recognised by the State). There are three persons who are leading the outrages. Recently they tried to take half of the *beel* through an understanding with the people in the Central Co -operative and threatened the fishermen. The youths were angry with the fishermen who ignored them when they made this arrangement. These *mastan* 'thugs' are also activists of the present ruling party. They recently attacked the secretary of the Charan Fisherman Co-operative and robbed him of seven hundred taka. They were angry with him for trying to settle something at the District level and so ignoring the power of the local *mastan* 'thugs'. The youths' guardians returned the money, but failed to offer any apology.

According to a victimised fishermen:

> Those boys will not gain control of the *beel* legally. The real problem for the fishermen is that they are in the minority and lack money. If they try to assert their legal rights to the *beel* the 'thugs' could kill them.

After taking account of the real politick the fisherman reluctantly agreed to take A-Half share of the *beel* with the youths. They paid thirty thousand taka for this half share. However their future prospects are uncertain, as the Pachcharan youths do not allow them to collect their share of the rent. They insist everything will be collected by them at the end of the year, and then they will give the traditional fishermen half of the money. The fishermen are suspicious and fear being cheated. The fishermen of Charan described the youth's proposition as *shialer kacheye murga bagi* 'lending the chicken to the fox'.

Photograph: A thug is waiting for fishermen on the *beel* for rent collection



Furthermore, the youths in Pachcharan acquired thirty thousand taka from the Fishermen's Co-operative in Agcharan for half of the share of the *beel* and then, later, refused to abide by the contract. The contract was negotiated by the people involved in the Central Co-operative, but the *mastan* 'thug' youths said that they were not bothered about what is written in the contract. They rule the streets and now the *beel* has come under their control. They were asking double

the rent of the previous year for a *berjal* 'net'. Previously fishermen paid fifty taka a day for each *berjal*, but now 'thugs' are receiving one hundred *taka* from each boat. If any fisherman delays paying the rent then these youths curse him. They defame the forefathers of the fishermen and are very offensive. A prominent fisherman, Vice President of the Co-operative, went to speak to these youths. He requested them to sort something out that would help the fishermen. They refused and insulted the Vice President. Then they insisted that he should give them all the money he was carrying with him. He was afraid and gave them seventy five *taka*. Then they took off his *lungi* 'wrap' and searched for money in his underwear. They discovered two thousand five hundred *taka* and took it. No steps were taken against them. Later this person described what had occured:

> He calls one of the thug's mother *dhormer ma* 'mother through religion' and this lady was present when he went to talk to the youths. These boys were friendly at first and offered him a cup of tea but later they started cursing him. While searching him for money they rendered him totally naked. Their guardians were present in the house and although they heard everything, they kept quiet and did not intervene.

Most of the fishermen said they could attack the youths, but if this happened then the greater Muslim community would retaliate and drive the Hindu fishermen from the area. The local M.P is respected as people think he has sympathy for the poor fishermen. He is the member of the present ruling party which reviewed support from the minorities in the country, such as fishermen, during the election. How it was possible for these youths to intimidate when the

present ruling party is supposed to support the fishermen? When the fishermen went to the local M.P. to complain against his followers, he showed sympathy towards the fishermen and pretended that he was unaware of this incident. He called a person named A-H, the main ring leader in Tangail, and told him to take steps as soon as possible to hand over the *beel* to the fishermen. But nothing happened. The fishermen of Charan think that the M.P is *dui noukai pao dichen* 'standing on two boats at the same time' trying to maintain good relations with both the fishermen and the *mastan* 'musclemen'. He needs these youths to help him intimidate people during the election, as they will attack his rivals.

7.10 Politics and manipulations in Tangail

This section describes how the people in the Central Fishermen's Co-operative in Tangail control the access of the fishermen to the *beel* in the remote parts of the District. Involvement of a person like A-H and acts of his associates who always worsen the situation for the Hindu fishermen for their own benefits is explained. This type of person keeps the good relations with the *ijaradar* like M-J and can also betray them if someone comes with more profitable proposal in relationship with the lease of the *beel*. Although some of the facts are repetitive, it helps to get the total picture and to observe the real access situation from a different angle which can provide a better understanding.

The *ijaradar* 'leasees' spent a lot of money to influence the administration in order to have it work in their favour. The District officials constantly claim money

for the L.R fund. No one understands the real purpose of this fund. A-H paid seventy-two thousand taka as lease money and five thousand taka was given to the L.R. fund. The Central Co-operative had also received twenty thousand taka which A-H donated to the Co-operative in a demonstration of support. In this way A-H and his followers had spent 97 thousand taka to obtain control on Charan *beel* for three years. So they ask for more than one and A-Half *lac* taka (1 *lac* is equivalent to one hundred thousand) from M-j and the Agcharan Fishermen's Co-operative. M-j settled for one *lac* and ten thousand taka for three years and paid 90 thousand *taka* in cash for two years. M-j and the Agcharan fishermen promised to pay twenty thousand taka more in the third and final year. However, A-H and his followers spent some of the money on other things. Therefore, they could only pay for the D.C.R (duplicate carbon receipt) for two years. When the third year arrived they found that they needed 11 thousand taka if they wished to carry on the contract with their former party. As they would get only twenty thousand taka from M-j and the others, they would have to pay 31 thousand taka for the D.C.R. So A-H and his followers discovered a way of making more money. They invited another party (the youth 'thugs') to take out a new contract for one year.

According to M-j the D.C.R (duplicate carbon receipt) was issued against the name of the Central Co-operative. There is no provision for sublease in the Government procedures. It was illegal to sub-lease and it cancels the lease if someone tries to do so. Usually people in the Central Co-operative prepare a

paper for the Government where they mention some names of persons who are doing the maintenance work on their behalf. This paper is useless as everything is settled, verbally, between the Co-operative's man and sublease holder. M-j claimed he was cheated because he trusted them. It is hard for him to believe that everything went against him in spite of all his efforts.

A-H is a *nikari* 'fish businessmen'. He is the richest person among the fishermen in Tangail District. He stores fish, which come from Chittagong and other places and supplies them as a wholesaler. Another person, who is the assistant Headmaster of the AlengA-High School, is the former President of the central Co-operative in Tangail. He lost his post in the Central Co-operative when the opposition group played a trick on him. At first he argued with A-H in favour of M-j, but he failed and he was also pressured from different sides not to continue with the contract that they made with M-j. According to the contract, M-j was supposed to control of the *beel* for three years, but this former President of the Co-operative claimed that it as a faulty contract and thus invalid for the current year. When it was said that there was a typing error in the contract M-j realised there was a conspiracy and thought that A-H was the main culprit. He questioned how they could claim that it was a typing error? Surely they had had two years to make the discovery? This was why A-H was able to take the *beel* away from M-j and give it to the youth 'thugs' of Pachcharan. Why these youths invaded the *beel* 'business' was a puzzle to M-j. They were not involved in any kind of fish-related work. When M-j heard that they were trying to takeover the

beel he showed them his deed of agreement, which was valid until the 1405 Bengali year. However, they said the year 1405 was mentioned in the agreement due to a typing mistake.

According to the fishermen, A-H and the former President threatened violence against the fishermen from a local neighbourhood who wanted to go to Tangail. They prevented them from buying the schedule (bid permit). If someone had attempted to bid for it at the auction they would have stopped him taking part in it. According to the rules of the schedule auction, at least three co-operatives should take part in the bid. A-H himself submitted tenders (*darpatro*) on behalf of three different Co-operatives thus ensuring that he had the highest bid. He manipulated the auction with the help of his bribed friends at the Revenue Office.

A-H and his people took over the Charan *beel.* Since they live far from the *beel* area, they are not able to manage it. It would be more convenient if they have someone in the Charan area who could pay them double the money which they have spent in the bidding process. If they spent twenty thousand then they ask for forty thousand from the second party. They search for a third party who was eager to get access to the *beel* even if he is not a fisherman.

According to the Secretary of Agcharan Fishermen's Co-operative, A-H is responsible for all these problems of the fishermen. He has an *arot* 'warehouse' there. All the *pikars* 'fish wholesalers' used to buy fish from him. He does not

catch any fish of his own. Fishermen used to go to him with their catches and then he would arrange for open bids amongst the wholesalers. His role was important as the fishermen thought he could help them to get a good price. A-H used to get six- percent commission from the fish sale price. However, gradually the fishermen became aware that this man is a cheat. He used to set a low price with the wholesalers before the bidding session, and also used to take away some fish for his own use from the fishermen without paying them any money for them. He used to collect a huge quantity fish in this way.

When the fishermen realised A-H was cheating them, they stopped going to him and started selling fish on their own. There were some good and clever fish businessmen among the fishermen who knew the true price of fish. On realising that the fishermen had discovered his trickery, A-H started searching for a new way to exploit them. He used his political connections to get membership of the Central Co-operative in Tangail. He kept up a good relation with the leaders of all the political parties by sending fish to their houses as gifts. Gradually, he succeeded in achieving an important position in the Central Co-operative. Then he conspired to interfere in the bidding procedures so as to deprive the fishermen of their rights. A-H introduced *omotshojibi* 'non-fishermen' into *beel* leasing in order to control it. All the traditional fishermen of the whole of Tangail district became victims of this trickery. A-H obtained money from the non-fishermen groups by helping them to establish rights to *beel*, regardless of the fact that this was illegal. His main objective was to do business and make

money. He encouraged non-fishermen because he wanted their catch to be sold to him, as he thought that they were unaware of the true price of fish and he could cheat them easily.

7.11 The present arrangement

In the Bengali (lunar calendar) year 1406 (1999), the fishermen of Charan succeeded in leasing in the *beel* from the Government. They went to the Minister of Fisheries and Live Stocks with the help of their friends in the Central Co-operative to establish their fishing rights[6]. Although the *beel* is now under their control according to the law, in reality, this is not the case. M-J has continued his sub-leasing activities. The fishermen are poor and their lives are still threatened by the *mastan* 'thugs'. M-J and his fellows have the advantage over them, his uncle being an activist in the present ruling party. He wanted to get A-Half share of the *beel* but pay only half of the true value. M-J paid one fourth of the money and acquired three-fourth share. The fishermen managed to secure one fourth, but this was too small a share for them. Therefore, though the *beel* was in control of the fishermen officially, in reality it is controlled by the other interest groups. M-J now claims how helpful he is to the fishermen. The fishermen do agree that nowadays M-J is a little more polite, than before, when collecting rent. However, the young *mastan* are still aggressive and the fishermen cannot escape from their intimidation having insufficient money in their Co-operative to lease the *beel*. Therefore, for the sake of peace they

[6] The Minister himself was a Hindu. The fishermen of Charan had the feeling that that person would realise their problem as he also belong to the minority.

compromise with one *mastan* to escape the outrages of another. The fishermen say their position is like *joleye kumir ar dangai bagh* 'threat from crocodile in water and tiger on the ground'. When M-j was asked, how it is helpful for the fishermen when he and his relatives occupy three-quarters of the *beel*, he was angry and answered that he was invited to do so by the fishermen. When asked if the fishermen managed to pay the money back they owed him, is there is any possibility that he would leave the *beel* to them he became very unhappy and would not answer.

7.12 The role of NGO in solving poor fishermen's problems[7]

In this section, there is an attempt to examine the role of an NGO which wanted to intervene in poor fishermen's lives in order to provide them a sustainable livelihood. The attitude of the fishermen towards this development practitioner and their acts will be examined according to the past experience of the fishermen, which tend to judge the role of the outsiders in the present day situation. Cheung (2000) asked how and why it is important to know the history and recall events which happened in the past. They think people are always interested in the general historic reconstruction or the expected historical narrative which can be politically dismantled for some present purposes. He

[7] To deal with the fisheries problem is very delicate in Bangladesh. Not only the NGOs, but the government also has a problem of introducing fish culture in the *beel* to parts of the country. When the Fisheries Department introduces new fish they restrict the fishing activities for a long period which makes the situation uncertain for the fishermen's livelihood. This is why they are against the fish culture in common fisheries like the *beel*. One of the national natural resource [illegible] who is involved in farming systems research told me of his experiences. He went to a village in the Kishore Ganj District to introduce fish culture. An advance party was sent before hand. While approaching the village market on his errand then he saw many men and women coming with sticks and choppers in their hand. They were shouting *dhor dhore*. Since many of them were there to catch him, he also came to leave fish in the *beel*. He saw his associates scattering up to avoid being beaten by the villagers and so he also moved in the opposite direction to escape the hassle.

investigated the indigenous villagers' memory in Hong Kong in order to explore how reconstructed history or social memory is contested and complicated. Ellis and West (2000) stated that local history is a form of knowledge that is not properly analysed in contemporary discussions of 'indigenous knowledge.' They also discussed how a clearer understanding of local history as 'indigenous knowledge' would help the development practitioners to add to the creation of a more socially equitable kind of development practice. There is an effort to examine this knowledge in the context of Charan fisheries problems.

Same natural resource scientists of the DFID project concerned with the problems of the poor introduced an NGO into the Charan. Recently, an NGO involved in fisheries management had taken some action in an attempt to solve some problems of the local people. 'Partnership' and 'co-management' are words that they are fond of using. The idea of partnership allows government and NGOs to join together in launching interventions (Berkes 1994*a*, 1994*b*; DOF 1992; Flower 1998, White 1999).

> Co-management usually refers to power sharing in a partnership between government agencies and those citizens with a stake in the common pool resource. (Ahmed et al: 1997, p 234)

It introduces aquaculture management and interventions which are evident in most of the third world countries (Amarasinghe and Desilva 1999; Aguero and Ahmed 1990; Aguero et al. 1989; Ahmed 1991; Ali 1991; Anderson and Fong 1997; Delamare 1998; Pillay 1997; Rauniyar 1998; Setboonsarong and Edwards 1998).

In the Charan case, the involvement of NGOs, which are trying to intervene by making physical changes to water bodies, does not imply that they respect local people's opinions. The same applies in other regions of the world (Breton et al. 1996). Baker and Pierce (1997) for example question whether fisheries management of the River Murray in Australia reflects societal values. They argue that management structures should reflect societal values in order for the effectiveness of management strategies to be ascertained. Mosse (1997) was concerned about the policy which favoured 'community management' approaches to common property resources such as forests and water bodies. Through an historical and ethnographic exploration of indigenous tank irrigation systems in Tamil Nadu, he challenged the economic-institutional modelling of common property systems in terms of sets of rules and co-operative equilibrium outcomes. Mosse argues for an understanding grounded in historical knowledge and politics involved in the resources, rights and entitlements.

In a certain case one can examine the role of an NGO and judge how it is interpreted by the target population. The NGO at Charan set up a workshop for a 'problem census', concentrating mainly on the Hindu fishermen in order to identify their problems (Problem Census 1998). The main intention was to address the problems of the poor and search for the possible solution. Previously, this NGO had carried out a fish conservation survey with the help of local enumerators for natural resource scientists to whom they sent their

collected data (Discussed in Chapter 9). Two persons used to come once a week from Tangail to monitor the enumerators on the survey. They used to discuss different problems with the female enumerators. When they came to do the problem census they tried to make a list of the 'stake-holders' in order to arrange a discussion, using different PRA methods.

The NGO organised this problem census in August 1998. They came with a handout, written in Bengali, which attempted to explain the sort of work they intended doing among the poor. On the first day they called in some poor rural women. In their introduction the NGO staff tried to explain their objectives and their ideas, though clearly expressed, sounded very *modhur bochon* 'words sweet like honey' according to the audience. Their efforts were questioned, because NGO staff were all men asking rural poor women about their problems and, the women would reply by asking 'why should I tell my problems to you'. The NGO staff talked about the importance of hearing female views, but men started the discussions. They also had some female enumerators at the session to reassure the women. Later the women started talking about their problems such as starvation, behaviour of their husband's etc. One woman was very out-spoken and blamed her husband for doing too little work for the family. Later, it was learnt that the lady had problems with her family for disclosing family business at a public meeting.

The Hindu fishermen gradually come round to voicing their opinions. Most of their problems related to fishing and their access to water bodies. The Hindu fishermen having been cheated by different interest groups, as was discussed in the previous section, were very suspicious of any one asking them about the *beel*. In the beginning, the fishermen were also suspicious about the DFID project, which they thought was launched for the purpose of acquiring (see Chapter 2) the *beel* for other interested parties. When the NGO people started asking about local people's problems they described politics in Tangail and the activities of the *mastan* 'thugs'. Strangely, they kept silent regarding the activities of the *ijaradar* 'leasee' like M-j and did not say anything bad about the non-fishermen. They even added that M-j is far better than the others, as he has some sympathy for the fishermen. The fishermen pointed out some constraints like inactive sluice gates, over-silting of the linkage canal of the *beel* with the river etc. They were very reluctant to mention their social problems. During the sessions the NGO people noted the problems mentioned by the fishermen. The moderators then worked hard to rank the problems. Later, when I asked the fishermen why they kept quiet about M-j and other social problems such as the outrages of the Muslims etc, they said that 'many people were moving around the meeting following (i.e. taking notes) our words'. They were worried and did not trust the NGO people. They also had some problems understanding what they wanted to know.

The fishermen recalled their history of being exploited and abused for generations, which makes them very suspicious of any outsiders, such as the staff of NGOs. Many of them burst into tears when describing their experiences. Most of the Hindu families who left Charan village for India during the communal riots in 1947 and 1965 did not even get the promised money for their land. A few rich Khan in the village were very poor thirty or forty years ago. Some of them had small pieces of land. During the communal riots they occupied most of the Hindus' land. Some Hindus went to the Sub-Registry Office at Kalihati Thana headquarters to make the land deals with the buyers. On the way back to the village associates of some of the buyers robbed them of their money. Some other Hindus were told that they would receive their money at Mymensingh railway station. When they reached Mymensingh no money was given to them and they left the country for fear of their lives without a single *paisa*. This is why that before their departure most of Hindus had left the *bati* 'lamp' on so as to let people think that they still in their homes. The following morning it was discovered that nobody was in the houses.

In these circumstances, the arrival of the NGO has brought additional worries into the fishermen's lives[8]. People working in the same NGO had run a survey for another organisation in Pachcharan a few years ago and their office was attacked by local people as they were suspicious about their activities. Charan fishermen are aware of these incidences. The same NGO intervened in another

[8] There are a few other NGOs and development agencies working in the locale but have no relation to the fisheries. Although their activities in the village can be questioned, as these caused many problems in local people's life, they are not relevant to this discussion.

beel in the neighbouring *thana* of Alaishin. They dug out soil from the bottom of the *beel* called *Shingho Ragi* 'angry like a lion' in order to promote the fishing. The fishing community around the said *beel* is the same caste as in Charan. This NGO had to fight against dominant people such as A-H (in the central co-operative in Tangail) in order to get a lease of the *beel*. It was a story of success at the time. Later it worsened the situation of the fishermen.

After digging the *beel* and supporting the fishermen against the non-fishers and other interest groups, the NGO's development activities suddenly ceased. Then they concentrated on different survey work and informed the villagers that they could not go on in improving poor fishermen's lives. They still have a small office and staff of two who are always present. The poor fishermen were in trouble again when A-H and his non-fishermen thug friends filed a case against the NGO, claiming that its activities of *beel* management was illegal.

Charan fishermen are in the same situation as their fellow fishermen in Alaishin. Some of them related that they had heard that the NGO was going to dig out the *beel* and to introduce some fish culture. The people of the NGO asked the fishermen to stop fishing during the monsoon, when fry emerge, but the fishermen were not given any clear ideas how they would survive in this period if they stopped fishing. Three people from the NGO were staying in the village and going out to monitor the catches. As these people were very low paid staff and have the same background as most of the villagers, the NGO allowed them to do

this work. The fishermen accused these people of not saying exactly what they were going to do in the village. They kept quiet as they were dictated to do by their higher 'officers', and the fishermen were very suspicious about their secretiveness. The people at the top of the NGO have little contact or interaction with local people.

A similar incident took place in another field area of the same project as the villagers were suspicious about the act of the development practitioner and experts. This was in the village of Ujan Kholshi in Durgapur Thana in Rajshahi. The person who was supposed to conduct anthropological work in that particular area is a botanist. When the project was introduced, the people of Ujal kholshi thought it would bring a big change in their lives, as it was a foreign project. The person who was in charge of the project was a scientist and had a University background (people's attitude towards educated persons is described in Chapter 3). The people were afraid of him, mainly because of his strong personality and he failed to make a good relationship with the local people, and explain what was the main objective of the project in a way which was understandable for them.

People were very wary from the beginning. A few elderly people thought the project was introduced here to measure underground reserve of gas or oil. Later, when a census was taken in the hope of identifying people's problems and, ultimately, to intervene when disaster were imminent. The poor fishermen of the village were told at the workshop that they would benefit if the project

could organise the removal of soil from the bottom of the *beel* in order to deepen it and so reserve the water during the dry season. The landowners, mostly the big farmers, disagreed, saying that this would prevent them from growing *boro* paddy. They proposed to dig a canal to drain the water completely out from the *beel* for the sake of their rice cultivation. A conflict arose between the poor fishermen and the rich farmers. As the objective of the project was to support the poor, it was not possible to respond to the demands of the rich farmers. The organiser of the village workshop stopped the dialogue between the feuding parties and so did not allow the interested villagers, i.e. the rich farmers to express their views. This made the rich farmers angry, as they considered themselves to be the leaders of the village. They spread a rumour among the villagers that this project was introduced here to create conflicts among them to break the harmony of the villagers' everyday life. The poor fishermen were threatened when they tried to get support from the outsiders.

As the station researcher was working on behalf of, and represented, the project people, the villagers distrusted him. He started to feel insecure in the village. The organising scientist who had a university background and was considered an expert in this field, stopped going to the fieldstudy area. The stationed researcher also left the village for more than fifteen days due to threats from the rich farmers.

The access of Charan fishermen to the *beel* is complicated with long historical roots. What will happen to these poor fishermen if conflicts arise with other interest groups, as in the case of Alaishin *beel*? It is difficult for these poor fishermen to cope with the *mastan* 'thugs', the *ijaradar* 'leasee' like M-j, or any newly emerging interest group. It may be possible for some of the physical problems of the *beel* to be solved, but whether an effective strategy can be developed for social problems including exploitation of the poor by various pressure groups, is much more difficult to overcome. This is why the fishermen are suspicious; they are worried about what is going to happen to them in the future.

Bancharam Das related his distress in a story in which he referred to a classical Hindu text, Ramayon. There was a garden of *omritofal* 'fruit of heaven' in the *Lonka Nogori* (Sri Lanka, land of demons). People wanted someone to guard the garden and the Hanuman 'monkey god' volunteered himself. A few days later, people found that the entire garden's produce had vanished. When he was asked for an explanation, the Hanuman said that one day he tasted a leaf from a plant because he was hungry. The leaf was so sweet he started eating the fruits too and in this way he finished the roots also. After a while the whole garden was empty. When he finished this story Bancha Ram smiled, and said that these NGO people might be waiting to do a similar thing to that of Hanuman. He thinks that everyone is just trying to take advantage of the poor.

This is why those concerned with attempting to solve the problems of fishermen regarding the *beel* face great difficulties. Not only are there physical difficulties to be surmounted; the social difficulties are large, also, and difficult to tackle when the people distrust (often with good reason, based on earlier experiences) those who intend to help them. Such social and political problems do not get any attention from the development practitioners and natural resource scientists.

Chapter 8

Social organisation of fishing

8.1 Introduction

Social organisation plays a prime role in determining where fishing can take place and who can participate in it. The Hindu fishermen comprise a traditional occupational group supported by their kinship relations. This chapter describes how the fishermen's community is organised, relationships between fishermen and how their kinship relations help them organise their collective fishing activities. Types of fishing gear ownership and fishermen's other economic activities are also explored. It will examine the social rules and different group fishing activities of the fishermen. It hopes to show the contrast between the Hindu fishermen's socially controlled group fishing behaviour and the Muslim's less controlled and profit-driven fishing activities. Social and cultural norms of Hindu fishermen prevent them from harming their fishing resources; these restrictions are completely absent amongst the other groups.

Although they are not part of the Muslim community, the Hindu fishermen's community is not separated off from the wider rural society. The fishermen have their own rules and norms. On the other hand, the largest village Agcharan has various occupational groups which influence the fishermen's community and their everyday life. It must be repeated that fishing is not confined solely to traditional Hindu fishermen and we have, therefore, to consider the relationship between them and Muslim fishermen and how they impinge on each other's activities. As

marketing is also a part of organised fishing activities, this is also explored in relation to the social organisation of the community.

Hviding (1996) found a form of organisation among the Marvo fisherman of Melanesia who has some process of group formation, personal alignment, and territorial association which appears as a guidelines for 'who may do what where'. Lansing et al. (1998) mention that in traditional Twana Indian or Sokomish society of North Fork, all individuals have the right to seek subsistence by hunting, fishing or gathering anywhere in the Twana territory. The Twana have no term for the nuclear family or household unit, but their major social unit is recognised as the group of kinsmen who occupied the large winter joint-family houses. Twana social organisation is a form of kinship organisation which is called *deme*, such as a clan or group of persons who reside together and are related to one another by marriage or by common descent through either of their parents. Twana *demes* functions like a corporate group, whose joint estate included weir sites on the river and the large wooden house that served as their joint residence. They inherit specific rights and property through membership of the *deme*. Their shared estate of *demes* included real property like large joint-family houses, smoke houses, weirs and fishing equipment. Twana *demes* are social, religious and productive units. Rights of *deme* members to use natural resources are linked to obligations such as performing the necessary rites to ensure the perpetuation of animal species which prevents pollution of the river. This is more or less a common characteristic of tribal fishermen's societies (Barnes 1996; Berkes 1984; Brelsford 1946; Jackson 1983; Rouja 1998).

This is not evident among the Charan fishermen, as they are not a tribal community, on the other hand they have to share their fishing territory and the social sphere with other occupational social groups. According to Frager (1966) and Kalland (1980) in Malay and Japan, the fishermen families are subordinated to other social groups, which is a similar to that of Charan.

8.2 The *motshojibi shomaj* 'fishermen's community'

Everyone is related to everyone else, but some people are more related than others (Hvidings 1996). This is true about the Charan fishermen. The word *shomaj* literally means 'society' in the Bengali language, but it has various shades of meanings. A *shomaj* is a small group of people, who are often relatives, who live and work together. At the other extreme, all Bengali people form the Bengali *shomaj*. People in a small village have their own *shomaj*. The term *shomaj kora*, roughly translated 'forming a society' dictates who is allowed to interact with whom. Jahangir (1976: 94) is of the opinion that the *shomaj* often differs from the kin group as members are related to it interactionally and ritually. He also mentions the existence of *shomaj* based on the *para* (section of a village or neighbourhood). A separate *para shomaj* exists for the rich and poor farmers. The position is unique to Bangladesh (White 1992; Wood 1994).

Any Hindu caste or occupational group in a small village will have its own *shomaj*. So, the fishermen of Charan, as well as being part of the greater village *shomaj*, have their own fishermen's *shomaj* which has its own rules and organisation, reflecting its different identity from other occupational groups. The fishermen's

shomaj of Charan can divide up into fishing teams, also called *shomaj.* Borman (1992) described, in his novel about a group of fishermen in the Brahman Baria district in Bangladesh, how these fishermen, in the same location, are fragmented into small groups and have their own *shomaj* which determines who can go out to fish with whom. He showed, also, that if any newcomer wished to join in the fishing he had to attach himself to a *shomaj.* Although Bengali society is undergoing rapid social change, these rules are still to be found among the traditional Hindu fishermen. The Charan fishermen followed similar behaviour two or three generations earlier. As discussed in the Introduction, Charan fishermen are called *jolo das.* They are endogamous and with their own social rules organising their fishing activities. The kinship relations of these traditional fisherman determine who can go out fishing with whom.

8.3 The way the fishermen's *shomaj* works

The Charan fishermen are experiencing problems in arranging marriages for their young persons, as the numbers of fishermen has declined in the country. The marriage rule is strict endogamy. The *shomaj* plays a prime role in arranging marriages for its members. There are a few *matbor* or *shardar* 'leaders' in the *shomaj* who deal with these issues. They visit the families of fishermen in different communities in search of a bride or groom. Price (1995) mentions the Soko, a fishermen group in Niger river basin in Nigeria. The group recognise a common descent and share a common social organisation based on corporate patrilines. For example, they specified fishing seasons, limiting fishing techniques or gears and selected sanctuaries for fish production and growth. The senior fishermen based their authority on their knowledge and relationship with the water deities.

There are four acknowledged leaders of the fishermen's *shomaj* who deal with these social issues. If there are any conflicts among the different families then the leaders attempt to settle them. Most conflicts are over small issues, mainly involving women. For instance, if someone's chicken destroys another's homestead garden, women may start arguing with each other and this gradually spreads to the men. On a few occasions it turns into a bigger conflict. Then they may fight. The *shomaj* has to take a strong stand against members involved in such a dispute. The fishermen are always reluctant to involve the police when there is any conflict amongst them. The *sharder* 'leaders' rely on the accounts of neighbours who witness any event. Sometimes if the victim receives wounds or loses anything, then the *shomaj* asks the culprit to pay cash to the victim. This is the usual penalty. In most cases the women are forgiven if they admit to being wrong and follow it up with the local word *map-mukti* 'forgiven-and free'.

The main aim of the Charan fishermen *shomaj* is to unite its members and to resolve conflict. Sometimes a *shomaj* will excommunicate a person or family if there are any major crimes committed. One such incident, which recently occurred in the Charan community, was as follows:

> A young woman, a housewife, who had a daughter, suddenly became *shadhuni* [1] She used to go out to the temple at Bolla and meet with other meditators there. There was a *bhondo shadhu* 'fake *shadhu*' among them who had an *oboidho shoprko* 'illegal relationship' with her. This relationship changed her social behaviour. She began paying less attention to her daughter and husband. Then the fishermen's *shomaj* told her to stop her meditation because she was too young to do it. The idea is that people should only occupy themselves with religious acts when they get older. This warning did not stop her. The fake *shadhu* used to

[1] The feminine gender of *shadhu*, one who meditates. It belongs to the *baishonob* tradition, when people ignore their social and family responsibility and get involved in meditation in the temples along with other *shadhu* and *shadhuni*.

threaten the poor husband of the woman, claiming that he knew some *tontro montro* 'magic'. One day the woman left the village to visit her father's house. The suspicious husband went to his father-in-law's house and discovered she was not there. On the way back he went to the village where the lover of his wife lived and discovered his wife riding on a bicycle with her lover. The fake *shadhu* with other villagers beat the husband severely. When the injured fishermen got back home, he told everyone exactly what had happened. The following day when his wife returned, she denied everything and her husband also declined to leave her. The *shomaj* thought that the reputation of the fishermen was hurt by this incident and *bandh* 'excommunicated' the couple.

This illustrates the role of the fishermen's *shomaj* in settling quarrels and trying to preserve its good reputation. Formerly, before the formation of the co-operative, (see section 7.5) the *shomaj* used to control all fishing activities. Nowadays, the role of the *shomaj* has become passive in this respect as it has lost its control over fishing activities. As the fishermen are living in Charan, the village wide *shomaj* which includes all those living in Charan, both Muslim and Hindu, also has influence over people's lives. The fishing community has to follow the norms dictated by the village *shomaj*.

8.4 The *bongsho* 'lineage' and *shomaj* 'society' of fishermen in Charan

This section describes how the greater Charan *shomaj* 'society' works and how it influences the fishermen's *shomaj*. Previously Agcharan was part of greater Charan, but several years ago the village divided into two as described in Chapter 1. After the division, Agcharan became the smaller section. One Muslim *Bongso* 'lineage' is dominant here, the Khan *bongsho*. Other *bongsho* are *Sheikh (Miah)*, *Siddiqi*, *Mir* and *Mirza*. There are three Hindu castes the *Jolo das* 'fisherman' *mali* 'gardeners', and *Sutrodhar* 'black smiths'. The *Jolo das* is the most dominant one of

these occupational groups. Only one family of the *mali* and *Sutradhar* presently live in the village. Forty to fifty years ago the *Jolo das* dominated the whole village, as discussed earlier.

Among the Muslims, the *Khans* used to distinguish themselves from the *Miahs*. All Khan people were landowners and the *Miah* were their tenants. Only one Muslim Khan *bongsho* together with several Hindu *bongso* formed the habitants of Agcharan at the beginning of this century. About 30-40 years ago, when the number of Hindus started to decline, the *Miah* arrived as agricultural labourers. There were no instances of intermarriage between the Khan and Miah *bongso* as the *khan* thought the *miah* were of lower social status. During this period, the lower caste Hindus, mostly the fishermen, were treated similarly by the upper caste Hindus.

Due to the decline in the number of Hindus, the Khan *bongsho* began to control the land resources. Today, the Khans claim that they have always been in control of everything. They do not agree that upper caste Hindu *bongso* were dominant in the area before they invaded the Hindus' land. Later, the number of Khan increased as people moved to the village through marriage their children inheriting maternal property. In this way *Siddiqi* and Mirza *bongso* arrived in the village from the neighbouring community.

The Khan people were very exclusive in the past and they still act with superiority to the Miah. However, the distinctions between them have been reduced gradually; the Khans arranging marriages with the other *bongso* even though the latter occupied a lower status. Their landholdings also started to decrease with the rapid population

growth. On the other hand, some of the Miah improved their economic position, many of them becoming educated, while others opened businesses.

At the present time Khan *bongso* dominates the whole of Charan. They have also spread into different *para* neighbourhood of the village. The Khan people have a number of *shariq* 'sub clans' in different *para* neighbourhoods. A *shariq* is a group of people from a *bongsho*, who are headed by a person of acknowledged authority, who move away from *bongsho*'s location to live at another. There can be many *shariq* in a *bongsho*. In each *shariq,* the heads of the households are brothers or cousins, and one of them is the leader.

Among the Khan there are several *sharder* 'leaders', one to each of the *shariq*. A few of them are old and they are called *murubbi* 'elderly'. There are some young men, also, leading their *shariq*. Among the old *sharder* or *murubbi*, two brothers are well known. Their cousin is also a leading person in the village. Both of the brothers were officials in their government service life. After their retirement the two brothers returned to their village. They are still influential in the governmental administration. One of their cousins, from a neighbouring village, was the President of Bangladesh, and his father was the Speaker in Parliament during the Pakistan period. They are dominant not only in Charan, but in the whole region and have power and property. When they came back to the village twenty years ago, from government service, many people came into the village as the sharecroppers and day labourers from the surrounding villages in order to cultivate their land. The traditional fishermen had to obey the two brothers, as they are the minority and poor. There are some people who believe that the brothers have spoilt the village, breaking it up. In particular, the

elder one does not like persons who do not seek any assistance from him and whose *shariq* consider that he is abusing his power. As he was away from the village for a long time, he was not aware of village politics. He responded to accusations without making any enquiry into their grounds. For example, he filed cases against innocent boys, and they were charged with stealing coconuts from his trees. The villagers usually avoid the courts and try to solve this type of small dispute in the *shomaj*. To the common people *mamla mokoddoma* 'filing case' and *court kachari kora* 'placing dispute in the court' are not gentleman's acts. By this man showing off his power to the poor in such a way he scared them and this made most of the villagers unhappy.

These two brothers, and two other influential persons, have much power in the village. The poor fishermen have to respect their decisions. The Khan act as patrons and others, such the fishermen and the Miah, are their clients[2]. During elections these leaders dictate to people for whom they should cast their votes. In the 1997 local government elections the Khans told the fishermen and Miah how to cast their vote as usual, but the fishermen supported another candidate. Then the khan threatened the fishermen and the Miah when they campaigned for their own candidate. The patrons i.e. the two brothers and their cousin told their client sharecroppers that they would not allow anyone to sharecrop on their land if their candidate failed to win. The fishermen were threatened in the same way as they were told that their access to the *beel* and *jhata* 'fish refuges' would be restricted. The fishermen and the Miah remained united in the election. The Khans were

[2] Bertocci (1970, 1974, 1976, 1979), Jahangir (1982) explained the typical patron-client relation in rural Bangladesh where the relation between the rich land owner and poor sharecroppers or day labourers are suppose to be reciprocal. It might not be same case in the context encountered in Charan. In many of the cases, the role of the rural 'patron' was observed to be exploitative and dominant of his poorer clients.

angry, as their prestige was threatened and they had spent a lot of money in order to win the election. After their defeat they started taking revenge. They took land away from the sharecroppers. The fishermen were told not to enter the *beel*. The fishermen were told not to fish in the *jhata* 'fish refuges', the Khans claiming the land inside the *beel* belonged to them. So the *shomaj* of the Charan village try to control the fishermen. The Miahs in Charan received the same treatment as the fishermen; many of them have recently joined in fishing with the Hindu fishermen. They think they have a good relationship with the Hindus, but as far as the fishermen are concerned, this unity is only on the surface. The traditional fishermen are not happy with the increasing number of persons, previously not fishermen, joining them in fishing in the *beel*.

8.5 Kinship and *para* location

The present section illustrates the kinship network and relationships among the fishermen. It describes the small community of the fishing group.

The small fishing community is based on kinship. Kinship relations are important throughout Bengali society (Arefin 1986; Aziz 1979). From the highest administrative level of the government to the lowest rural unit level kinship is the determining factor in decision-making and other activities. Fishing activities and team formation depends on who is related to whom. Although individual skills are important, a kinsman will always get priority for inclusion in the fishing group. This is characteristic of 'small scale fishers', as McGoodwin (1990) noted:

> Small scale fisher's world view and connection with the world are typically much more localised ...Small scale fishers' lives are usually centered around a community or a string of communities. Moreover, in small-scale fishing it is common ...to know one another on a personal basis and to work closely together. (pp-44-45)

The fishermen's *para* in Charan, have these the characteristics. Most fishermen live in Chapila para, the rest mainly live in Nadirpar 'river bank' and Pukurchala 'ponds areas'. There are also a few fishing families that are scattered in other *para* of the village. The fishermen's *shomaj* has fragmented today. There are about forty fishermen households in this village.

The *para* are divided into several *bari.* These are homesteads where all close kin reside. Extended families may form a *bari.* Each *bari* comprises a few *ghor* which is a nuclear family household. The literal meaning of *ghor*[3] is room. A man lives in a *ghor* with his wife and children.[4] Sons accompany their fathers from an early age to watch fishing activities and in this way they learn the techniques of fishing. Until a son marries and opens a new cooking arrangement the *ghor* does not split. People in the same *ghor* cook their food together, which follows the local saying *ek chulai randhon baron/ ek pateye khaon daon* 'cooking in the same oven and having food from the same pot'.

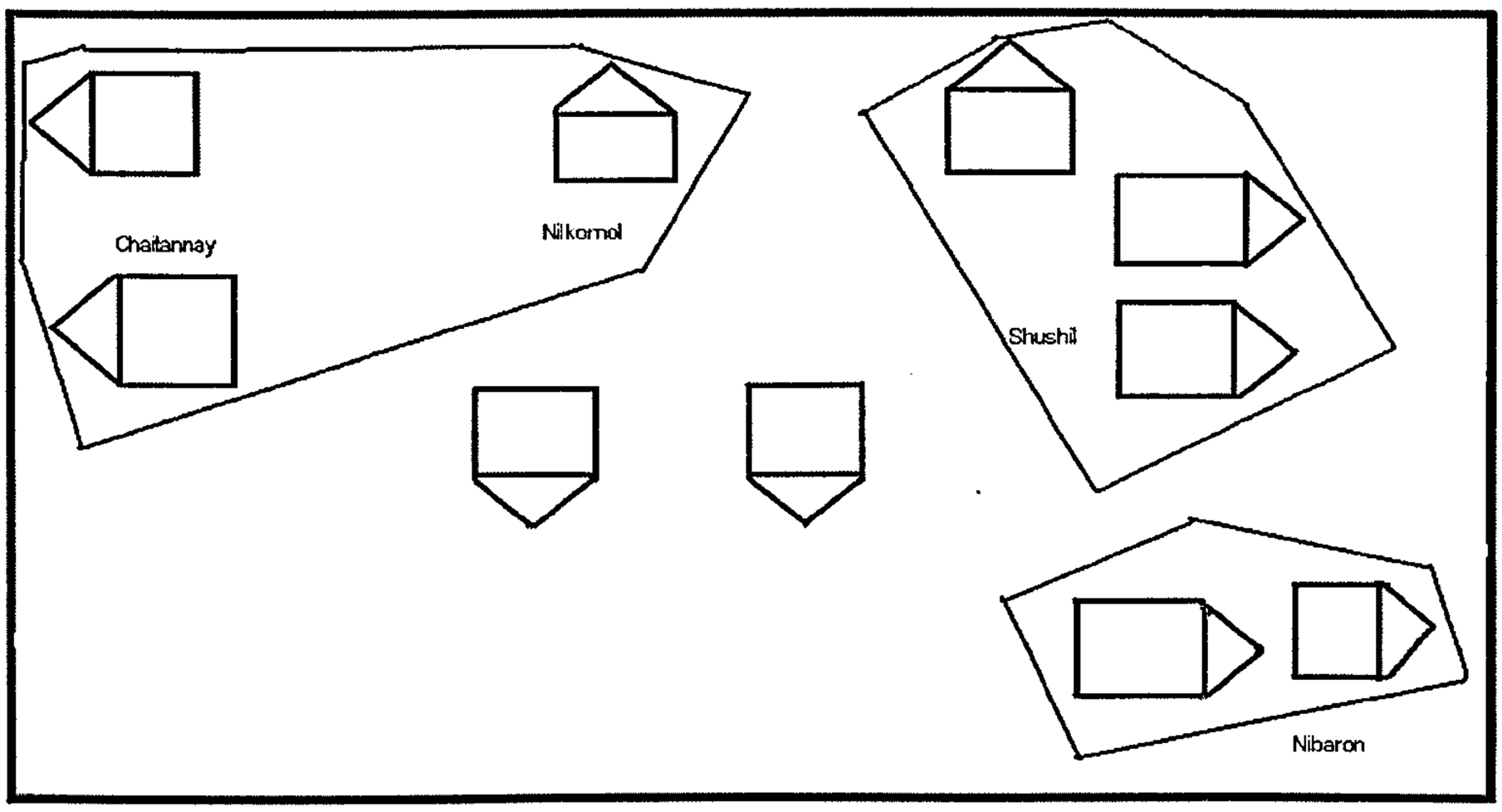
8.5.1 Chapila para

A *chapila* is a kind of fish, Chapila para is the *para* of *chapila* 'fish'. The fishermen are not happy with this name. They say that it was given to them by the Khans; a fish name indicating their low status in the society. According to some fishermen, the word *chapila* also means 'narrow', which relates to the shape of the *para.* There are number of *shariq* (division of *bongsho*) groups living in Chapila. Each divided into several *ghor.* These *shariq* are named after Chaitannaya chodro Das, Khushi Mohon Das, Dinesh Chandro Das, Shushil Chandro Das and Nibaran Das. Most of

[3] Another popular Bengali word for the household is *Khana.*

these are people's relatives who left the country earlier. Only a few fragments of the different *shariq* are now in the village. The name came from those who lead the *shariq* fragment other members having split away for different reasons.

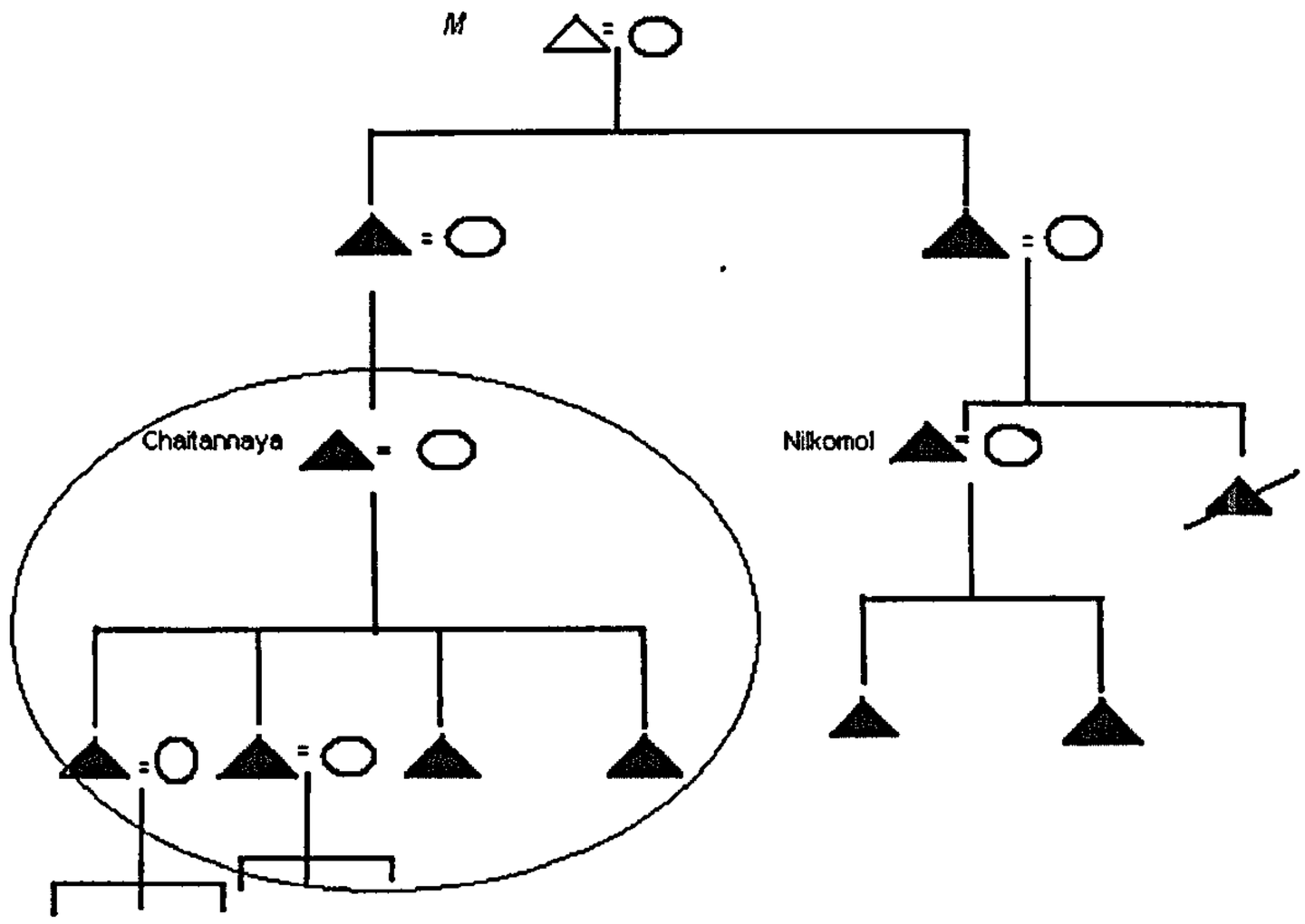
Figure: 8.1 *bari* and fishing group in Chapilapara



The size of families and households varies. Different types of families are found here Chaitannaya and his four sons live in the same homestead. Except for the youngest son, the others are married and live with their families in the same *bari*. All of them are fishermen. The grandchildren are too young to fish yet. The two eldest sons have their own *ghor* and cook separately. Although two of the Chaitannaya's sons have separate households, they fish together with their father. All of the sons are equally involved in Chaitannaya's boat and net.

[4] Frazer (1985: 123) experienced similar family organisation among Malay fishermen.

Figure:8.2 chaitannaya's *shariq* and fishing group



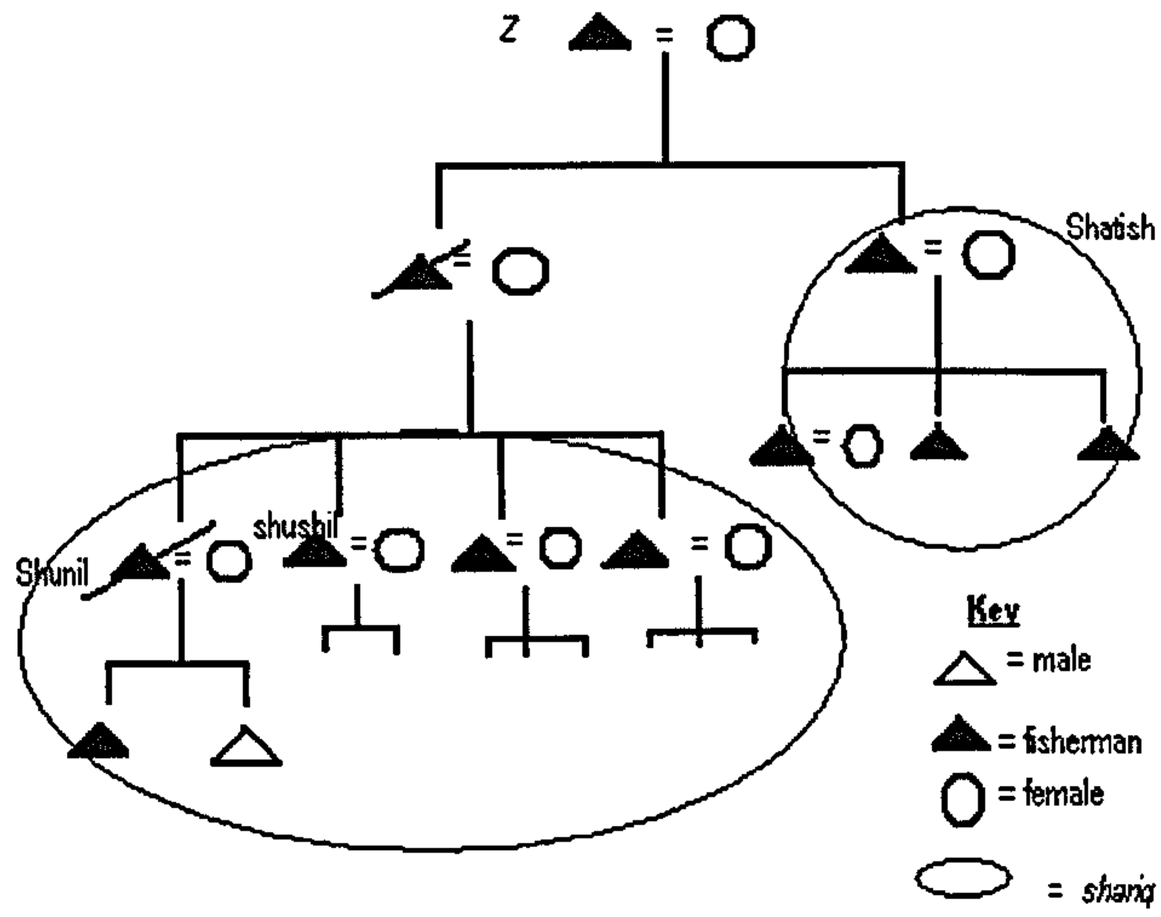
Nil Komol Das belongs to the same *bongsho* as Chaitannaya, being his paternal cousin, and he is considered a *shariq*. Nil Komomol lives with his wife and his two unmarried sons in the same household. His brother died a few years ago.

Khushimohon also lives in the same *para* as the Chaitannay family, with his two sons and three daughters, all unmarried. He is the only member of his *shariq* line in the village.

Dinesh is from another *shariq*. His family consists of three sons (one married) and one daughter. They all fish with their father. He also has one brother and a cousin in Charan.

Z has a large number of descendants who are fishermen (see figure: 8.3).

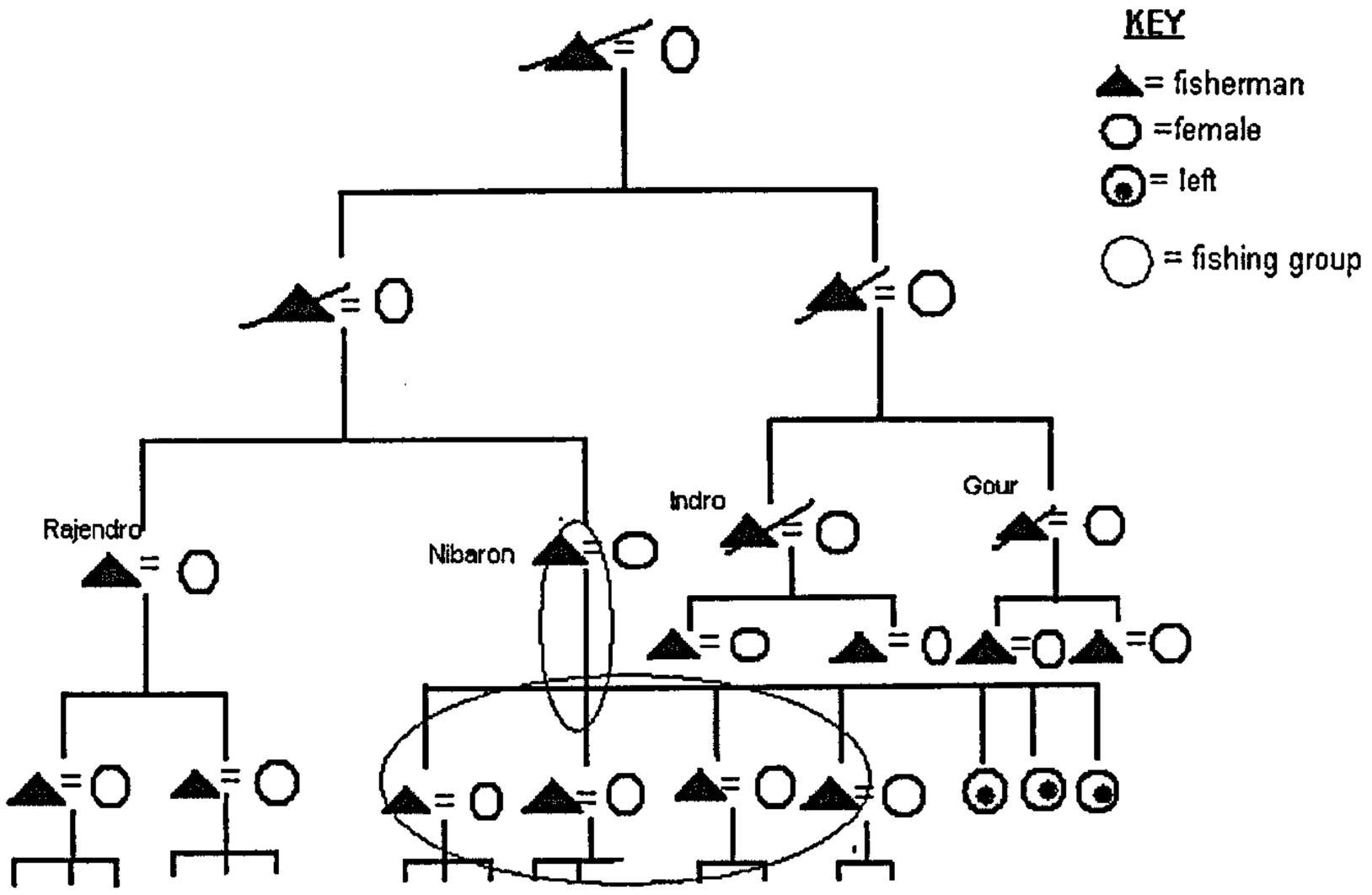
Figure: 8.3 shunil's *shariq* and fishing group



Shunil, now deceased, was the secretary of the fishermen's co-operative. His family still live in Pukur chala (another *para*). His surviving brothers comprise the same *shariq*. Their father's brother Shatish moved to another *para* and with his sons forms another fishing group.

Another household head is that of Nibaron (figure 8.4) who has four sons and three daughters. His sons all married and with children, fish with him in the same fishing group during the monsoon. They have separate *ghor* and cook separately, but they all fish together collectively. His daughters have all married men in distant villages and live far away.

Figure: 8.4 Nibaron's kins and fishing group



Two sons of Nibaron's deceased brother Rajendro live in Charan. Both have children and live in different *ghor*. Nibaran's deceased paternal cousin Indromohon has two sons living in Nadirpar. Another dead cousin Gour also has two sons in Nadirpar. All of these men are involved in fishing.

8.5.2 The *Nadirpar Para*

Nadir para or 'bank of the river neighbourhood' comprises a few households of fishermen who reside on the riverbank. They have lived there for the last ten years. All of these fishermen have lost or sold their farmland before moving to this place. There are a few landless labourers' families residing at the same location. The land belongs to the government. However, some Khan people claimed ownership and have 'sold' rights to the fishermen.

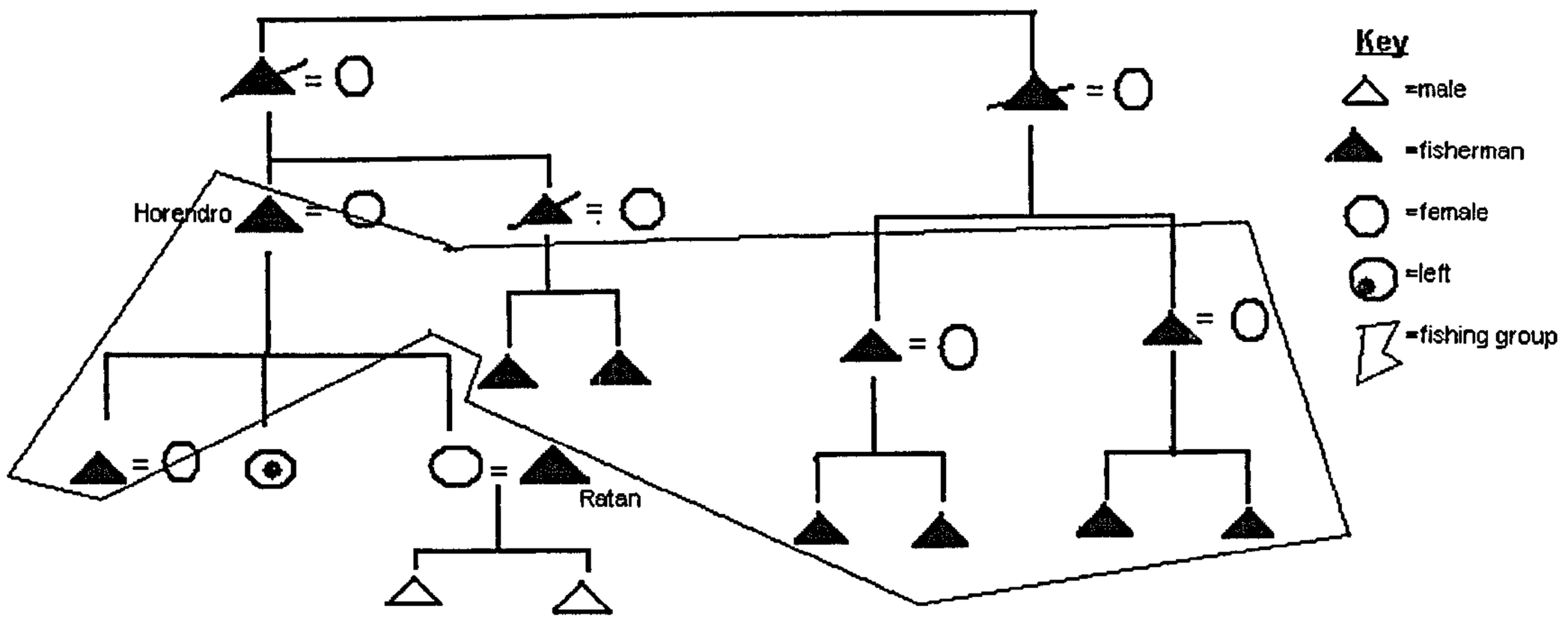
Bancharam and his two sons, fish together here (the rest of his kin are in India).

Another family comprises Indromohan's, three sons, two of whom are involved in fishing. Both of them are married and reside in separate *ghor*. The youngest Raj Kumar is not married, and resides with his mother in another *ghor*

8.5.3 *Pukur Chala Para*

Pukur chala para or the 'bank of the pond neighbourhood' is some one hundred yards away from Chapila *para*. There are some anomalous types of kin groups here. Usually, girls move to their husband's home when they marry, but there are some exceptions, as found in *Pukur chala*. In rural Bengal, amongst Muslims, a bridegroom staying in his father-in-law's house is called *ghor jamai* 'house groom'. This is not a term of respect.

Figure:8.5 Horendro extended family and fishing group



Horendro has a son and two daughters (see figure:7.5). The husband of one of his daughters, called Ratan, is a *ghor jamai* 'house groom'. He obtained a small piece of land from his father-in-law to build a house on. Usually *ghor jamai* in Bengali society do not need to do any work, but as his father-in-law is too poor to support him, Ratan has to work hard to provide for his wife and Harendro's deceased brother's two sons

who also live the *para*, as well as two cousins, each with two sons who are involved in fishing. All of Horedro's *shariq* belong to same fishing group when exploiting *jhata* 'refuges'.

8.6 Fishing Group Formation and Selection of *Vagi* 'Partners'

This section describes how fishing groups are formed and how fishing partners are selected. Kin -founded fishing groups are the norm among Hindu fishermen. Kin feeling which promotes emotional ties is the main characteristic of groups. They share the same space and exploit the same resources, as they are striving to survive together. For fishing, they share equipment (i.e. boat and fishing gear). Libier (1994:155) found a similar organisation on a Polonesian atoll called Ontona, where fishing groups were organised according to kin group, which he defined as an extended family. Acheson (1981) mentions that in most of the fisheries in the world where 'kinship is the paramount concern, since many crews ...are organised around a core of fishermen' (p-279). It is also evident in other works that crews are composed mainly of kinsmen and, typically, everywhere the boat and gear owner shows great flexibility in recruiting crews (Faris 1972; Firestone 1979). It is also very true of the Charan fishermen.

Although Muslims also fish in groups, these are not based on kin relationships. The membership of Muslim fishermen groups changes frequently, which is rare among the Hindu fishermen. As Hindu fishermen are concerned about fish stocks, they usually take measures through their *shomaj* to conserve them. The fishermen's *shomaj* had raised a communal fund during the Pakistan era to buy two boats and two groups were formed among the fishermen. These groups arranged to fish

communally, rather than individually, during the dry season. It was thought that individual fishing had been devastating the resources, being beyond the control of the *shomaj*. After Liberation in 1971 when the fishermen's co-operative was formed in Charan, all Hindu fishermen were encouraged to act in the same way.

The way of recruiting fishing partners (*vagi*) is similar in all types of fishing. Groups usually form according to the type of fishing gear. The fishermen group together according to the type of gear they plan to use (e.g. *berjal*, *Chela jal*, *thela jal*, *Chechijal*, *bor jal* etc. see chapter 6). They also fish in groups inside the *jhata* ' fish refuges', using various types of net.

Pond owners and people who raise fish in their paddies during the monsoon, invite fishermen to help them catch the fish. Nets like *berjal*, jhaki jal are used in ponds (see Chapter 6).

The owner of a net decides who will be fishing partners. The net owner does not always consider his prospects to be good. Therefore, he tries to find a few skilled persons to join in his group, but there are few other things which he needs to consider. He will try to avoid any conflict or quarrels with his *vagi* 'partner', and not to recruit any hot-headed person. This encourages net owners to select *vagi* from their nearest kin. Otherwise, they try to find someone who lives in their neighbourhood. Hindu fishermen prefer their kinsmen to make up their fishing groups. Sometimes they bring their relatives from neighbouring villages, to assist them.

If the boat owner is volatile and has a poor reputation, people will try to avoid him, including his nearest kin. If any conflict breaks out during fishing, the group will split up. The boat and net owner is then in trouble having no one to go out fishing on his boat. The *vagi* on a boat rarely change each year. Before inviting any new *vagi* to join him the *malik* 'owner' has to ask his former partners whether they do not want to fish with him this year. Every one follows this rule strictly.

The distribution of the catch is the same in all boats. They sell the harvest and divide the money into sixteen parts. Each part is called an *ana*. Sixteen *ana* are equivalent to one taka. The boat and net owner take *char ana* '4 parts' of the money. The remainder is distributed equally among the crew. If the owner also fishes with the group then he also receives a share, out of the crews' share. In many boats young boys are found working as a *vagi*. They get half the share of an adult *vagi*. Some boat owners encourage (*bokshish dei* 'give tips') their partners to catch more fish by buying them food in the restaurant or paying for them to see movies at the local cinema halls.

The following accounts describe various fishing group among Hindu fishermen at Charan.

8.6.1 Anuj's Team.

Anuj is leader of a group for *berjal* fishing. There are eight other members in this group. Two are his *bhai* 'brothers' and one is his *bhatija* 'nephew', another a *jathato bhai* 'cousin' and the sixth man is his *daker jatha* 'honorary uncle'. The seventh is this man's son's honorary cousin. Other relatives of these men also, occasionally,

help out with the fishing. A Muslim day labourer has recently joined them and fishes with them during the rainy season. The crew took pity on him as he is poor man.

The crew work together on average for six months of the year. Anuj along with his two brothers and nephew also fish together in *Katha* 'refuges'. The other three form a separate group under the leadership of Anuj's honorary uncle. After the *katha* fishing the teams split up except Anuj, his two brothers and nephew who continue to fish together whenever possible. One of his elder brothers, Shushil, has an incurable disease which is why he cannot work like other healthy people, but he is included in the team as Anuj wants to support his brother to run the family.

8.6.2 Baren's Team

Baren has a large boat and a *berjal* 'net'. There are three other shareholders in this boat and net. They are his brother and his *maishaya shoshur* ' 'wife's uncle', and his *bon jamai* ' brother in law', who lives in the neighbouring village of Tenguria. Other related crew members are cousins and a cousin's brother-in-law. The rest of the crew comprises Muslims who have recently joined the Hindu fishermen. They are mainly day-labourers, only fishing during the rainy season.

8.6.3 Chaitannaya's Team

Chaitannaya is 67 years old and runs a large boat and net. It is crewed by two *shariq* 'fragments of lineage'. The first *shariq* consists of Chaitannaya, his son and two nephews. The other *shariq* is headed by Nibaron who is Chaitannaya's brother's father-in-law and Nibaron's two grandsons (see figure 8.2).

8.6.4 Anath's Team

Anath has eight persons as partners in his boat. Two are his nephews. The rest of the crew comprises his neighbours and a number of Muslim day labourers.

8.7 Other types of group and individual fishing activities

This section describes other types of fishing groups and individual fishing, which are not seen so often. Both traditional Hindu fishermen and a few Muslims take part in these other types of fishing groups. It is not only *berjal* 'net' fishing which requires a team. The *chela jal* fishing is only done by traditional fishermen. It requires three persons, usually close-kin. When the *berjal*-fishing season ends, for example, then Khushimohon, a traditional fisherman, starts *chela jal* 'net' fishing with his brother-in-law and nephew. They usually divide the catch into four parts: one part goes to the boat and net owner and other three parts are distributed between the three partners.

Fishing with *chechi* or *khara jal* 'nets' are also undertaken by groups of relatives. There is only one *chechi jal* 'net' in the village and it belongs to a rich person who often hires it to traditional fishermen to catch fish during the period of *Chechijal* fishing (see chapter 4). The *khara jal* 'net' requires three persons. The fishermen work for twenty-four hours at a time and then change shifts.

Fishermen sometimes fish on their own with a *jhaki jal* 'net' or in pairs if they fish from a boat. For instance, Bancharam, who is elderly, when his boat and *ber jal* 'net' were out of order, sometimes went out on his son's boat to get some fish for his subsistence.

Another type of fishing group forms during the dry season when water level goes down in the *beel.* The fishermen form several groups while fishing with *thela jal* 'nets'. The number of men are more than twelve to a group. They usually comprise close relatives, such as cousins and uncles. The Hindu fishermen never include any Muslims in *thela jal* 'net' fishing. Muslims form separate groups. They not only fish, but they chant rhymes in chorus (*Jahur deya*) to scare the fish. They include many 'adult' words and so, members are adult people only. The catch is taken to same place and after selling all the fish the money is distributed equally between all members.

One kind of group fishing takes place in *jhata* 'refuges' (see Chapter 4), called locally *jhata mara* 'killing in *jhata*'. When the *beel* water level drops, fishermen commence this activity. Only the Hindu fishermen fish in *jhata*, which requires particular skills believed to be held only by them. The fishermen split into two large groups of relatives to fish in the forty *Jhata* in Charan *beel.* One group comprises with members of Chapila para and Pukur Chala, and the other is formed by the fishermen of *Nadir par*. One consists of twelve members, the other has fifteen members. They mainly use *khuia jal* 'nets' to catch fish from the *jhata.* The income is divided into two parts. One half goes to the *jhata* owner and the other half is divided equally among the members of the group. There is no extra share for the net and boat owner.

When water levels start to decline in ponds, the pond owners bring in fishermen to harvest their fish, which they have cultivated during the monsoon. It provides a good income for the fishermen. They go to distant places in groups, mostly *shariq* based.

The big net owners usually form these groups with their close relatives. Their numbers vary according to the size of the pond. The pond owners gives 10 per cent of what he receives when he sells the fish to the fishermen. This money is distributed equally among them. There is no extra payment for the net owner. The pond owners, also, sometimes give fish to the fishermen as a gift.

There are some fishermen who travel to different distant places. For example, Akhil and Akabbor, from the neighbouring Thana Bhua pur, leave their home for about one month and move around the whole region with their fishing nets. They travel on foot, to places such as Ajakair, Beilar, Hatkhola, Kokdhohra, Charan and Gopal Pur. In all those places they fish in *beel*, canals, river and other open water bodies. In their own over crowded village non-fishermen newcomers pushed them out. The small *beel* where traditional fishermen used to fish cannot support all these people and so it is hard for traditional fishermen to survive economically, forcing them to leave their village in search of better opportunities.

These travelling fishermen's *kathi jal* 'nets' are not used by the Charan traditional fishermen. They visit Charan *beel* four or five times in a season and pay nothing for access. It is risky for them to move around and fish like this, as they may be challenged anywhere. They have been in trouble a few times, but this does not stop them fishing as they have no other alternative. Every day, after fishing and selling their catch at the Hamid Pur hut, they sleep in an open field there. This has proved risky for them, as their money has been stolen on a few occasions.

Another kind of group fishing, which involves aqua culture, is increasing common among the villagers over the last eight years. The villagers call it *mach chara* 'leaving the fish' or 'project'. Muslims organise this fish cultivation, not Hindu fishermen. First of all, people collect money from those who are willing to join their 'project'. They might not be relatives. The number of members of a group can vary. Landowners on the paddy are invited to join. During the monsoon when the water floods the paddy, then they mark their territory according to the land ownership of the group members. They put a fine mesh net around the 'project' area to contain the fish. They buy fingerlings from the hatchery from Mymensingh district. They do not consult any fisheries experts or their neighbours. Members of the group select a person as their 'project' leader to keep the accounts. All the members are responsible for checking the net to see that it is tied up properly and that no one is causing any damage to it. During the night, they guard the area because others in the village may try to destroy their efforts. Group members also fall out when they *fail to make a profit after the fish harvest. Sometimes the team leader and his friends cheat the other members, as they are opportunists. Sometimes they fight* with each other. For instance, A-S is a Charan person *who lost his job and went to* the villagers to propose a 'project'. People trusted him and contributed money. At the end of the season, he failed to show any profit and even failed to pay people back their investment. People were not ready to accept his excuses, thinking that he had stolen fish and sold them secretly. This rumour spread among the villagers and they accused him of cheating them. However, he stood his ground with the support of his relatives.

8.8 Other Income activities

This section describes other income earning activities among fishing families. The fishermen of Charan cultivated land in the past (see section 6.). Nowadays, they reside on small areas of land. Some fishermen are involved in agriculture, as sharecroppers during fishing lean periods. They rarely number more than two or three. Some fishermen raise cows and sell the milk to support their families. Some families raise sheep for other rich families in the village who leave them in the care of the fishermen. The number of sheep has been increasing by the year. The fishermen own over half of the sheep. The children in the fishing community take care of the sheep.

A few women in the fishermen's village, whose husbands are not able to support families, do various jobs in order to earn money. These women collect *gobor* 'cow dung' from the rich farmers' houses and dry it. It is then termed *ghoshi* 'fuel' and they sell the dung fire blocks to farmers. The women also go out to collect wood to burn in their ovens. They also collect wild vegetables available around the village, and, after cooking them, serve them at meals (see Stokoe 2000). A few women work in the rich-farmers' houses during the harvest. They are paid with paddy, not with cash. The women have no involvement in fishing, but they always help to sort out problems with the fishing gear. They usually repair holes in nets. About 30-40 years ago women used to make nets at home. Nowadays, they are rarely involved in this work as men use nylon string nets[5]. Women also used to process fish by drying them, but nowadays the catch is not large enough to do so.

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[5] Pramanik (1994) mentions that the womenfolk from 167 fishing households of two villages of south 24 Parganas, West Bengal, where mechanisation has taken away net making job from the fishing families and induced fisher-women to undertake net mending activity. Fisher-women have now been compelled to take up activities not related to fishing for their subsistence.

8.9 Boat and fishing gear ownership

This section describes the ownership patterns of the major fishing equipment of traditional Hindu fishermen, which reflects their social interdependencies. A boat is necessary for major types of fishing. A *boro nouka* 'large boat' costs more than 20,000 taka, while a *dingi* (a small boat which can carry two or three persons) is not more than 5000 taka. Most of the fishermen in Charan have their own nets. Nets like *jhaki* or *thela* or other small and cheaper nets are owned by individuals and all males in the family can use them. All fishermen have common fishing gear such as *thela jal*, *gainja, dula* etc., found in each household. For the large and expensive nets, there is joint ownership among the *shariq* members. A net like the *berjal*, or *chela jal,* which needs to be used from a boat, is always jointly owned. As the fishermen are poor, they cannot afford to have large nets or boats of their own. Three or four brothers or other relatives usually buy a boat or net together. If there are more brothers in the same household then boys go out with the net and boat, alternatively. The income of the household is shared by all its members. The fishermen get loans from the bank or an NGO to buy their nets and boats. In previously times they used to go to the local moneylender to borrow the money and used to have to pay very large sums in interest. Sometimes fishermen use part of the dowries received in marriages to purchase boats and nets. For instance, Baren, received 30,000 taka as dowry from his father-in-law at his marriage. He spent twenty thousands taka to arrange his sisters' marriage and the remainder of the money he used to buy a *berjal* 'net' jointly with others.

Figure:8.6 ownership of gear fishing gear and crafts

Local name	Nadir *para*	Pukur chala	Chapilapara	Type of the equipment	Ownership Type
Ber jal	1	1	2	A fine mesh net	Joint
Jhaki jal	8	7	10	A net	Single household
Khara	1	-	-	A net	Joint
Chela	-	-	1	A net	Single house hold
Dingi	2	2	4	Small boat	Single household
Boro Nouka	1	2	7	Large boat	Joint

The ownership of fishing gear and craft among Hindu fishermen requires them to share their property communally. Such joint ownership is absent among the Muslims who are involved in fishing. The joint ownership of fishing craft and gear is part of how Hindu fishermen organise their livelihoods, but it is also helps the fishermen to serve their common interest.

8.10 Fish selling

This section describes the fish marketing process. All members of a fishing group do not take part in fish selling, as it requires a degree of expertise. The fishermen rely on the person who can talk and attract the customers. Considerable bargaining takes place to get a good price for the fish. There are some buyers who go to the *beel* to buy fish directly from the fishermen. If the price offered is not satisfactory, the fishermen go to Balla Bazar or Bhondeshor to sell their fish. If the catch is very good, they go Kalihati or Tangail to sell their fish as they can afford to travel there

and will receive higher prices than locally. The fish prices have increased as the fish population has declined. There is a committee at each market place, which asks for rent from the fishermen when they go there. The rent varies on different days of the week. Each village market is held on a particular day in the week when sellers and buyers come from distant parts of the region.

The person who sells fish does not get any extra money for his work. He has to be strong-minded; otherwise buyers can exploit him. The fish market is also full of thugs who try to take away fish by force, from the fishermen. Some of them pay the market price, but others threaten the fishermen if they will not sell fish to them for the amount of money they offer. Many incidents have occurred in Bolla market, where some influential businessmen have injured fishermen badly while bargaining the fish price.

Chapter 9

Conclusion

This final chapter will present the conclusion to my discussion on the different issues, cases and arguments presented in this thesis. The thesis aims to show how anthropological approaches to natural resources, here fisheries, can contribute towards a better understanding of indigenous knowledge in development contexts and how it can be employed to solve current problems.

9.1 Ethnographic context and Conclusion

It was discussed in the 'Indigenous knowledge and ethnoscience' chapter that the objective of the study is to 'bridge 'the gap between our scientifically founded technology and local awareness and practices' in development (Sillitoe et al. 2000 c:24). The thesis highlights issues surrounding this 'gap' and to caution the scientists about the dangers of treating customary practices as culturally disembodied technical knowledge. The aim of the discussion was to bring out the value of an anthropological approach which can assist interdisciplinary working and help the scientist and development practitioners to understand people's livelihoods and what people want to reveal regarding their own lives. The inter-disciplinary research for the DFID project included an indigenous knowledge research team composed both of Bangladeshi nationals and foreigners so as to cover various aspects of the subject and to include a variety of attitudes towards specific problems. Although the natural resource scientists were, initially, sympathetic to the idea that Indigenous knowledge features in the research, they failed to capitalise on it; no doubt due to the lack of time to enable them understand its significance. They did not have time for experimenting with so-called 'non-standard' research methods,

which they think are followed by the anthropologists (see Chapter 3). For the anthropologist, an appreciable length of time was necessary in order to comprehend the local people's attitude and identify local problems involved in local livelihood processes. Therefore, by the time that the anthropologists were ready to inform the scientist colleagues regarding the problems of natural resources, through a continuous learning process obtained from the local people's concern about their livelihood, the project had reached its stipulated time span.

In Chapter 3, it was shown that the local Charan people's way of thinking about fishing differs from that of the natural resource scientists and that there is a problem for the people in understanding scientists' motives. Chapter 2 related current thoughts and issues on indigenous knowledge. It showed how this knowledge, in a development context, can provide a better understanding of issues. Different authors' views were examined and it emerged that non-anthropologists concentrate on the value of technological information, but ignored the wider cultural context. This omission can be a danger to the use of indigenous knowledge research in development work (see 2.3). This Chapter also pointed out why and how all scientifically biased indigenous knowledge studies have failed to note and take into consideration local people's knowledge in Bangladesh. The present study on the fisheries of the Bangladesh floodplain tackled this issue using evidence from the Charan people's own experiences. A discussion of the development of ethnoscience was presented in this connection, which placed an emphasis on the way people interact with their environment and classify the things in their region. Chapters 4, 5 and 6 highlighted the importance of ethnoscience in attempting to identify and

classify natural resources on the Bangladesh floodplain, fish, water resources and other aquatic life.

In Chapter 4, people's ways of classifying their aquatic environment, particularly different water-ways and water-bodies, were described. When local people identify different parts of the water-body, such as the *beel* 'lake', they include reference to different incidents regarding the naming of locations e.g. *gorumara teck* 'where the cow was killed'. This is why an understanding of the people's way of identifying certain sites is important when exploring natural resources, because sometimes an event like this can tend people to identify a place rather then resources. This context has been overlooked or ignored in many of the scientific approaches.

The way the fishermen furnish the *katha* 'refuges' with branches for the fish in the *beel,* to assure their survival, was also described. The villagers' way of digging a pond, or re-excavating it for aquaculture, shows their considerable knowledge of their fisheries' management. The relation between aquatic environment and its flora and fauna were also described in accordance with the people's understanding. This ethnobotanical record shows that the people of Charan have knowledge of the properties of the aquatic plants. Some plants have important uses in the villagers' everyday life as food or medicine. Others determine water quality and, thus, fish growth and survival. People's way of identifying and classifying other animals is also useful in this regard. Most of the animals referred to are not eaten by the people, with the exception of the turtle, which are a food favoured by Hindus. Other animals, though not part of people's diet, have characteristics, behaviour and availability

known to people. People are less concerned about the aquatic insects and their role in the environment, and have only a simple classification of them.

In Chapter 6, the way people classify and identify fish species was described. The distinction between *jeol* and *ojeol*, *gura mach* and *boro mach*, and other categories such as *na khauinna mach* 'inedible fish', and *pagairamach* 'cultivated fish' were explained. A clear distinction was made by the author between scientific fish taxonomy and the classification of local people. Fish are of major importance to peoples' livelihood. Local people's taxonomy is based on colour, size and growth of fish (e.g. the name of the same fish often varies according to its size) whereas scientists classify fish according to formal categories based on genetics. For example, scientists have assumed that local people prefer to have big fish. In reality, small fishes are not only more numerous than big fish, but people consider that they taste better. Although introduced fish are cheaper and bigger in size, the common complaint against them is that they are unfamiliar and have an 'artificial' taste. In addition, as Chapter 5 shows, more factors are involved than taste when people choose fish. These are also a number of fish, which people consider unedible. They are plentiful in the water-ways, but most of the village population, even the very poorest, often decline to eat them. The fishermen throw them away if any are caught in their nets. It is not only because of their taste. The main reason that they give for avoiding them is that their forefathers did not consider them edible. There are certain fish that the Hindu fishermen say are forbidden to them. This shows that there are other cultural or social factors beyond practical ones, which influence people in considering whether fish are edible or not, very tasty or less tasty and

determines their classification. Unfortunately, fisheries scientists and nutritionists frequently fail to take into account local people's evaluation of fish species.

In Chapter 6, a number of fishing technologies are described and categorised according to the fishermen's points of view. The fishermen classify their fishing gear in various ways and also describe how they relate this to their cultural ideas about fish conservation. The introduction of new fishing gears and resulting changes in fishing technologies, has been accompanied by the involvement of non-professional fishermen in the Charan fisheries and, this has brought about the over-harvest of the fish population. The traditional fishermen's way of fishing and the types of gear they use at present, are quite different to that of the newcomers. When the fishermen of Charan say *agila kaler machmara* 'fishing of the past' (See 4.2.1) they refer to the use of wide mesh nets which allowed all small fish to escape, leaving the larger ones behind. This conserves fish stocks, leaving small fish to grow bigger, which is one reason why fish catches were larger in the past. When the fishermen relate the introduction of new fishing gear to the *koli juger mach mar* 'fishing of *koli* 'present' era' (See 4.2.2) they explain how devastating this new gear is for the fish population. The Hindu fishermen say that, according to their cultural beliefs, the use of spears, harpoons and lines hurt the fish while they are being caught, which is anti-religious behaviour, so none of them use any of this gear (See 4.2.4). The Hindu fishermen's way of fishing also shows that they are well informed about the aquatic environment and fish behaviour, which makes them more skilful than newcomer Muslim non-fishermen. According to their traditional knowledge they know which part of the water body would be appropriate for the use of a particular type of gear at a certain time of the year, in order to harvest a satisfactory amount of fish. As well as the

fishing practices of the professional Hindu fishermen, various types of fishing technologies were described which are used by subsistence farmers. These technologies are not appropriate to professional fishing. The farmers use them occasionally (See 4.2.3).

The complex access rights of the Hindu traditional fishermen to the water bodies of Charan were explained in Chapter 7. An account is given of the lease system of the common fishing ground in relation to common property rights in Bangladesh, dating from the Jamidar past. During the historical development, access to common property, such as the *beel,* has become competitive and other non-fisher groups' interests have become prominent in this business. The traditional Hindu fishermen's fishing right were customary in the earlier periods and later their livelihoods have come under threat by different interest groups. The biased State rules, which have allowed non-fishers to gain access to fishing waters, have also helped bring about over-fishing, resulting in a 'tragedy of the commons' (see Chapter 7).

Involvement of an NGO to improve the livelihood of the poor, such as the fishermen, has also created distrust among the fishermen (see Chapter 7). Due to their bitter experiences, in the past, the Hindu fishermen are very suspicious about the activities of such development organisations. The suspicion was aroused by the NGO not informing people about their objectives. When the NGO tried to intervene, the fishermen thought they would restrict their access to the fishing waters. The aims of the NGO to facilitate technological change, or bring about physical change in the water-body, cannot be achieved while the NGO's intention and acts are not understood by the local people. However, where access to fishing waters is so

sensitive and complicated, through the involvement of leasees and thugs, the benefit of any proposed intervention might not reach to the poor, but rather further the interests of other wealthier interest groups.

Chapter 8 describes, the way that the fishermen's community is organised, with emphasis placed on the Hindu fishermen's *ghor*, *bari* and *para* community groups, as these dictate their fishing activities. The kinship relations of people in *bari* and *para* determine fishing group formation. The ownership of fishing gears is often *para* based, being commonly shared by fishermen's kin. Kin relationship determines who can go out with whom to fish. The genealogies of some *para* based fishing groups were drawn to show the structure of the Hindu fishing community of Charan. The changing composition and size of fishing groups in different seasons were explained, as they split up during the dry season and start using different types of fishing gear. The role of the *sharder* 'leaders' of the fishing community was also described and how they try to solve conflicts in the community.

The position of the small group of Hindu fishermen in the dominant community was mentioned. The changing trends in the community were described. It related to the way Hindus were exploited by the other social and religious groups in their historical past. As many Hindus, including fishermen, fled the country during the communal riots of Partition, this has reduced the size of their community. Other income activities of the fishermen, apart from fishing were described, including the involvement of their women in various jobs in order to ensure the livelihood of their families. The characteristics of the fishermen community are discussed in relation to their fishing activities.

9.2 Scientific versus indigenous knowledge in relation to the field site

The fisheries scientists on the DFID projects collected information on Charan fisheries using various scientific methods to measure water conditions and quality of different water bodies. Other research was conducted into fish consumption, catch, and fishing gear uses. They applied various survey and Participatory Rural Appraisal tools. Some of the information they collected, using these methods does not comply with local people's experiences. Some of these contradictions were discussed to show the contrast between scientists' and local people's knowledge, as interpreted using the anthropological approach. For example, the fisheries scientist Craig (2000) reported that in Charan fisheries, the fishermen use about eight fishing gears: *jali jal, thela jal, veshal jal, satiber jal, dhorjal, berjal and current jal.* However, according to the present study, the fishermen of Charan use over 30 kinds of fishing gear (see Chapter 6). The vernacular names for the gears mentioned by Craig (e.g. *veshal* and *sutiberjal*), were not in use at Charan during the period of this study. He also tabulated large amounts of information regarding fishing. He explains how in different seasons, fishermen from divergent social stratas fish in water bodies, such as the *beel*, *canal* and river. This is questionable, when many important fishing gears are not mentioned on the list. It is necessary to note which gear people use in which water body, otherwise understanding of fishing is incomplete.

Rahman and Islam (2000) produced a 'Fish Consumption Monitoring' report for the DFID project which concerned both the field area of this project at Charan in Tangail, and Ujan khalshi, in Rajshahi. The information was collected using female enumerators (see chapter 7) from 35 households of different socio-economic stratas

selected out by the project researchers. They mention that a higher per capita consumption of fish occurs among poor families around Charan *beel* compared with Padma *beel* in Ujan khalshi. They state, also, that poor families in the Charan *beel* consumed more fish in post-monsoon periods than those in the Padma *beel* area. Rich families consumed more fish than households lower down the socio-economic strata. Higher consumption was observed among the rich families in Padma *beel* compared with those households of Charan *beel*, which was due to the fact they owned fish ponds in which they regularly caught fish for their own consumption. This 'pond culture' is mentioned many times by Rahman and Islam (2000) as an explanation for the higher consumption of fish by rich farmers of Ujan Khalshi.

The present study suggests a different interpretation. Ponds in Charan are less suitable for fish culture as they fail to contain sufficient water during the dry season, due to the sandy soil through which the water percolates. In spite of this, in recent years people introduced huge fish into their ponds (See 4.3.4). Although the season of fish cultivation is short in this area, people cultivate fish in their ponds. Some villagers install a water pump to keep the pond full of water during the drought to support the fish cultivation. The villagers also formed a few groups to introduce fish into their paddy fields during the monsoon. However, many of the villagers involved in pond culture said that they do not like cultured fish. This was found to be the case, also, by a researcher working at the Ujan khalshi site. In a personal communication to the author, he stated that the villagers, regardless of their social strata, were very reluctant to eat cultured fish, as they always preferred open water fish. This does not tally with Rahman and Islam's (2000) report that the abundance of pond cultured fish explains the high consumption of fish by rich people. Rather

agriculture is profitable in Ujan khalshi compared with fisheries. This area is one of the highest onion-producing zones in the country. The rich people in Ujan khalshi, consequently, have money to buy tasty fish from elsewhere. In recent years many poor farmers have made money by selling onions. When the report (ibid) claims that Ujan khalshi produces twice as many fish as Charan it can be questioned, as Charan *beel* is a large water body and fishing activities continue during the post monsoon period. The Padma *beel* in Ujan Khalshi is a much smaller waterbody and in some years, when there is drought it is devoid of all fish.

The reasons for the above confusion by Rahman and Islam (2000) are linked to the shortcomings of the methods used for information collection. The persons who conducted the survey were not familiar with the people, and the information collected from their sample families was not connected to the greater social and cultural context (see the discussion of Sillitoe 1998*a*, in section 2.3). They were not involved in the everyday way of life of the villagers, as was the anthropologist. From the research done for this thesis, it is evident that an anthropologically informed approach to indigenous knowledge research can provide a better understanding of the strategies which people employ in achieving in their livelihoods.

This thesis shows how indigenous people fail to appreciate or are even suspicious of the motives of outsiders, such as natural resource scientists, who claim they wish to intervene to help them. These outsiders fail to take adequate heed of indigenous people's intimate acquaintance with local conditions and the reasons for their work strategies. Interventions, which are not appropriate to people's lives and aspirations and cultural values are unlikely to realise any benefits for the poor.

9.3 Final Conclusion

In the introduction to the thesis, the author considered issues surrounding the value of indigenous versus scientific knowledge in development contexts. The author concludes that if indigenous knowledge is going to be brought into the development process, as it must be, the terms on which it is to be included need to be clearly specified. An approach which extracts 'elements' from indigenous knowledge 'disembodies' those elements by removing them from their cultural context is not adequate. Approaches which focus on technological knowledge, without taking account of the wider cultural context, are generally reductive of the local reality. Yet in the designing and implementing development interventions, it is important to grasp the wider context. Focusing on extracted 'elements' is to think of them from the point of view of the external analyst rather than from the perspectives of the local people--and that can lead to inappropriately designed interventions based on the analyst's different goals and assumptions about the situation. The 'participatory' movement has indicated the very different goals that people have in their livelihoods, while anthropology has shown the very different practices and beliefs that exist among different peoples.

The author, in his review of the contributions of indigenous knowledge studies d to development, has shown that many local natural resource management practices are not as destructive of resources, as many scientists have thought, and that greater familiarity of researchers with local practices, and the rationale for them, has shown their value for sustainable natural resource use. The participatory movement has picked up anthropological methodology to increase interaction between

scientists and local people, and has increasingly moved RRA to a longer duration from PRA and to PLA as the significance of the local cultural context to natural resource use has become even more apparent. However, there is still a need for scientists to attend more to the unobtrusive, 'non directive', participant observation methodology of anthropology, rather than 'hurrying' the appraisal and planing process.

This thesis has sought to put indigenous knowledge on natural resources into a wider cultural context in relation to fishing practice at one site in Bangladesh. This has shown the very rich knowledge that fishers have, which unfortunately many Bangladeshi fisheries researchers have failed to draw on in their preference for promoting 'scientific' fisheries management. The same difficulties in adjusting researchers' perspectives so as to take account of indigenous knowledge was noted amongst the multidisciplinary research team at the field site. The difficulties were partly due to the different research traditions, but also for (local staff) due to the inherent tendency to use scientific knowledge to maintain status relations over poorer people. (i.e. knowledge/power). They saw a stress on indigenous knowledge as threatening their 'expert' knowledge. However, if we are to develop appropriate interventions to uplift local people, we must listen to local people. We should take account of their indigenous knowledge use to complement 'expert knowledge'. This thesis has shown some of the dimensions of indigenous expert knowledge in relation to the fisheries sector.

Chapter 8 has dealt with the social organisation of full-time fisheries among Hindus. It contrasts the more sustainable fishing practices of Hindus with the more profit –

driven practice of seasonal Muslim fishermen (see section 8.6). The increasing entry of the latter into the fisheries is a major concern for their sustainability, and raises fears about a 'tragedy of the commons'. Yet the preponderance of Muslims in rural communities in Bangladesh, together with social processes leading increased landlines among the Muslim population, make it difficult to restrict access to fisheries and to ensure their sustainable explanation.

It is the hope of the author, that this work has illustrated the value of indigenous knowledge (and of anthropological methodology for accessing such knowledge) for the development process. It has emphasised not only that indigenous knowledge is holistic, but also that indigenous knowledge not normally considered by researchers—that cultural and political information—need to be taken account if we are to develop interventions which are relevant to local people and can ensure an equitable and sustainable access to natural resources in the fisheries sector.

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Glossary

Akrite size

Babu or *bhodrolok* gentlemen

Bainna gold smith

Balu sand

Bangali Bengali

Barsar pani monsoon water

Barsha mash monsoon

Barui grower of betel leaf

Bawa fish-catching festival

Beel lake

Bisho korma god of all craftsmen

Bongsho lineage

Borgadar or *Bhagi* sharecropper

Boro grihosto large farmer

Boro houn growth

Chamara rice cultivar

Chanda rent

Chashi farmer

Chirsthayi bondobosto permanent settlement

Choto grihosto small farmer

Chun lime

Chutar carpenter

Chwak cultivated fields

Dhibor fisherman

Dhopa deep

Digi large pond

Dinmojur or *kamla* day labourer

Doba or *pagar* ditches

Doho whirlpool

Gabar worker

Gaheen depth

Gang river

Ghar house

Ghat steps/approach to the waterbody

Ghola pani turbid water

Gram village

Gura mach small fish

Guru teacher

Halik or *halodas* farmer

Ijaradar leasee

Jal net

Jal mohal general term for waterbody

Jalkar water tax

Jat caste

Jele fisherman caste

Jhata or *katha* or *boro gata* big pit

Joar tide

Joar-vata rise and fall

Jol water

Kada clay

Kaiborto das fisherman

Kharap pani bad water

Khas jami government land

Kulu mustard seed grinders

Kura Khail husked rice and mustard cake

Lal red

Mach fish

Maicha dew demon fish

Maita rang soil coloured

Mali gardener

Mash month

Mastan thugs

Misti alu sweet potato

Murkho illiterate or ignorant

Nadir tola riverbed

Nala drain

Nayali mach new fish

Ovayash behaviours

Para neighbourhood

Puja worship

Pushkuni pond

Rang colour

Ras soil 'sap'

Renu pona newly hatched fry

Saf pani clean water

Shab sir

Shahitaya literature

Shaitan or *shocks* 'devi'l beings

Shak leaf

Shaluk seed

Shomitee cooperative

Sutar or *sutradhar* carpenter

Uinna mash lean period

Vita platform

Voi-bipoder dangerous