CHAPTER 6

SUSTAINABLE DEVELOPMENT OF THE FISHERIES AND THE FISHING COMMUNITIES

This chapter deals with the sustainable development of the fisheries and the fishing communities in Barak Valley. To examine the sustainability an attempt has been made to look into the nature and direction of the development of the fisheries and the fishing communities. Depending upon the environmental conditions various fishing and occupational strategies have been adopted by the fishing communities over the years. In the two fisheries; namely, the Shonebeel and the Barak river some of the strategies adopted by the communities are found to be sustaining the CPR fish as well as their fishing occupation whereas some of these are found unsustainable. Besides, in the changing environmental conditions, there is perceived occupational diversification among the communities and there are the new occupations being adopted by the people. Among the emerging occupations, also, some are found to be sustainable whereas some are unsustainable in nature. The fisheries play a very significant role in the socio-economic life of the people, specially the fishing communities in the Barak valley. Of the three main categories of the valley's fisheries; viz., wetlands, water bodies and private ponds, the wetlands and the natural water bodies are open to access of all while the private ponds are owned and exploited by individual owners or group of individual owners. A good number of fishing communities are depending on such fisheries of water bodies for economic support (Jhingran 1991). These

fisheries have impact upon life styles, nature of occupations and various adaptive strategies of the fishing communities in the given (changing) environment in the valley.

The Shonebeel fishery makes a good niche of different schools / varieties of fish, specially, during the floods. These fish varieties include osteoglossiformes, elupciformes, cuprineformes, siluriformes, perciformes, etc. The beel is the main source of the villagers' livelihood, directly or indirectly, which, along with its entire area, gets inundated during the monsoons to become CPR fish and reverts to PPR fish in the winter when the water recedes and the households resume fish cultivation in their private ponds. The fishing communities are also regularly switching over from one kind of institutional arrangement to another one in such a dynamic resource system. However, the Barak river fishery provides only the CPR fish and there is an institutional arrangement for managing fishing activity accordingly.

The fishing communities living in the villages of the two fisheries largely derive a common culture from their occupational activity based on the fisheries. In the Shonebeel fishery, the floods during the monsoons engage the fishing communities not only in CPR type of fishing but also in transport service by motor boats to ferry the people in the villages across the flood water. On the other hand, the receding flood water in the winter allows the people to engage in cultivation on their agricultural lands and PPR type of fishing in the ponds. The PPR and CPR fishing as well as cultivation supports them economically. Some water logged pockets in the low-lying area of the beel are also given by the SFCSL through tenders to individuals or groups of individual fishermen for PPR fishing, which last for a short duration only. As the flood water recedes

early in the upper portion of the beel it gives advantage to the inhabitants of Kalayanpur in respect of cultivation. They raise both Sali (high yield variety rice) and boro (low yield variety rice) crops while the villagers in the other two villages; namely, Devadwar and Belala on the lower side of the beel go only for boro varieties of rice. The CPR fish exploitation involves an increasing number of the fishermen, competing to maximize their fish exploitation, which is ultimately depleting the fish resource as well as reducing their income size. Then, this is compelling them to adopt occupations such as rickshaw pulling, mason work, carpentry, wage labour etc. in the urban centres like Hailakandi and Karimganj or in the urbanizing places like Anipur and Nilambazar. The occupational changes have impact on their cultural activities also.

In the Barak river fishery also the CPR fishing here is crowded, competitive, overexploiting and depleting and the people are taking alternative occupations such as rickshaw pulling, wage labour, mason work, carpentry, goldsmithry, motor mechanics, etc. in the Silchar town and thus gradually being urbanized also. Thus, the fisheries in the valley, specially the two; namely, the Shonebeel and the Barak river have immense impact on the structure of socio-economic activities of the fisherfolk and the changes in it lead to occupational and cultural changes. From the viewpoint of sustainability various aspects of development of the fisheries and the fishing communities are being discussed here.

ASPECTS OF DEVELOPMENT IN THE TWO FISHERIES

The discussion on the fisheries in the preceding two chapters reveal various aspects of the development taking place in the fisheries as well as the fishing communities depending upon them. Considering sustainability of these

aspects they may be conceived of two types : (i) Sustainable aspects of the development and (ii) Unsustainable aspects of the development. Sustainable aspects are attributed to renewability or replenishability and durability of the resources being exploited for development in relation to the societal needs while unsustainable aspects are quite temporal in nature of the resources being exploited for development of the societal or sectional needs.

Sustainability or unsustainability of development of any fishing system can be decided on the basis of four components; viz., (i) fish technology, (ii) nature of fish resources, (iii) management of fish exploitation and (iv) maintenance of fish niche (Partha and Jyotishi 1991). These components are discussed here to understand the nature of development with reference to its sustainability in the two fisheries.

I. The Shonebeel Fishery

The four components found in the Shonebeel fishing are discussed below :

(i) Fishing Technology

Fishing technology enhances technical capacity for exploitation of fish resource and the same may be used for overexploitation of the CPR fish. Prior to 1980, in the Shonebeel fishery there were a good number of fish varieties with their huge stock. But overexploitation, by use of improved techniques, by an increasing number of fishermen is very obvious act that has destroyed the fish in the beel. The fishermen have begun to use Micro Filament Yarn (MFY) nets which can catch even the small spawns and fingerlings. Thus, the very source of fish development is being destroyed under the combined work of overfishing and seed destruction and it will deplete the resource in the beel

fast. The SFCSL as well as the Department of Fisheries, Government of Assam, has banned the use of small mesh nets like mosquito nets, current jal, etc. But some fishermen are illegally using such nets owing to poor control of the SFCSL over these fishermen. The Patni of Devadwar and the Mahimal of Belala inhabiting the lower portion of the beel use large mesh nets as the lower portion of the beel retains the water for a long period and they want to catch fishes during the entire period. But the Kaivartya of Kalyanpur inhabiting the upper portion of the beel use small mesh nets as the flood water recedes fast and retains for a short period, and they want to exploit the fish as much as possible during the period and thereafter shift to cultivation of paddy.

Thus, as far as fishing practice is concerned, the former practice is sustaining the fish resource as no reckless exploitation of fish or fish seeds take place by using the large mesh nets while the latter one is unsustaining the resource by exploiting recklessly the fish and the fish seeds, by using MFY nets. It indicates that there are two different fishing patterns available on the two sides of the beel. On the upper side the villagers get a longer period of time for agriculture and shorter period for CPR fishing while, on the lower side, the other people have a longer period of fishing and a shorter one of cultivation in a year. The villagers on both the sides deal rationally with the fishing or agriculture in their own means-end frame. The short duration crops grown on the lower portion are not harmful to the fish resource until harmful chemicals etc. run off into the beel but the reckless fishing in the upper portion during this short period of water recession is going to make the fish resource unsustainable. However, it seems that agriculture is sustainable activity on the upper portion and fishing is

sustainable on the lower portion of the beel. If the agriculture is developed on the upper portion to engage a significant population, then, over fishing and reckless fishing may be contained and rule enforcement among the people having common interests will be easier.

The Mahimal of Belala are mostly using traps in the river Kachua and the river Kakra. They mostly place *dori* traps and *pharong* traps on the strategic points of the flowing water in the rivers and in various channels as most of the channels and rivers are found in Belala. Dori and *pharang* traps are also placed in the channels of the Devadwar village. Besides, the fishermen of Devadwar and Belala in particular catch the fish by *Panichanda* technique in which two fishermen stand deep in the water of 3 ft or more and start whirling it to catch the fishes drawn into the whirl. The using of traps and the techniques of *Panichanda*, both are the sustainable aspects as such techniques can trap only big fishes and do not exhaust spawns. These techniques are common among the villagers on both the sides of the beel. Construction of *Kathibandh* (bamboo fencing) is another technique contributing to sustainability of fish in the beel. Just after the inundation of the beel, the *Kathibandh* at the strategic points of the rivers, Kachua and Kakra in Belala, prevents the fishes from moving out of the beel area and retains them within the beel for longer period.

Thus, large nets, traps and *kathibandh* techniques may be improved for sustaining the fishing activity in the beel area. To offset the pressure of overfishing and reckless fishing the agriculture has to be developed as sustaining activity on the upper portion.

(ii) Nature of Fish Resource

In the Shonebeel fishery both CPR and PPR type of fishing is practiced depending upon the environmental condition. But overfishing is a rampant practice in CPR while balanced fishing is a feature of PPR. In CPR fishing, there occurs an intensive competition among the fishermen to maximize fish catch from the common resource. The competitiveness is the outcome of increased number of the fishermen and rising demand of fish in the market, in view of the recent growth of population in the area. However, in PPR type of fishery, owner decides when and how much fish is to be caught from the given (private) fish resource.

Thus, PPR management mode of fishing is more sustainable while CPR mode of fishing leads to overexploitation. It is because of relatively open access to CPR vis-à-vis PPR. Hence, the nature of resource leads to its unsustainability in the changing environment and population. Such a resource undergoing the increased pressure needs to be managed by the methods similar to those of PPR sustaining practices. Finite resource cannot sustain under the ever increasing pressure and practices of overexploitation.

(iii) Management of CPR Fish Exploitation

The local institutions crafted for management of the CPR are not capable enough to prevent illegal overfishing. Though the Shonebeel Fishermen Co-operative Society Limited (SFCSL) takes care of the fishing by its members only, it does not exert control over the members due to some vested interests and corruption in its management. It is believed that in the Shonebeel, every year, a huge trade exchange, worth of Rs. 3 crores takes place but the SFCSL records a little amount, i.e., Rs. 5 lakhs or so. Thus, on

the one hand, the Government is deprived of the earning and, on the other hand, the funds of the SFCSL also remain meagre. Rather, it is learnt that the illegal amount (bribe) is distributed among the members of the committee of the SFCSL. Thus, SFCSL can not perform any remarkable job for the welfare of the fishing communities which is practically the prime goal of the SFCSL. The Government also acts passively through the SFCSL. Due to such reasons the SFCSL has also lost its holds over its members' activities. Besides, due to lack of massive awareness there is always a wide gap between the executive members of the SFCSL and the ordinary members. The committee management is lacking full enforcement of norms of the SFCSL upon the members. Consequently, the fishermen are using mosquito nets, current jals and small mesh nets without any penalty from the SFCSL. These are causing a gradual depletion of the fish resources in the beel. The SFCSL and the Government of Assam have already imposed restrictions on fishing from the 1st April to 15th July as it is the high breeding time of the fishes. Yet, the fishermen are catching the fish by violating the ban. This mainly causes depletion of fishes. If the rules banning all the fishing activity during the breeding period are enforced strictly the Shonebeel fishery will sustain enough quantity of fishes and meet adequately the existing demand in the valley and also help the fish stocks to regenerate in the beel reservoir.

In managing the beel fishery, both, the Government and the local institutions (SFCSL) are working together but their efforts are not enough to manage it sustainably. To improve its management, at the local level, in the event of the failure on the part of the third party like the SFCSL and the Government, an element of a skilled NGO (Non-Government Organization)

may be involved to manage the affairs with the participation of the people; or skilled managers and professionals may be hired under the SFCSL to haul up its affairs. And then only the beel can be saved from the illegal and over fishing. On the one hand, the Government will earn the actual revenue accrued and, on the other hand, the fishing members will earn by sustaining the fish and enhance their socio-economic conditions. Such experiments made in the dairy co-operative movement at Anand have paid the people in real sense.

(iv) Maintenance of Fish Niche

The type of fishing practices in the CPR is responsible for destroying the fish niche. Before 1980 the beel covered with lush green bushes of different varieties provided the fish safe shelter for breeding and rest during the winter. Many Siberian migratory birds also visited the beel in the period. On the other hand, their excreta was a good nutrient for fishes. But, for the sake of smooth fishing, the fishermen cut down the bushes which were the birds' shelters and now the birds are not coming. This indirectly destroyed the fish niche. Besides, the plying of motor boats for transportation in the area is also responsible for the destruction of specific variety of the fishes which generally stay in the upper layer of water as the sound and waves prevent the fishes from laying eggs (Trivedi 1986). Plying of motor boats creates heavy sound and waves. Therefore, for sustaining the fish staying in the top water layer in the beel, the plying of motor boats must be restricted to specific routes. Besides, the natural vegetation in the beel also must be conserved for sustaining the fish resources in the beel. The dyke constructed in the 1960s on the river Shingla to control floods in the beels periphery has been causing siltation in the beel's bed and thereby hampering its water logging capacity, which adversely affects

the fish niche as well. Therefore, de-siltation of the beel should be regularly done. The beel must be dredged and the dredged out silt may be sold to the farmers for fertility of the paddy lands. However, the de-siltation is also related to the management of the resources. The management component appears to be most important one in case of such a complex fishery as the Shonebeel. Besides, in the winter when the land dries there occurs no CPR fishing. Then, the people culture fish in the trenches called *gata* which they have dug before the floods on their own land. In these trenches the flood water remains logged for longer periods where they culture fish as PPR fishery. This type of fishery sustains fishes for many days. Besides, they also culture fish in the paddy fields as PPR. They are also sustaining the fishes in the beel. The fishermen of the Shonebeel also provide more attention to composite fish culture in their private fisheries with the Indian Major Carp (IMC) like Rohu (*Labeo rohita*), Baus (*Labeo calbasu*) and Mrigel (*Cirrihinus mrigella*). This practice helps provide a good return. But growing of specific fish culture may destroy the total ecology of the beel fishery.

Thus, proper maintenance of the beel through plantation, dredging and de-silting and promoting of appropriate fishing techniques and fish culture (gata and paddy fish culture) can sustain the CPR fish. This is possible through effective management of the beel.

II. THE BARAK RIVER FISHERY

In the Barak river also, the CPR fish has a common access of the members. And for the non-members also there is open access to the channels and flooded areas during the monsoons. The same competitiveness as well as absence of property rights or operative property rights as found in the

Shonebeel's CPR fish is perceived here also. The absence of property rights means the members under jurisdiction of the particular part of river can exploit the fishes as much as they desire. During the exploitation of fish resources they maintain only the area of operation. Although there is an official ban for catching fish by small mesh nets like MFY nets or mosquito nets. Yet the fishermen are using such small mesh nets without any restriction. Besides, during the breeding season also the fishermen are catching fish by violating the ban imposed by the co-operative society, under which the fishermen are registered to catch the fish, as well as that by the Government of Assam. If the ban on fishing during breeding period and use of small mesh nets is strictly enforced then the Barak river will produce enough fish to meet the existing demand of the fish in the valley. The CPR fish in the Barak river also face the same problem related to fishery technology, nature of fish resources and management of the resource as the Shonebeel fishery.

In one of the fisheries the co-operative society is working whereas in the other one an individual lessee is controlling the fish exploitation by the fishermen. The problem related to vested interests crop up from both the structures, i.e., the Government as well as the localized co-operative society. The controlling / managing system itself becomes like open access and thereby ineffective. Therefore, some professional management input needs to be given by using neutral, external elements into the local participatory management to run the fishery like efficient production unit.

In the Barak river, due to various types of chemicals and waste disposals, the pollution factor hinders the growth of fish stocks. The chemical fertilizers used in the paddy fields contain nitrogenous substances which are

drained by the rain water into the river. They produce eutrophication which leads to grow phytoplankton and causes the imbalances into the Dissolved Oxygen of the river water. If the level of pollution can be checked properly, then the niche of the fishes in the river can be conserved. The maintenance of niche is also directly related to management.

The three villages of the Barak river basin; viz., the Netaji Nagar (Patni), Radha Nagar (Kaivartya) and Balighat (Mahimal) are practicing PPR fish on their own ponds as well. It is observed that in the river fishery, the villagers are exploiting the fishes through out the year for which the quantity and per capita fish catching, both, are decreasing. Therefore, all the three villagers have now begun to practise fishing privately on their own lands. Particularly the villagers of Radha Nagar have dug ponds of small and medium size while some of them have large fisheries from which they earn good returns. In these fisheries there seems to be a ray of hope for sustainable development of the communities and reduction of the pressure.

In view of the declining CPR fish, many of the villagers have adopted new occupations like motor mechanics, carpentry, mason works, gold smithy, etc. Of these occupations motor mechanics and gold smiths are observed to be more sustainable as the scope of these services is growing even in the villages. Occupational diversification will also offset the increased pressure on the finite CPR fish.

Thus, a systematic development of the PPR along with the CPR will provide the way out for sustainable development of the fishing communities by offsetting the pressure already built upon the CPR fish. The clue for

development of fisheries on the PPR line is emerging from the very new PPR fisheries coming up in the areas of the two fisheries. Now, a question arises : What is the nature of the four components of fishing found in the PPR fisheries in the Barak valley? The question has been attempted by making case studies of 12 prominently sustainable PPR fisheries in the valley.

III. CASE STUDIES OF THE PPR POND FISHERIES

These fisheries, four each, are located in the three districts; namely, Cachar, Karimganj and Hailakandi of the valley. Of four fisheries from a district two each comprise urban and rural fisheries. The cases have been studied during the period from March 1, 2005 to February 26, 2006. Distribution of the PPR fisheries into the districts and rural and urban areas is given in the following table :

Table 6.C1.1 : PPR Fisheries Cases Undertaken in the Barak Valley

District	*Urban*	*Rural*
Cachar	Case No.	Case No.
	1	7
	2	8
Karimganj	3	9
	4	10
Hailakandi	5	11
	6	12

The cases are being given below with a view to derive sustaining practices of the PPR fisheries with regard to their components.

Case 1

Supriyo Paul, Sonai Road, Silchar Town (Fictitious name)

A grocery wholeseller in Silchar took up his family business after graduation (B.Com). One of his friends, Md. Abdul Bari, from Madhurbond, Silchar town, a practicing pisciculturist, advised him to take pisciculture.

Supriyo has two small hillocks near Irongmara village. Abdul advised him to convert them into a fishery by building dykes. Supriyo acted accordingly and got a 4 bigha fishery with little investment. He released Indian Major Carp (IMC) on *belly* basis to allow them to grow for 3 years. He engaged a fisherman for Rs. 500/- per month to look after the fishery. He started the fishery in 2004 and harvested the fish in 2007. He sold the fish for Rs. 3 lakhs, making a profit of Rs. 2 lakhs (approximately).

His fishery proved to be a sound choice of business and the profits substantial. He also opined that there is a golden opportunity in pisciculture provided the Governrnent comes forward to extend loans and know-how to the educated youths. A good demand of fish is existing and the fish can be exported from this valley to other areas. Pisciculture may provide an alternative source of employment. This idea can be implemented anywhere in Barak valley successfully both at individual and community level.

Case 2

Niranjan Roy, Meherpur, Silchar Urban (Fictitious name)

Having graduated in 1994, he became frustrated when all the doors of the Government jobs appeared to be closed for him. One of his cousins suggested him to start fishery business. But he had no cash, then. He applied and subsequently took the loan amounting Rs. 1 lakh under Prime Minister Rojgar Yojana fund in 1997. He and his cousin together constructed fishery near Dwarbond at his cousin's waste land. The fishery located under the foothills covering three sides and the remaining side was covered by a dyke for collecting rain water. An outlet was kept for releasing the excess water from the fishery. In the 1st year, i.e., in 1998 they released the fish seeds of size 4" –

5" of five different varieties such as rohu, mrigel, baus, ghania and grass carp. At the end of six months, they sold the fish. The details of fish seeds releasing, food stuffs and the sale are given in the following table :

Table 6.C 2.1 Fish Seeds Released in the Fishery in 1998

Local Name of Fish Variety	*Scientific Name*	*Size*	*Cost @ Rs. Per piece*	*Quantity in numbers*	*Total Cost (in Rs.)*
Baus	Labes Calbasu	4" – 5"	2.00	1000	2000
Rohu	Labeo rohita	4" – 5"	2.00	1000	2000
Mrigel	Cirrhenus mrigela	4" – 5"	1.50	1000	1500
Ghania	Labeo Genius	2" – 4"	1.00	1000	1000
Grass Carp		4" – 5"	0.50	500	250
	Total				6,750

After 6 months, i.e., in the month of September they sold the fish for the amount given in the following table :

Table 6.C 2.2 Sale of Different Varieties of Fish in 1998

Varieties	*Total sale amount (in Rs.)*
Baus	10,000
Rohu	15,000
Mrigel	12,000
Ghania	10,000
Grass Carp	5,000
Total	52,000

Soon after the selling of fish, they released the fish seeds in their pond fishery. In the very next year, i.e., in 1999 in March-April they again sold the fish amounting Rs. 45,000/-. The ongoing profit inspired them for better and scientific culture of fish. They consulted the Department of Fishery and practiced as per their guidance. Gradually Niranjan repaid fully the loan amount in 2004. He and his cousin Niloy presently practicing fish culture in eight fisheries with the same varieties of fish. Out of eight

fisheries, six fisheries have been taken on lease. They are now well established and earning a handsome amount. Both of them are looking after all the fisheries and sell the fishes alternatively from these fisheries.

Niranjan and Niloy opined that the fishery not only provided them economic stability but also social status. To Niranjan it is a great opportunity to earn a lot. From the case, it appears that private management brings all success in fisheries.

Case 3

Shekhar Sharma, Karimganj Town (Fictitious name)

An upper primary school teacher and leading pisciculturist of Karimganj, is living at Nayabari – the extended road of Laxmi Charan Road in the western part of the town. He has been in the fishery business since 1990. Before 1990, his fishery was used for domestic purpose only. After renovation, he has been using the fishery commercially as well as domestically. The fishery covers 4 bighas (.52 hectares) of water area having the depth of 4 to 6 feet. Shekhar began composite fish culture after taking some tips from the leading fishermen of the town. He first renovated the fishery by pumping out the water from it and then allowed it to dry. Meanwhile, he applied 80kg. lime @ 20 kg/bigha. Besides, the fertilizers like murate of potash, urea, super phosphate and cowdung were applied to the bed. After some days, he ploughed the bed gently and allowed it to dry atleast for 1 month. This was renovated in the month of January – February and when the fishing got filled up with the rain water, he released different varieties of fish as given in the following table :

Table 6.C 3.1 : Fish Varieties Introduced in the Pond Fishery of Shekhar Sharma

Local Name	*Scientific Name*	*Number of Units*	*Size (in inches)*
Baus	Labeo calbasu	300	4" – 6"
Rohu	Laneo rohita	400	4" – 5"
Mrigel	Grrihinus mrigella	400	4"
Ghania	Labeo gonius	300	4"
Japani rohu	Cyprinus Carpio Var. Communis	300	2" – 3"
Total		1700	

For preparation of the pond, he spent approximately Rs. 9,000/- and for releasing the fish seeds in the pond, the expenditure was incurred as follows :

Table 6.C 3.2 : Expenditure for Fish Purchasing in 1990

Variety of Fish	*Size (in inches)*	*Rate (in Rs.) per piece*	*Total Amount (in Rs.)*
Baus	4 to 6	3	3/- x 300= 900
Rohu	4 to 5	3	3/- x 400= 1200
Mrigel	4	2	2/- x 400= 800
Japani rohu	2 to 3	0.50	0.50- x 300= 150
Ghania	3	1	1/- x 300= 300
Total			3,350

Thus the total expenditure was as Rs. (9,000 + 3,350) = Rs. 12,350/-. Besides, some unseen expenditure incurred amounted to approximately Rs. 15,000 in 1990 only. In 1990 Shekhar used only rice bran, dry fish dust etc. and fed the fish. In 1991 he sold the fish worth of Rs. 40,000/- with a net profit of Rs. 20,000/-. This encouraged him. Again, he released the same varieties of fish a good amount was spent on the fish feeding.

The details of expenditure incurred on the feeding is given in the following table :

Table 6.C 3.3 Month wise Feeding of the Fishes in 1991 – 92

Item	Amount (used in kg.)	@	Amount (in Rs.)
Rice bran	4	3/-	12
Oil Cake	4	6/-	24
Dry fish seed dust	0.2	5/-	20
Chapar	0.2	4/-	20
Lime	80	7/-	560
Total	84.4	25/-	632

In 1991-92 for feeding of the fish he spent Rs. 7,584/- and for catching and selling of the fish he spent approximately Rs. 15,000/-. In the year he sold the fish of Rs. 45,000/-. He earned a profit of Rs. 30,000/-. From 1993, he changed the method of fish rearing. In 1993-94 he harvested the fish twice a year which showed a good margin of profits. After every two years of fish farming, the fishery was renovated and every year he received more incomes.

After 2001 he constructed a new stock pond and released 4" – 5" sized fish seeds in it. He released the fish seeds into the new fishery from his fish stock which ultimately helped him not to purchase the new seeds as he did earlier. This helps him earn more income as the cost of fish seeds has lessened. In 2005 – 06 he earned of Rs. 1,20,000/- approximately. In his opinion it can provide many educated youths a handsome income and good life. This case indicates that proper management brings increasing profits.

Case 4

Rajat Dey, Karimganj Town (Fictitious name)

A renowned fishing farm called 'Kamala Fisheries' situated at Barakatpur in the South-East part of Karimganj was established by the late Balahari Dey, father of Rajat Dey of Karimganj town. Rajat Dey's father started this fishery as hobby. But, later on, he earned a good amount from this fishery. The fishery not only provides a good amount but also gives a good feeling that atleast they have become the part of domestic local fish producers, meeting the rising demand of local fish in the region.

Due to political unrest, Balahari Dey was compelled to leave Bangladesh (the then East Pakistan) like other Hindus. After arriving in Karimganj he faced

an acute financial crisis but there was no way to earn more. To enhance the economic condition, he took up various activities. He had a dream to set up a house which would comprise a big fishery, surrounded by coconut, betel nut, jackfruit and other fruit trees, various types of flower and all kinds of domestic animals as he had in his native land in Bangladesh. Though he engaged in various economic activities, none of these could obscure his dream. Soon, in 1976, he purchased a big plot of land at Barakatpur, 10 km from Karimganj town. Soon, he started a fishery covering 4 bighas (0.52 hectare) of water logging area at Barkatpur. He spent Rs. 3000/- for constructing fishery and for purchasing fish seeds he spent Rs. 2000/- (4" to 5" size of fish seeds only). He started composite fish culture with the four varieties such as Rohu, Baus, Mrigel and Ghania.

Balahari was fully engaged in other activities at Karimganj town which did not allow him to look after the fishery in a proper way, hence, he appointed one person to look after his fishery. He paid Rs. 500/- per month. The expenditure incurred for maintaining this fishery was as follows :

Table 6.C 4.1 Fishery Construction and Rearing of Fishes
(Percentage in parenthesis)

Item	*Fishery Size*	*Amount (in Rs.)*
Land	0.52 hectors	2,000 (14.81)
Fishery construction	0.52 hector	1,500 (11.11)
Fish feeding	--	1,000 (7.41)
Employee's salary	For 12 months 12 x 500/-	6,000 (44.44)
Fish catching and Miscellaneous	---	3,000 (22.22)
Total	---	13,500 (100)

In the year 1977, he sold the fish amounting Rs. 20,000/- and thus he gained a profit of Rs. 6,500/- (approximately). Soon, he purchased 30 bighas (3.9 hectares) of land under three different areas of the same locality. Each

plot covers 10 bighas (1.3 hectares) of water area. He constructed three more fish ponds on the lands. The fish varieties remained the same for each pond. He heeded the advice given by the technical experts from the Fishery Department, Karimganj. He applied lime, cowdung, etc. He ploughed the bed of the fishery very gently and then allowed it to fill with rain fed water. The total expenditure in the year rose to 30,000/- (approximately) while the selling value rose to 45,000/- . Balahari Dey could not pay his full attention to his fisheries as he was fully engaged with other business in the Karimganj town. In 1978 and 1979 also, there is seen a gradually increasing profit in his business. Meanwhile, to look after the fisheries he appointed three more paid employees. The increasing profit in the business encouraged Balahari. From 1980 onwards he began to pay more attention to this business. This business flourished with satisfactory returns. The profit was reinvested into the business. But that time, there were no good roads between the town and the village. Balahari along with the villagers held a meeting for the development of road. As per decision of the meetings he invested a good amount for the construction of road. Besides, Balahari also involved himself in many welfare activities in the village. To establish a school, Balahari took initiative and finally he succeeded to establish a school at Latarchwak;, near Barkatpur. He donated a good amount for setting up the school. The villagers are also happy with the school named Balahari High School after him. Later Balahari donated for the construction of the school building also. Not only for the school, he has also donated land for the Nathupur Primary Health Centre (PHC).

The fishery site touches three villages; namely, Nalgarh, Dighirpar and Barkatpur. Every year the profits go up significantly. But in 1986, there

occurred sudden flood and all five fisheries were submerged under the flood water and fish were washed out. As a result, in 1987, they incurred a loss amounting Rs. 30,000/- (approximately). Subsequently, in 1988, in Barak Valley as a whole, all the fish varieties were attacked by Epizootic Ulcerative Syndrome diseases (*DOSA*) and thus they did not invest any amount in the fisheries. Soon, the diseases of the fish cured. In 1989 they again invested a very good amount for fish seed purchasing and they got a healthy returns in 1990. In the year, out of the five fisheries, they earned Rs. 95,000/- (approximately). Soon, they decided to increase the number of ponds and, in 1992, they were able to establish 09 stock ponds of water covering an area of 60 bighas (7.8 hectares) and 04 seed ponds of average 1.5 bighas (0.195 hectares) each. And exclusively for *Renu*, spawn stock, one pond of 1 bigha (0.13 hectares) is maintained. They purchased *renu*, spawn, etc. very cheap in *belly*. Balahari Dey not only paid his attention to the fishery but also he diversified his attention to plant various trees for horticulture. On the bank of fishery, he planted coconut, banana of different varieties, guava, jackfruit, mango, blackberry, betel nut, etc. Thus, his earnings are multiplying from the fishery as well as the horticulture. From 1993, onwards, Balahari Dey was capable to sell the fish amounting Rs. 4,00,000/- per annum wherefrom he earned a profit of approximately 1.5 lakhs. *Belly* fish egg is purchased generally in one bowl called *belly* from which more than one lakh *renu* can be produced.

After the expiry of Balahari Dey, the entire responsibility fell upon the shoulders of his son, Rajat Dey. Now, Rajat is looking after these fisheries along with his other business. Meanwhile, for looking after the fishery sites and

the rearing of fish he has already appointed six watchmen who have been working in the fishery. After the expiry of his father, Rajat has changed the working pattern. He purchased five water pumps with 50 ft. long pipe for transferring water from one pond to another as per the requirement. These watchmen are maintaining the fisheries. Rajat allotted them duties in three shifts per day. In each shift two persons are engaged. The total expenditure on watchmen's salary is Rs. 5,000 x 2 = Rs. 10,000/- per month. Besides, incentives like bonus etc. are also given to them.

In the 1980 baus (*Labeo calbasu*) in particular grew at 1.5 kg. to 2 kg. a year, but now, the growth rate has declined to 1 kg. to 1.5 kg. for the reasons not known to him, as yet. He is not applying chemical fertilizer for the fish growth as it destroys the taste of a fish.

Upto 2001, the fish were sold twice a year, i.e., in the last part of July and of October. From 2002, he has started selling his produce thrice a year. In this system money rolls quickly and the returns are encouraging. In the first week of February, the fish seed is introduced to the stock pond. Before that in the seed pond, the spawn is introduced. Generally, in the month of April, Baus (*Labeo calbasu*), Rohu (*Labeio rohita*), Ghania (*Ghonius Ghonius*), Mrigel (*Cirrhinus mrigalla*), each of one *belly*, is introduced in the seed pond. After 3 days, the spawns become *renu* and these *renu* after 7 days become *baish*. After 21 days these *baish* will become fingerlings of the size 1" to 1.5". The fingerlings, after two months or so, will grow into 2.5" to 3.5" seeds. Generally, in the beginning they are kept in Hapa, a space made of three sides closed by mosquito nets of 6 ft x 4ft in water and the upper side of the hapa remains

open. The belly seeds are placed within the nets. The cost of each variety of seeds per belly is as follows :

He reduced the different fish spawn in his pond like Baus, Ghania, Rohu, Mrigel and Grass carp amounting Rs. 500/-, 200/-, 300/-, 300/- and 125/- in belly wise.

After 3 days, the belly will be converted into spawn. After 3 days it will become *renu*. The *renu* is transferred from time to time to the seed pond. In the seed pond, various fish sizes are generally introduced. As it is a composite fish culture, various fish species are planted in a specified seed pond in a specified number in the space of 0.13 hectare. He introduced Baus, Ghania, Rohu, Mrigel and Grass Carp in the number of 150, 120, 120, 120 and 100 respectively.

Out of 100 grass carps about 25 to 30 will survive. Excreta of the grass carp is a very important food for other fishes. The grass carp takes various types of creep, grass, banana leaf etc. as food. Thus, there grows no creep or unwanted plants inside the sidebalm of the pond and the pond water remains free from all kinds of plants. There happens no clash among the different varieties of fish as their food habits and niche are in the different layers of the pond water. Every year he applies 20kg lime and 1 quintal cowdung per bigha for better growth of the fish. In the feed he, first, mixes proportionately oil cake, rice bran, *chapar* and dry fish dust and then allows it for some days to rot in a pit. Then completely rotten stuff is given to the new fish seeds.

To understand the acidity or alkalinity of the pond water, he introduced lime as per the requirement. The texture of the soil of his pond demands liming

atleast once a month. Generally, 10kg / bigha (0.13 hectare) lime is required for every month. He introduces the excreta of sheep and poultry just after 7 days of liming. They are considered as a good food components for fishes. Therefore, he has also begun rearing of sheep and poultry at the fishery sites.

Since 2004, he has been maintaining the PH value of the water by PH meter. To get relief from the *DOSA* disease (Epizootic Ulcerative Syndrome) of the fishes, he applies Sifex, a brand name of medicine. After using this medicine he got a better result. This disease particularly attacks the fish in the months from January to March. A one-fourth acre of water cover area needs 100ml of Sifex. But he applied 30 ml. Sifex for 0.13 hectares of water covered area every month.

This case reveals that scientific culturing of fish will ever provide a good benefit to the pisci-culturists. This occupation can provide a huge profit to entrepreneurs and it can engage educated youth meaningfully to meet the huge fish demand in the region. On the whole, his fishery is well maintained and managed and has earned reputation in the market.

Case 5

Satu Chakraborty, Hailakandi Town (Fictitious name)

Satu Chakraborty, the son of Late Prabhat Chakraborty, has his own water pond in an area of five bighas. He has five brothers. The pond with its fish and water was used for domestic purpose. After the expiry of their father, they decided to use the pond as commercial fishery. Satu discussed with his brothers and decided to renovate the fishery. The brothers invested Rs. 5,000/- each. They pumped out water from the pond and then prepared the

pond's bed by proper liming and applying urea and murate of potash in January 2002. The pond was allowed to dry for the next two months. After filling the pond with the rain water, Satu brought *baish* of the following varieties and costs shown in the table :

Table 6.C 5.1 : Introduction of Fish Seeds (*Baish*) in Pond

Local name	*Number*	*Amount (in Rs.)*
Baus	2000	500
Rohu	2000	500
Mrigel	2000	290
Japani Rohu	2000	250
Total	8,000	1540

For feeding, rice bran, oil cake, chapar and dust of dry fishes were used. Besides, the excreta of poultry was also used and they were collected from one poultry farm. Cowdung was also used. For all these, they spent Rs. 10,000/- (approximately) per annum. After one year, they sold the fishes for Rs. 80,000/- and they equally shared the profit. From the next year (2003), they decided that one of them would take the fishery for 2 years for rearing the fish and every 3rd year another brother would take the fishery. Thus, every two years the ownership of the fishery was to rotate among the brothers. Profit, loss etc. will be borne by the brother in the turn. In the process, more than Rs. 1.25 lakhs were earned by the eldest brother in 2005. In 2007, another brother earned a profit of Rs. 1 lakh approximately. In 2007 another brother changed the strategy and brought the *belly* of each variety selling the fishes bi-monthly. He hopes that by the end of two years, in this strategy, he may earn more than 1.75 lakh as profit.

These brothers opined that the fishery business provides them a good financial support and this business may emerge as a leading one in the region

in the coming time. The case shows that the experience of how a big private fishery is managed properly may be extended to manage a CPR fishery also.

Case 6

Faruk Uddin Choudhury, Hailakandi Town (Fictitious name)

Faruk Uddin Choudhury started fish culture in 1990. His father, Guljar Hussain Choudhury, inspired him to start pisci-culture. Guljar Hussain had retired from a job in the Government of Assam and was unable to afford higher education for his son. After Higher Secondary School Examination Faruk could not continue his studies. His father suggested him for fish cultivation on their water pond covering an area of 3 kathas (2160 sq. ft.). They decided to cultivate fish seeds instead of big fish, though having no experience at all. Nazim Uddin Choudhury an employee of the Department of Fishery, Hailakandi, explained him the method of fish culture. Accordingly, they brought fish seeds from the Nilambazar fish seeds market. They brought four varieties of fish seeds; viz., Baus, Rohu, Mrigel and Ghania, one *belly* each. They placed the seeds in the pond under the guidance of Nizam. After 7 days they matured as *renu*. After 22 days the *renu* became *baish*. They could procure about 60,000 seeds of each variety from each *belly*. After 22 days they started selling their products in the market. The following tables show the cost and the sale value of their products :

Table 6.C 6.1 : Cost of the Fish Purchased in 1990

Local name	*Scientific name*	*@ Rs.*
Rohu	Labeo rohita	400
Baus	Labeo calbasu	350
Mrigil	Arrihinus mrigella	225
Ghania	Ghonius	200
Total		1275

Besides the cost of the fish seeds, about Rs. 500/- were spent for collecting the seeds from the Nilambazar.

Table 6.C 6.2 : Sale Value of Fish in 1990

Variety	*Size of the fish variety*		
	Renu	*Baish*	*3" – 4"*
Rohu	10,000	20,000	10,000
Baus	10,000	20,000	10,000
Mrigil	10,000	20,000	10,000
Ghania	10,000	20,000	10,000

The *renu* was sold at Rs. 50/- per thousand and thus from *renu* only they earned Rs. 5,000/-. Similarly, from the *baish* they earned Rs. 20,000/- . They earned Rs. 10,000/- as profit the sale value in the fist two months comes to be Rs. 5000/- + Rs. 20,000/- + Rs. 10,000/- = 35,000/-.

The profit encouraged them. They reinvested and went for 2nd phase of cultivation. For better results they spent the following feeding of the fish :

Table 6.C 6.3 : Food Stuffs Provided for the Fish Seeds

Types	*Amount (in Rs.)*
Oil cake	500
Rice bran	1000
Dust of dry fish	500
Cowdung	200
Total	2200

After 3 months, (in October) they sold the fish seeds of size 2" – 4" which returned around Rs. 30,000/-. In the next year (January 1991), they pumped out the water by machine. The bed of the pond was ploughed and applied with lime and urea. The pond was allowed to dry under the sun. As soon as the rainfall started in March – April they again introduced the fish seeds as earlier. But they changed their marketing strategy. Instead of selling the 3" – 4" size fishes they sold the *renu* and *baish*. Thus, every time

they purchased the *belly* for different varieties and sold the *renu* and *baish* and in every phase this earned a net profit of Rs. 15,000/- or so. Next year, in January again they prepared the pond. In 1994, they constructed a new pond of water covering 5 bighas of their own land which cost Rs. 30,000/-. Besides the lime and urea, they applied murate of potash also. In the year they sold the *baish* and *renu* as earlier. Some *baish* were transferred to the new big pond and allowed them to mature. All these varieties were retained for 2 years in the new pond where the *baish* were transferred from the seed pond to the stock pond. The process continued in the years 1994 and 1995. From the stock pond they did not sell any fish for the next 2 years. Meanwhile Faruk Uddin had taken a training on hypophysation, i.e., the process of induced breeding by injecting mature fishes. In the period they prepared one more stock pond in 4 bighas of water cover area. Soon, they began the fish seed by hypophysation.

Now, they sell not only the fish seeds of size *renu*, *baish*, 2" – 3", 4" – 5" but also the big fishes from their stock ponds. Presently from these fisheries they are earning about Rs. 20,000/- per annum. For domestic consumption also fishes are taken from the stock pond. They have received time to time guidance and advice from the fishery department, especially from Nizam Uddin. To them, it is he who helped them establish as the leading fishermen in the district. Faruk Uddin Choudhury feels that in view of the growing demand of the local fish in the market, the fishery business may become a lucrative source of earning.

The case indicates that both the fish seeds and big fishes provide a good source of earning when managed as PPR under technical guidance and management.

Case 7

Islam Uddin Barbhuiya, Village : Koroi Kandi, Cachar Rural (Fictitious name)

Islam Uddin Barbhuiya, 51 year old, a progressive fisherman resides in Durga Nagar Pt. II at Koroi Kandi village of Udharbond Development Block of Cachar district. He has a wife and three sons and one daughter, presently studying in school and college. He has owned an Assam type house comprising 3 rooms of the size of 8' x 8' approximately and one drawing room. Besides, he owned 2 canoes, a black and white television set, a two-band radio set and three bicycles. The house has a big court yard and a kitchen garden in front of his house. There are hundreds of betel nut trees, guava trees, 20 coconut trees, and other indigenous fruit trees in the house. He has a big pond of the size of 2 bighas (approximately) in front of his house where he cultivated fishes.

Islam Uddin Barbhuiya could earn from agriculture simply his bread and butter for subsistence. Soon, he came in contact with a fisherman who inspired him for fish cultivation. In 1983 he started fish cultivation. Then he gradually became a successful fisherman. At first, he took a loan amounting to Rs. 37,000/- from the United Bank of India, Udharbond Branch, under a fishery scheme. Then, he renovated his fishery under the guidance of a person from fishery department and started pisciculture. In the year he earned a profit of Rs. 4,000/- (1983-84). He cultivated fish in a pond of 4 bighas, i.e., 0.52 acres of land. Next year (1984-85), in the month of December – January he dug a pond 4' to 6' deep for which he spent Rs. 17,000/-. Then, he introduced fish seeds by spending Rs. 2,000/- and Rs. 3,000/- on food stuff for the fishes. In the year he sold the fishes earning him Rs. 12,000/-. He has started composite fish culture with the fish varieties such as Rohu (*Laneo rohita*), Mrigel (*Crrihinus*

mrigella), Baus (*Labeo calbasu*), Japani Rohu (*Cyprinus Carpio var. Communis*). In 1985-86, he released the fish seeds in his new pond alongwith the old ones. In the pond he introduced the Rohu, Mrigel, Baus, Japani Rohu and Grass Carp also. He observed that the Silver Carps grow well but the market value of this species was very poor. After one year he sold fishes from both the ponds for Rs. 40,000/- and earned a net profit of Rs. 20,000/-. Next year he again took loan of Rs. 42,000/- from the same bank and took on lease a fishery of 14 bighas for three years costing Rs. 3,000/- per annum. But, unfortunately, during the year, the fishes in the valley were attacked by *DOSA* (Epizootic Ulcerative Syndrome) and it totally destroyed the fish business as the people of the valley mostly stopped taking fish from their daily diet.

Due to collapse of the fish market, Islam Uddin came under great pressure of the bank's loan recovery. Notably, the Central Government then announced subsidy on fishery loan upto Rs. 10,000/- and also provided alternative trading schemes such as vegetable trading and the like. However, he could not run his new business. Soon after the disease of fishes was over, gradually people began to take fish. Islam Uddin immediately turned back to the fish farming business in 1993-94 and gained a little. However, in 1994-95 he used experience of a technical expert from fishery department and cultured fishes in the three of his fisheries and earned a profit of Rs. 60,000/-. The department also helped him free of cost in many respects like providing a technical expertise. The department also supplied food stuff, lime, mustard oil cake, rice bran and sometimes the fish seeds also. He earned a profit in every successive years at an increasing rate of about Rs. 10,000/-

Mehboob Hussain, his neighbour, took a fishery in 25 bighas on lease by paying Rs. 40,000/-. He cultivated fish but he suffered a loss of Rs. 15,000/-. Soon he came in contact with Islam Uddin and offered him to culture fishes jointly. Islam Uddin agreed but he imposed some conditions upon him. Mehboob agreed. They jointly cultivated in 1999-2000 with composite fish culture. They earned Rs. 70,000/- i.e., Rs. 35,000/- each as net profit. Besides, they distributed some fishes free of cost to their relatives, beel's watchmen etc. Altogether, they distributed the fishes amounting to Rs. 20,000/- approximately.

Due to illegal hunting of fishes by the outsiders with *fashjal* creates a big problem. From his fishery more than 20 quintals of fish are being stolen and cumulatively it is a loss of 35 – 40 quintals. This fashjal could catch even a small fingerling, spawn, *renu*, *baish*, etc. Practically, after 10 months, these fishes could have had a minimum size which would show approximately a loss of 40 quintals. Besides some birds, mammals (*Udd* etc.) also take away fishes from the fishery at an average of 1 quintal which has a market value of Rs. 6,000/- approximately. Islam Uddin feels that if some people in every village come to know the profit in fishery business, then they will came forward to join it and the valley will be producing surplus fish. Further, unwanted varieties of fishes like *puti*, *tengra*, *chingri*, etc. should be cleared from ponds and fishes must not be sold in the same month; rather when the market demand picks up the fishes should be sold to earn more profits. Generally, the fishery department suggests to catch fishes during the month of December – January. But Islam Uddin prefers to catch the fishes in June –July. For constant supply of fishes he applied a new technique for pond preparation. In his 25 bigha

fishery, he constructed two parts by erecting a dyke. In the beginning he introduced fish seed in both parts. But after 10 months, he caught fishes only from one pond. After fishing from one part, he pumped out the water and allowed the pond for preparations scientifically. After preparation, he again introduced fish seeds newly. Meanwhile he began to catch the fishes from the other part of his fishery. In the way, he cultivates alternatively and obtains a constant flow of fish. He has already received several awards as a progressive fisherman of the district.

During the interaction with him an ecological point of view emerged. He told that some poachers hunt fishes by applying Foradun (a kind of poison) in the fishery. These fishes are generally taken by the bird and immediately the bird died. Every year with such process more than 3 to 4 thousands of birds of different species have died. If it does not stop immediately, various species of the birds like *pani khauri*, *bogura*, *hari*, *dauk*, *kurra*, *machrang*, etc. may go out of scene.

The above case study exhibits that although Islam Uddin is not highly educated but his experience in the field makes him successful. Besides, his awareness regarding the ecology is also useful in scientific rearing of fishes.

Case 8

Nabarun Chakraborty, Village : Salganga, Cachar Rural (Fictitious name)

Nabarun Chakraborty, an unemployed youth, started the fish culture on his own fishery with a meager investment not as a profession but as a hobby in 1998. He prepared the fishery by building a dyke in the open side. The rest of the sides are covered by lush green bushes. He spent only Rs. 5,000/- for both

clearing of the forests and the construction of dyke as well. One outlet is kept to release the excess water. The outlet is covered by the nets for preventing the fish to go out. The total water area covered by the fishery is about 2 bighas approximately. Nabarun was warned by many people that being a Brahmin going for such a business would adversely affect his social status. But Nabarun started to culture fish with his full effort. He introduced the composite fish culture with the varieties such as Rohu (*Laneo rohita*), Mrigel (*Crrihinus mrigella*), Baus (*Labeo calbasu*), Japani Rohu (*Cyprinus Carpio var. Communis*).

The total amount he spent for purchasing the fish seeds is about Rs. 2000/-. In the Ist year, Nabaraun neither provided food supplement nor any special care for the fishery. However, at the end of the year, i.e., in 1999, he sold fish of Rs. 10,000/- and thus earned a profit of Rs. 8,000/- (approximately). This encouraged him. He invested more for purchasing fish seeds. He regularly supplied food to the fishes. Meanwhile, he engaged with a local NGO, Vivekananda Mandal, which was associated with another famous NGO called Deshabandu Club and worked together for implementing various projects. Meanwhile he took a training on pisci-culture organized by the State Agriculture Office, Khanapara, Guwahati. This training helped him a lot in later days for pisci-culture more scientifically.

In 2001-02, he adopted an alternative strategy and realsed 4" to 5" fish seeds on his fishery of amounting to Rs. 3000/- and after one year he earned a profit of around 15,000/-. Similarly, in 2002 – 03 he introduced big fish seeds of around 5" to 6" and provides food supplements which raised his expenditure upto Rs. 9,000/-. The food supplements were spent as follows :

Table 6.C 8.1 : Expenditure on Different Food Supplements

Name of the food supplement	*Quantity on Qtl.*	*Amount (in Rs.)*
Rice – bran	3	400
Cake of mustered oil (Khail)	3	500
Cow dung	3 (just for carrying)	300
Labour charge, etc.	12 x 500	6000
Total		7,200/-

Nabarun always maintains the water level round the year about 4 to 5 feet as per the expert suggestion. In 2002 – 03 also he earned a profit of Rs. 20,000/-. Alongwith the fishery he took a license from LIC (Life Insurance Corporation of India) as an agent. In 2003 -04 he started another fishery of water covering area of 7 bighas (approximately) on lease. The lease amount for 3 years is Rs. 35,000/-. As in his earlier fishery he introduced the same category of fishes vis-à-vis another species called silver carp. Though, the market rate of grass carp is less in comparison to other fishes. However, the growth of the species is maximum. Hence, the ultimate gain by producing these species cannot be considered as loss according to Nabarun. He also told that *moka, puti, tengra*, are automatically grown in the fishery and the market value of *moka, puti*, etc. are also high. Thus, these species also pay a very handsome amount. In the year he earned a profit of amount Rs. 30,000/- approximately. In the next year, i.e., 2004-05 he took another fishery of water covering area of 8 bighas at Khaspur T.E. located nearby has house whose lease amount is Rs. 10,000/- per annum. Nabarun then altered his strategy and made the pond of 2 bighas as his fish seed pond from where he supplies the fish seeds for each fishery. He purchases now only the *baish, renu*, fingerlings and release \s it to the small ponds. After maturing the seeds of 3" – 4", he shifted the seeds into the big ponds fishes. The marketing strategy of

Nabarun is found something different from other fishermen. Generally at the time of fish catching, he hired four or five members of professional fishermen for 15 days or so. Every day they catch fish and go for sale immediately to the different local markets as well as Silchar market. Just after the catch he makes an assessment with these fishermen and sells it to the fishermen roughly 20 rupees less than the existing market rate. He also informed that this is due to the market demand, the strategy is applied. Even a fisherman cannot sell the fishes in the market, the entire loss or profit will be borne by the fisherman even they are unable to sell or to make more profit. Moreover, in such policies, the fishermen are also encouraged by the strategies of marketing. The various markets near the fisheries are given below :

Table 6.C 8.2 : Fish Market in the Vicinity

Market name	*Distance (in Km.)*	*Week days*
Salganga market	2	Sunday, Wednesday
Kumbha T.E. Market	6	Tuesday
T.E. Market	5	Saturday, Friday
Kumbhirgram Airport market	4	Thursday
Thakigram market	4	Thursdaym Tuesday
Udharbond Market	8	Friday, Monday
Tikal Market	3	Monday

When Islam Uddin was not in favour of grass carp cultivation as there is no such market demand Nabarun informed just reverse of it. He knew that the grass carp has low market value but people takes grass carp of his fishery. He perceived that just before one month of catching fish, he stopped supplying all means of food for grass carp, i.e., grass, leafs, banana leaf, etc. which are exclusively used as food stuff for this species. He opined that this is the prime reason by which the grass carp can make food more tasty.

The case shows that the marketing strategies and rearing practices add a new outlook to the management of fisheries and to the profits of the fishermen.

Case 9

Tunu Khan, Vill. Nilambazar, Dist : Karimganj Rural (Fictitious name)

Tunu Khan, a fish seed trader and hatching owner of Nilambazar in Karimganj district, is doing wonderful job in fish seed production in the valley. The owner hails from the Mahimal community and his performance in this field is highly notable. He claims to have pioneered fish seeds producing to set a role model for youths. The father of Tunu Khan started fishery business in 1978 when he was a young boy. However, he remembered the various techniques generally applied by his father for fish seed production. At the very outset his father Majir Uddin Khan prepared the pond fishery of water cover area 5 bighas (0.65 hectors) by fertilizers and huge amount of cowdung. After the bed preparation it was allowed to dry by the sun. For the pond preparation only his father spent approximately Rs. 5,000/-. After the water was filled up in the fishery he released fish seeds mainly *baish* of four different varieties Baus, Rohu, Mrigel and Japani Rohu of amount Rs. 4,000 approximately. After one year he sold fishes of amounting to Rs. 50,000/-. Then immediately he again released *baish* and 3" – 5" sized fish seeds of the same varieties and sold twice a year which ultimately provides him more profit of around Rs. 55,000/-. In the third year, i.e., in 1981, he sold the fishes in two phases in a year. Thus, year after year their production becomes more. Soon, Tunu Khan joins with his father in fishery business. Majir Uddin Khan also changed his strategies from big seed production to fish seed production. For that they began to collect fish

seed from Howrah (market) of West Bengal and they produced the seeds like *renu*, *baish* and sold it into the local market. Meanwhile in 1989 Tunu Khan took a training on fish seed production from Agartala (Tripura), Kolkata (West Bengal) and Guwahati (Assam) wherefrom he learned how to collect hormone from matured fish for induced breeding. For the pond preparation and purchasing of pumps etc. he took a loan from UBI, Nilambazar Branch of Rs. 25,000/-. Besides a big fishery of water cover area of 7 bighas (0.91 hectors) was also constructed. Gradually he invested for the construction of new fishes and ultimately he had owned with 8 big fisheries. Soon, after the expiry of his father, the responsibility of the whole business came on his shoulder. Gradually he switched over from the big fishery to seed production business. This fish seed production business returns more quickly and then from the year 1990 and 1991 he earned a lot. He also received a good amount of Government's aid by which he took two more fisheries on lease. With the amount they produced more fish seeds from which the Government of Mizoram alone purchased the fish seeds for Rs. 70,000/-. Besides they sold to the domestic market of amounting to Rs. 2 lakhs (wholesale rate) and the big fishes of amounting to Rs. 6 lakhs approximately.

Soon, in 1995-96, DRDA (District Rural Development Agency), provided a loan of Rs. 1.15 lakhs for hatchery construction, construction of brudder tank for feeding purpose. Department of Fisheries also provided necessary suggestion and advised time to time for the well growth of the fish seeds and big size fish seed production.

Since 1996, he sold fish seeds of the amount Rs. 70 to 75 lakhs per annum; from which they earned profit of amount Rs. 20 to 25 lakhs per annum

and from the main fishery, he earned a profit of Rs. 2 to 3 lakhs. Now, for looking after their all fisheries and the fish seed farm, they engaged 45 permanent labourers and 40 casual labourers. He opined that if anybody follows all the techniques accurately, then a good amount can be earned. Besides, a good prospect can also be generated from this business. He also informed that during seed production water from brudder must be changed within 12 days. The entire process is done by water pump and for providing maximum oxygen to the water he made an artificial current to the water in bruder tank. A constant flow is made by thrusting water to the tank. To pass out the excess water there prevails small outlets. But to maintain the process, electric power is essentially required. But due to random power failure in this area, he owned a generator. To him, due to this reason, the cost of fish seed production unnecessarily enhanced. If there occurs no (current) power failure, then the cost of seed production would definitely reduced.

Tunu khan mainly deals with the Indian Major Carps (IMC) only such as the fishes like rohu, mrigel, silver carp, grass carp and ghania. To perform the induced breeding the pituitary glands are collected from gravid fishes of both sexes either belonging to the same species as the recipient or a closely related one. Varghese et. al. (1975) found that the glands from marine catfishes (Arius spp.) to the equally effective though the doses are slightly higher than those of carp pituitaries. Bhowmik et. al. (1975) breed Labeo rohita by injecting extracts of pituitary glands weighing 10 to 16 mg from fresh water catfish per kg. body weight of the recipient carp. Tunu Khan also maintaining the process of collecting pituitary glands and immediately after collection kept in absolute alcohol for dehydration. After 24 hours, the alcohol is chanted for further dehydration and defattening. The glands are then weighed and preserved in

fresh alcohol contained in dark coloured phials and stored either at room temperature or in a refrigerator. The weight of glands may vary from 7.0 to 18.8 mg. in rohu. At the time of injection of breeders, the required quantity of glands are taken out of the phials and the alcohol allowed to evaporate. In usual practice, the female alone is injected with stimulating dose of 2 to 3 mg/kg weight followed by a second dose of 5 to 8 mg/kg weight after a lapse of 6 hours; if required. Two males per female by weight are given a single dose each of 2 -3 mg/kg weight at the time of second injection to the female spawning is not effected. Both the injected males and the females are kept together in a breeding 'hapa' for spawning. The Indian Major Carps normally breed once in a year. But in breeding techniques almost it breeds same eggs twice within an interval of 2 months (Bhowmik et. al, 1977). Generally, he strictly follows the scientific methods during the hypophysection process. Intramolecular injection of pituitary extract is administered by him with a hypodermic syringe with BD needle no. 22 for fishes wighting 1 to 3 kg. and for larger one he used the B.D. needle no. 19 and for smaller spawners, he used B.D. needle No. 24.

In the year 1993-94, Mizoram Government provided him 50 bighas (6.5 hectares) of water cover area on lease in Mizoram. The lease amount was Rs. 50,000/- only for every year. The scheme was as an aid for fish seed development in Mizoram. He built 24 fisheries. With this area, he earned Rs. 3 lakhs per annum and since then he gradually enhance his earning rate upto Rs. 1.5 lakhs per annum every year. In the Mizoram fishery, he mainly cultured sprawn (*Chingri*) seed. For the seed production and its feeding, the Mizoram Government provides Rs. 8 lakhs as an aid. The Department of Fisheries,

Govt. of Mizoram, provided all kinds of food stuff for the fish seed, free of cost. The only condition imposes to him that he has to supply all kinds of fish seed to the Government of Mizoram only as per the approved rate of Government of Mizoram. He has registered his farm under the fishery department in 2006. After registration to his farm, it become mandatory to pay atleast Rs. 50/- each labour. And to obtain the hatching license Rs. 1500/- must be paid in favour of the Department of Fishery as a registration fee. Finally, it is observed that although he has not hailed from the traditional fishing community (Mahimal), yet he runs the fishing business more successfully.

He strongly believes that he may become a role model in this business to the youths. He invites all the youths that they should come forward to join this occupation and try to meet the ongoing demands of fish production of this area. The case gives the clue how the large fisheries can be managed properly to earn sizeable profits.

Case 10

Prajapati Chakraborty, Vill . Kayasthagram, Karimganj Rural (Fictitious name)

Kyasthagram is located in the southern part of Karimganj district of Barak Valley. Most of the villagers are producing fish for domestic consumption while some of them are producing fish for commercial purpose. The village Kayasthagram is surrounded by cultivable lands which can easily be prepared for fish ponds. Just after completion of his pre-university classes at the age of 19, he came in contact with his neighbour and friend, Chayan Bhattacharjee, who was already in fish farming at his own pond. Chayan inspired Prajapati and thus Prajapati also started fish farming in his own pond of water covering area of 4 bighas (0.52 hectares) of land. Prajapati intended

to produce fish seeds for which he collected fish spawn from the Howrah market (West Bengal) and applying it to his fisheries. Generally after 3 days the spawn becomes renu. After 7 days it matures to *baish* while after 22 days it converts to *pona*. After 2 months it becomes 2" – 3" sized fish seeds. In 1971, he first prepared his pond by renovating his existing fishery scientifically. For the preparation the expenditure was made by him as follows :

Table 6.C 10.1 : Expenditure on Pond Preparation in 1971

Item	*Rate (per Kg.)*	*Quantity (in Kg.)*	*Total (in Rs.)*
Lime	3	30	90
Cowdung	0.05	1000	50
Super Phospate	3	5	15
Urea	4	3	12
Total			167

In the month of March – April, Prajapati introduced various types of fish (*baish* sizes) as given in the table below :

Table 6.C10.2 : Introduction of Baish in 1971

Varieties	*Scientific Name*	*Rate / thousand*	*Quantity (in nos.)*	*Total (in Rs.)*
Baus	Labeo Calbasu	100	4,000	400
Rohu	Labeo rohita	35	3,000	105
Mrigel	Cirrihinus merigella	35	3,000	105
Total				610

For the fishery, he applied oil cake and rice bran (once in a week) which are given in the following table :

Table 6.C 10.3 : Feeding of the Fishes in 1971 (May – June)

Item	*Rate (per Kg.)*	*Quantity (in Kg.)*	*Total (in Rs.)*
Oil cake	1	6	6
Rice bran	0.40	25	10
Total			16

Thus, in the month he spent Rs. 64/-. From the next month (May June) he applied the same feeding twice a week which cost Rs. 2 x 16/- = Rs. 32/- per week. In that month it cost Rs. 4 x 32/- = Rs. 128/-. From the last and 2nd months his cost of feeding became Rs. (128/- + 64/-) = Rs. 192/-. In the months of June – July, the cost became (Rs. 192/- + Rs. 64/-) = Rs. 256/-. For August – September, the cost remained the same, i.e., 256/- and for September – November and December, the cost became 4 x 256/- = Rs. 1124/- . He sold the fish in January 1972. Thus, the total investment for one year was Rs. 167/- + Rs. 610/- + Rs. 192/- + Rs. 256/- + Rs. 1124/- = Rs. 2,349/- where from he sold the fishes as given in the following table :

Table 6.C 10.4 Selling of Fishes in January (1971 – 72)

Number of Fishes	*Weight of the fishes (in Kg.)*	*@ Fishes / Kg.*	*Total Amount (in Rs.)*
180 (21.18)	1.5kg x 180 = 270 kg (31.43)	40	270 x 40/- = 10,800 (35.44)
400 (47.06)	1 kg x 400 = 400 kg (46.57)	35	400 x 35 = 14,000 (45.95)
270 (31.76)	0.7 kg x 270 = 189 kg (32.03)	30	189 x 30/- = 5,670 (18.61)
850 (100)	859 (100)	35/- average	30,470 (100)

Thus, at the end of the 1st year he earned the profit as follows :

Total sale value – Total Investment value
= Rs (30,470 – 2,349) = Rs. 28,121/-

In the next year, he changed his strategies and sold the fish seeds every month. He also introduced the fish as and when required (mostly month-wise). Besides, he also prepared a new fishery of water covering area 10 bighas (1.3 hectares). In the next year, i.e., 1972 he introduced fish seeds in both the fisheries.

In the year 1972 one new pond covering water area of 1 bighas (0.13 hectare) and having depth of 4 – 5 feet was prepared. For digging the pond, 20 labourers required for 10 days who worked @ Rs. 6/- = 120/- x 10 day = Rs. 1200/-, Lime 15 kg = Rs. 45/- (@of Rs. 3/- per Kg.), Cow dung 500 kg (own collection) = Rs. 30/- Super Phospate 2 kg (@ Rs. 5/- per Kg.) = Rs. 10/-, Urea 2kg (@ Rs. 4/- per Kg.) = Rs. 8/-. The total investment = Rs. (1200 + 45 + 30 + 10 + 8) = Rs. 1239/-. In the last part of January, the water was transferred from the old fishery to new fishery. After that, the old fishery was prepared by applying line, fertilizers etc. The total investment he made was as follows :

Pond preparation (old pond)		= Rs. 167/-
Fertilizers used (2 tirnes in old fishery)		= Rs. 1008/-
February – March	Fish Seeds introduced	= Rs. 610/-
	Fertilizers introduced	= Rs. 504/-
	Feedings	= Rs. 64/-
March – April	Feeding of fishes	= Rs. 128/-
April – May	Fish introduced	= Rs. 610/-
	Feeding	= Rs. 64/-
April – May (New fishery)	Feeding	= Rs. 150/-
May – June (Old fishery)	Fish introduced	= Rs. 610/-
(Old fishery)	Feeding	= Rs. 64/-
(New fishery)	Feeding	= Rs. 225/- (approximately)
July – August September (Old fishery)	Feeding	= Rs. 64/-
(New fishery)	Feeding	= Rs. 275/-
Labour charge		= Rs. 3240/-
Fertilizers used for new fishery (two times)		= Rs. 504/-

Total expenditure both for new and old fishery = Rs. 9,908/-

The following sale chart of fish for the year 1972 shows the profit and loss of the fishery owner.

Chart 6.C10.1 : Sell of the Fish in 1972

Month	Varieties	Quantity (in Rs.)	@ 700/- per thousand	Remarks
April Middle week of April (sold the fishes)	1) Baus *Labeo calbasu* 2) Rohu *Labeo rohita* 3) Mrigel (*Cirrhinus mrigella*)	2000 2000	700 225 225	All varieties of fishes are of one month matured
May Middle week of May	Baus Rohu Mrigel	1500 600 600	Re. 1/- / piece Rs.. 50/-/ piece Rs. .50/-/ piece	2 months matured fishes (All the varieties)
June	Baus Rohu	2000 300 2000 200 2000	700 Per piece Rs. 1.25/- 225/- .75/- per piece .75 per piece	(1 month mature) (3 months) (4'-6") (1 month) (3" – 5") (1 month)
July 3rd week of July	i. Baus ii. Rohu iii. Mrigel 	i. 1800/- ii. 100/- i. 800/- ii. 100/- i. 800/- ii. 100/-	Re. 1/- / piece Rs. 3/-/ piece Re. 1/- / piece Rs. 2/- / piece Re. 1/- / piece Rs. 3/- / piece	(2 months matured) (4 months matured) (2 months matured) (4 months matured) (2 months matured) (3" – $4^1/_2$) (3 months matured)
August Last week of August	i. Baus ii. Rohu 	i. 2000/- ii. 150/- i. 2000/- ii. 900/-	Rs. 7000/- per thousand Rs. 3/-/ piece Rs. 225/- / 100	(1 months matured) (4 months matured) (1 months matured) (2 months matured)

	iii. Mrigel	iii. 150 i. 2000/- ii. 900/- iii. 150/-	Re. 1/- / piece Rs. 3/- / piece Rs. 225/- per thousand .50/- per piece Rs. 3/- / piece	(3 months matured) (1 months matured) (2 months matured) (3 months matured) (4 months matured)
Process continued upto mid part of September	Upto middle week of September	All fishes	Rs, 17,025/-	(5 months matured)

After one year (from old fishery)

i. 100 number of 1.5kg. = 1.5 x 100 = 150 kg.
ii. 250 number of 1kg. = 250 x 1 = 250 kg.
iii. 100 number of 1kg. = 100 x 1 = 100 kg

Similarly, in new fishery (after 1 year)

i. 80 number of 1.5kg. = 1.5 x 80 = 120 kg.
ii. 200 number of 1kg. = 200 x 1 = 200 kg.
iii. 200 number of 1kg. = 100 x 1 = 200 kg

Thus, from both the fisheries, i.e., (old fishery + new fishery)

Total weight = i. (150 + 120)kg = 170 kg.
ii. (250 + 200) kg = 450 kg.
iii. (100 + 200)kg = 300 kg.

From old fishery 6 to 8 months fishes

i. 180 nos. of 500 gm = 90 kg
80 nos. of 750 gm = 60 kg
} 150 kg.

ii. 100 numbers (500 gm each) = 50 kg.
400 numbers (400 gm each) = 160 kg.
} 210 kg.

iii. 100 number of (500 gm each) = 50 kg
300 numbers of (300 gm each) = 90 kg.
} 140 kg.

From new fishery

Sold 6 to 8 months matured fishes

i.	80 numbers (500 gm each)	= 40 kg.	150 kg.
	60 numbers (750 gm each)	= 110 kg.	
ii.	80 numbers (400 gm each)	= 32 kg.	152 kg.
	200 numbers (600 gm each)	= 120 kg.	
iii.	80 number of (400 gm each)	= 32 kg	122 kg
	300 numbers of (300 gm each)	= 90 kg.	

After 8 months (from both the fisheries)

Baus = 150kg + 150 kg = 300 kg.
Rohu = 210kg + 152kg = 362 kg
Mrigel = 140 kg + 122kg = 262 kg

The total selling amount was

Baus @ Rs. 30/- per kg.	=	300 x 30/-	= Rs. 9,000/-
Rohu @ Rs. 35/- per kg.	=	362 x 35/-	= Rs. 12,670/-
Mrigel @ Rs. 25/- per kg.	=	262 x 25/-	= Rs. 6,550/-
		Total	= Rs. 28,220/-

Besides, Baus, Rohu and Mrigel, other varieties such as Moka (*Amblypharyngodon mola*), Sprawn, Tengra (*Mystus spp.*), Puti (*Puntius ticto*), Kholisha (*Colisa sasciatus*) etc. were also sold from both the fisheries.

The total of these fishes were 120 kg x Rs. 20/- = Rs. 2400/-

The total sale value is

	Rs. 59,050/-
	Rs. 28,220/-
	Rs. 2,400/-
	Rs. 13,038/-
	Rs. 1,02,708/-
Total investment	Rs. 9,908/-
Net profit	Rs. 92,800/-

In the year 1973, (January) the new pond was again prepared as earlier manner. After that he introduced cow dung, lime, super phosphate and urea as follows –

Lime 15kg	= Rs. 45/-
Cow dung 700 kg.	= Rs. 35/- (Rs. 5/- per thela)
Super phosphate 2 kg	= Rs. 10/-
Urea 2 kg	= Rs. 8/-
	Rs. 98/-

Meanwhile, he constructed two more fisheries and thus he possessed 4 fisheries in all. Two of them covered one bigha, i.e., .13 hectare of water area, one covered 1/2bigha while the other covered 2 bighas, i.e., .26 hectares of water area.

For preparation of pond he invested an amount of Rs. 8501/-. First the transferred water from the old fishery to newly constructed fisheries he brought the fishes of body weight 1 to 1.5 kg. each to the new fisheries shown as follows :

80 numbers of Baus
150 numbers of Rohu
170 numbers of Mrigel

After that he renovated the old fishery and also prepared *hapa* for induced breeding purpose. *Hapa* means making of *hapa*, Mosquito net (Nylon net). *Hapa* is prepared with a nylon mosquito net size 5' x 3' for breeding purpose (all sides are closed). Another type of *hapa* prepared with *Markin* cloth of size 7' x 3' having a height of 20" – 22" top sides are open.

Then he separated male and female fishes of each variety for breeding purpose and kept in two big *hapas* one each for male and female. Soon, in the first week of April, he began the process of induced breeding. At first Prajapati

Chakraborty collected hormone from the pituitary gland that exists in the head of the female fish and it added with distilled water and then it injected to the mature fish (both make and female). After that, the fishes will start breeding. For hypophysation he first brought at least 3 female fish of same species (body weight 5 kg) or so into the nylon made mosquito net *hapa* and eight make fishes having 8 kg. of body weight. Firstly, 5kg weight of mature female fish (Maximum 3 female) into a *hapa* and 8 kg weight of mature male fish (Maximum 5 numbers) into other *hapa* and then push injection to female fishes. The dose of the injection is for 1 kg body weight required 3 mg. After 4 hours, the same injection but dose of 6 mg. will be pushed to the same fishes. After that each make with body weight of 1 kg. required 3 mg injection. Then, it was brought to the *hapa* where the female fishes to the *hapa* where the female are already kept. After 4 hours the breeding will start. Each female fish will start jumping and breeding and male will spray their milk over the breeding egg and it will become a creamy layer and float on the water. After passage of 12 hours fish spawns (larva) will come into existence. Next day morning male fish will be separated and female fishes will be sold in the market. Some strong and stout fishes may be released to the pond after washing them gently with potash. Soon after 12 hours' stay in the *hapa*, the larva is transferred to the *markin* made *hapa* placed in the big pond. There, it will be kept for next three days. After three days, the fish seeds may be sold. These seeds are called *renu.* After 7 days, this *renu* will be termed as *baish* while 21 days seeds are called fingerlings. In the subsequent days of breeding the cultivator again repeat this process with new fishes and then transferred to the new pond in a new hapa. and in this way the cultivator Prajapati produced a crores of fish seeds sold renu, baish and fingerlings as per the market demands. In the old fishery, he is

producing the fishes while in new fisheries he is producing the fish seeds and thus his income is found to be multiplied in a very good manner. Prajapati formulated breeding mechanism for different varieties of fishes. He generally appling the injection for breeding among 80 baus (*Labeo clabasu*), 150 rohu (*Labeo rohita*) and 170 mrigel.

Chakraborty firstly separated the calculated number of fishes both for male and female in the last part of March. After that he started to apply the injection to baus (*Labeo calbasu*) only for 10 days. Similarly he spent 19 days for rohu (*Labeo rohita*) and 21 days for mrigel (*Cirrihinus mrigella*) respectively. Thus, for the breeding process he approximately spent two months or so.

In the coming months, i.e., from April to September he prepared the pond and each time induced breeding technique was applied with these three above mentioned varieties. Thus, for baus only he applied the breeding injection 10 times approximately while for rohu and mrigel he go for 7 times respectively. And, in earlier days, he earned from the fisheries (for big fishes) approximately Rs, 50,000/- . As he could not provide more attention to big fishes, he gave more emphasis on seed production and seed selling wherein the money comes quickly and the profit trend is also lucrative. Prajapati Chakraborty, continued the process. He earned approximately Rs. 1,00,000/ - per annum from the fisheries. He informed that this region is very fertile for fish production. Therefore, the educated unemployed youth should come forward to join the fishery business to make their fortunes.

This case again indicates the value of technical and professional knowledge in the maintenance and management of the fisheries.

Case 11

Ajib Uddin, Kali Nagar, Katakhal, Hailakandi Rural (Fictitious name)

Ajib Uddin and his friends, Sebul and Imran, have taken a fishery by paying a sum of Rs. 10,000/- per annum from Ramjan Ali in Kalinagar village of Hailakandi district in 1999. In the year, first prepared the bed of the fishery scientifically under the guidance of a pisciculturist. For preparation they pumped out the water. Then they applied lime, murate of potash, urea, cowdung, etc. and ploughed the bed of the fishery and allowed it to dry. Then, fishery was filled with the rainfed water and they released IMC varieties of fish seeds in *belly*, fingerlings, spawn and the 4" – 5" as well. All these activities incurred the costs shown in the table :

Table 6.C 11.1 : Expenditure on Pond Preparation and Fish Rearing for 1999 – 2000

Items	*Amount (in Rs.) / Annum*
Pond Preparation	10,000 for lease amount
Fish seeds purchasing	20,000
Foods stuffs, etc.	10,000
Total	40,000

After one year they sold fish of Rs. 1,50,000/- and earned a net profit of Rs. (1,50,000 – 40,000) = Rs. 1,10,000/-. They distributed the profits equally among them. Next year also they practiced the fishery as earlier and earned more profit. They restricted the fish seeds only to four different varieties like rohu, mrigel, baus and ghania. These varieties provide more profit in the same pond. They believed that for practicing PPR fish patience and scientific attitude is required.

This case demonstrates that the PPR fishery and its techniques may be applied in the beel fishery if the water can be logged for the whole year and this

big fishery divided into parts and can be leased to some private party or the fishing members on lease basis, then they may produce the fish like PPR.

Case 12

Altaf Hussain, Ratanpur Village, Hailakandi Rural (Fictitious name)

Altaf Hussain, a leading fisherman of Ratanpur village of Hailakandi, has two big pond fisheries covering the area of 8 bighas and 4 bighas respectively. He and his brother have been culturing fish for more than twenty years. Their father set up both the fisheries in 1960. Along with the fishery, Altaf and his brother, Masuk, are practicing both agriculture and fishing simultaneously. They like to cultivate big fishes and are not at all interested in fish seed production. They opined that fish seed production requires more concentration and care. Besides, there would be a tension for selling the fish within the stipulated period. However, there is no tension in respect of big seed production. They also preferred to cultivate IMC varieties. However, some times they alter their strategies regarding the varieties of the fishes. From both the fisheries, the average sell of fishes is Rs. 1.5 lakh per annum. The remaining fish in the pond is allowed to grow and subsequently they release the new fish seeds immediately after catching of the fish. They generally release the fish varieties for around Rs. 10,000 per annum. On feeding they spent approximately Rs. 10.000/- per annum. They strongly believe that it is the only tension free business. They are now planning to prepare two more big fisheries on their own paddy land. To them, the labour and the profit in paddy is remarkably less than that in the fish production.

This case also points to the sound experience and proper management of the PPR fish.

In dum, out of 12 private fishery owners only four, are graduates and Higher Secondary school passed, one is matriculate and the rests are not even the HSLC holders. Most of the fishery owners are not well trained in managing fisheries. But inspite of that they are practicing PPR fishery successfully. The studies reveal that in Cachar district one of the owners received the advisory support of the technical expert from the Department of Fishery, Government of Assam, while another one received training once from the Department of Agriculture, Government of Assam. While both the graduates have no experience in the fishery business and have not even taken any proper guidance formally from any individual or department. Even then they earned profits. All of these entrepreneurs feel that the Department of Fisheries should come forward for training and guidance of new entrepreneurs.

In Hailakandi district, the only graduate entrepreneur is earning profits. He also desired a formal training in fishery. Another two entrepreneurs earned moderate profits but they faced financial constraints also. They believed that if the fishes are kept for two years in the same pond then it will return more profit. However, one of the entrepreneurs believed that the selling of spawn, fingerlings and even 2" to 4" seeds will return more income. One of those from Karimganj district also has the same thinking while another one perceived that any form of fishery business will return profit. However, he believed that in the process of fish seed production, the money rolls in very quickly and hence it is appearing that the seed production has enough potential in the valley. Paradoxically, when the traditional fishermen are in search of alternative occupations, at the same time, the non-fishermen communities are taking up the fishery business.

The analysis it reveals that education has a role in using skills in fish rearing. Besides, financial assistance has also a significant role in extending fishery activities. Thus, the development of PPR fishery seems to be growing sector at present. The only thing required here is the technical and professional expertise to be disseminated through training programmes to the entrepreneurs and the fishermen. The something may be extended to the cooperative societies, the fishermen and the groups of fishermen in the CPR fisheries of the Shonebeel and the Barak river. This points out that the CPR fisheries have to be inducted with technical and professional expertise in their management along with participation of the traditional fishermen for sustainability the fisheries as well as the fishing communities in the Barak Valley.

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