A BASELINE STUDY REPORT IN THE SECTOR OF POND FISHERIES OF MORIGAON DISTRICT OF ASSAM WITH SPECIAL REFERENCE TO SIX GRAM PANCHAYATS OF MAYONG DEVELOPMENT BLOCK

FY 2021 - 22

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ABOUT ICCo

ICCo is a development organization working to achieve the twin core principles of "Securing Sustainable Livelihoods" and "Justice and Dignity for All". ICCo has been pioneering in India for more than a decade towards the goal of development and in doing so, has partnered with more than 100 agencies across India. We, at ICCo, believe that "Innovative" strategic thinking and "Collaborative" effort are the keys to bring a desired change in the society. At ICCo, we envision a just, inclusive and equitable society.

Thereby, working towards a brighter tomorrow, the organization is on a mission of designing and implementing innovative ideas and solutions, strengthening Community-Based Organisations for inclusive and high-impact growth in society. ICCo plays diverse roles as that of a Catalyst, Lobbyist, Networker, Implementer and an Entrepreneurship Booster. This helps in capitalizing on synergies with various stakeholders to amplify the impact of our work. Over the years, the organization has pressed upon three strategic pathways in the pursuit of its goals: Inclusive and Sustainable Agriculture System; Promoting Social Entrepreneurship for Rural Prosperity and Responsible Business Behavior Over the past decade, with its interventions in the areas of Agri-Value Chain, Clean Energy, Food & Nutrition & Social Entrepreneurship, ICCo has ensured accountability, integrity and upliftment of the society at large. Marginalized women are one of our key stakeholders whose capacity we have been building over the years. The organization continues to work extensively with its various stakeholders to empower communities and build a stronger economy which is the key to making Agenda 2030 and the achievement of the Sustainable Development Goals (SDGs) transformational and inclusive

TABLE FOR CONTENTS

1.	Acknowledgment & Acronyms	1
2.	A brief introduction of the fishery sector in Assam with special reference to Morigaon district	1-2
3.	**Chapter 1**	**3-4**
	1.1 Objective of the study	
	1.1.1 Objectives of door-to-door study	3
	1.1.2 Objectives of the PRA exercise	3
	1.2 Rationale for the baseline study	3
	1.3 Limitation of the study	4
4.	**Chapter 2 : Study Area and Methodology**	**4-7**
	2.1 Demographic Details	4
	2.2 Methodology	5
	2.3 Identification of Respondents	5
5.	**Chapter 3 : Demography of the Study Area**	**8-9**
	3.1 Ages of the Respondents	8
	3.2 Education Qualification	8
	3.3 Respondents from different Caste and Communities	9
	3.4 Economic Category	9
6.	**Chapter 4**	**10-18**
	4.1 Means of financing input cost of fish farming	
	4.1.1 Number of ponds per farmer (existing/lease)	10
	4.1.2 Size of the pond (total pond holding area)	10
	4.1.3 Experience of fish farming	11
	4.1.4 Types of fish pond	11
	4.1.5 Types of fish seeds	12

4.1.6 Types of common fish culture practices and feed-based culture practices 12
4.1.7 Commonly cultured fish species 13
4.1.8 Fertilizer used in pond 13
4.1.9 Fish farmers who have undergone any training related to fish farming 13
4.1.10 Gender distribution related to fishery activities 14
4.1.11 Fish disease in the operational area 14
4.1.12 Average production in last year 15
4.1.13 Approximate annual income from fish farming activities 16
4.2 Means of financing input cost of fish farming
4.2.1 Sources of fish seed 16
4.2.2 Types of feed and cost per kilogram of supplementary feed 16
4.3 Fish harvesting gears and one – time cost for netting 17
4.4 Price of fish 17
4.5 Marketing channel 18

7. Chapter 5 : Support from organization 18-20
5.1 Loans from Financial Institutions 18

8. Chapter 6 : Constraints and Challenges during Baseline Study 21

9. Chapter 7 : Recommendations 21-23

10. Chapter 8 : List of References 24

1. Acknowledgement

This report is an outcome of the study conducted by ICCo team in the Mayong Development Block of Morigaon district, Assam under the project "REBUILDING LIVES BY RESTORING FARM AND NON-FARM LIVELIHOODS IN ASSAM AMIDST AND POST COVID19" implemented by ICCo. The team spent a substantial amount of their time in collecting the data through door-to-door visits with a structured interview schedule and Participatory Rural Appraisal (PRA) at the community level. ICCo acknowledges the hard work and dedication being put forward by the **Community Resource Persons (CRPs)** for the door-to-door survey irrespective of all the challenges faced in the field. ICCo is also grateful to the respondents of the household survey and participants of the PRA exercise.

Acronyms

APPI : Ajim Premji Philanthropic Initiatives APL: Above Poverty Line

BPL : Below Poverty Line

CRP : Community Resource Person GP: Gaon Panchayat

IMC : Indian Major Carp

NABARD : National Bank for Agriculture and Rural Development

NFDB : National Fisheries Development Board

SoP : Standard Operating Procedure

2. A brief introduction of the fishery sector in Assam with special reference to Morigaon district

The state of Assam has a rich biodiversity and ancestral cultural heritage which has led Assam to be a resourceful state. Nature has abundantly blessed Assam with charming sights and exciting natural scenery. There is no denying the fact that the state of Assam during the last fifty years has made great strides in many fields. But a lot more remains to be done to bring the state to the forefront of development and progress. The state has two major rivers, Brahmaputra and Barak Rivers along with its tributaries. Thus, after agricultural

activities, fishery activities play a very significant role in the generation of income and employment opportunities especially in the rural areas of the state. The fish production has gone up from 2.94 lakh metric tonnes in 2016-17 to 3.93 lakh metric tonnes in 2020-21, registering an increase of 33.67%. Per capita fish consumption has risen from 8.5 kg per annum to 11.88 kg per annum. Fish seed production, too, has increased from 5678 million to 9886 million in the same corresponding period witnessing a rise of 74.11%.

The Morigaon district of Assam is basically an agrarian district. It is situated between coordinates of latitude 26°22'46.45" N and longitude 92°20'29.26" E. It is situated on the south bank of the river Brahmaputra of which Nagaon district is situated on its west, Darrang on the North, Kamrup on the west and South West Karbi Anglong on its south. The total area of Morigaon district is 1551 sq. km. It has three urban areas (Morigaon, Jagiroad, and Jagiroad paper mill) covering an area of 17.92 sq. km., with a total urban population of 37988. The present district of Morigaon has five revenue circles (Morigaon Sadar, Mikirbheta, Laharighat, Bhuragaon and Mayong) with five development blocks (Mayaong, Kapili, Bhurbandha, Laharighat and Moirabari). The total number of revenue villages in the district is 632 and there are 85 Gaon Panchayats under five development blocks. The district is also endowed with diversified water bodies in the form of river fisheries which includes tributaries such as Kolong, Sonai etc, beels/swamps like Gauranga beel, Mer beel etc and pond/tanks. Nearly 95% of the population of the district relish on fish as an essential supplement to their staple food. The normal rainfall of the district is 1772.4 mm. However, nearly 60% of the rainfall is received during the four monsoon months when the intensity of rainfall is very high. The economy of Morigaon is rural agrarian with a low rate of urbanization. There is lots of fishery potential in the district due to abundant rainfall as well as huge water resources availability along with the availability of agro-processing units like rice mills, flour mills, and mustard oil extraction mills which are the input materials in fish feeds and also due to availability of the dry fish market in Jagiroad, which is the largest dry fish market in Asia and Morigaon acts as the supplier of dry fish to the entire North Eastern Region. According to the data shared by the Director of Fisheries, the fish production of Morigaon district is estimated to be 21,707 million tons in 2020-21.

Chapter 1

1.1 Objectives of the study

1.1.1 Objectives of door-to-door study

- To assess the current pond holding area of the farmers along with annual fish production
- To assess the adoption of scientific PoP and type of current fish farming practices.
- To identify the current market channel and analyze the present income through fish farming.
- To assess the status of access to Govt. schemes and policies.

1.1.2 Objectives of the PRA exercise

- To understand the potential resources of the study area.
- To understand the strength of the community and identify future scope of development around the fishery sector.

1.2 Rationale for the Baseline Study (Scope and Purpose)

There is a high scope of scalability of fish production in the study area. More than 80% people of the area are involved in fish farming and it is one of the major sources of income of the families. ICCo wants to bring significant changes around the fishery sector in the area by intervening for a longer period, not less than 5 years. The state of Assam is highly indulged with natural water resources but rate of production is not upto the level. Proper scientific fish farming along with awareness will lead to the increased production rate. Moreover, the employment generation for the educated youths will lead to a secured future. Women empowerment through fish farming, fish processing technology, aquarium fabrication will build a strong status as well as strong will power among them to rise equally besides men. Morigaon was identified based on the data on the maximum area of natural water resources covered with beels, marshes, swamps, ponds, rivers etc. in the district which provides an ideal environment for entrepreneurship/enterprise development on fisheries.

Asia's largest dry fish market is situated in the block itself, but people of the area are not able to tap the market to enhance their income level. The study wants to explore the potential interventions in the area so that the farmers could be connected with the said

market called Jagiroad dry fish market. Also, the gateway of North East Guwahati city is only 65 KM distance from the Mayong block. There is a high scope to cater the need of fresh fish market in Guwahati city.

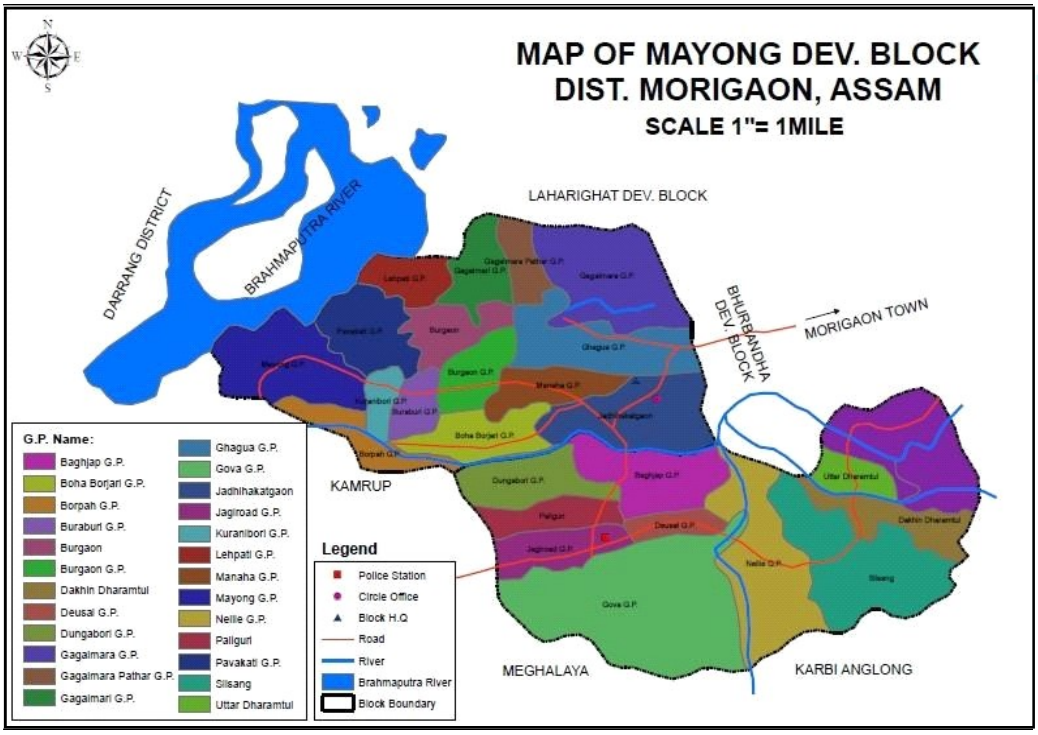
1.3 Limitation of the study

The scope of the study is limited to household level status of pond fisheries, but production and income from community owned "Beels" (Wetland) and ponds have not been taken into consideration. Although, through the PRA exercises, certain aspects were attempted to be covered.

Chapter 2: Study Area and Methodology

2.1 Demographic Details:

The geographical coordinates of the operational area come between longitude 92023/ 12.53//E and 26018/59.45//N latitude. This is an open water floodplain wetland, which is situated at the southern bank of the Central Brahmaputra Valley. The Mayong Block covers a total area of 503 km²



2.2 Methodology

Before the actual study was conducted, the methodology that was followed by the ICCo team was typically described as a rapid survey to get an overall idea of the area. Thereafter, the household level study was done through a structured interview schedule by using a mobile app named "Kobo collect" for 6 GPs of Mayong Development Block which covers 2000 marginal fish farmers. Before the study, a comprehensive questionnaire had been carefully prepared and piloted in 60 households. Necessary modification was done based on the pilot study. Transects walk for resource identification and mapping, Venn diagram diagram for problem identification and solution, Market Mapping to understand the existing market channel, Daily activity calendar for feeding, Seasonal calendar of fish farming, a simple „Force field analysis. Existence and importance of middleman etc. were done through PRA.

2.3 Identification of Respondents

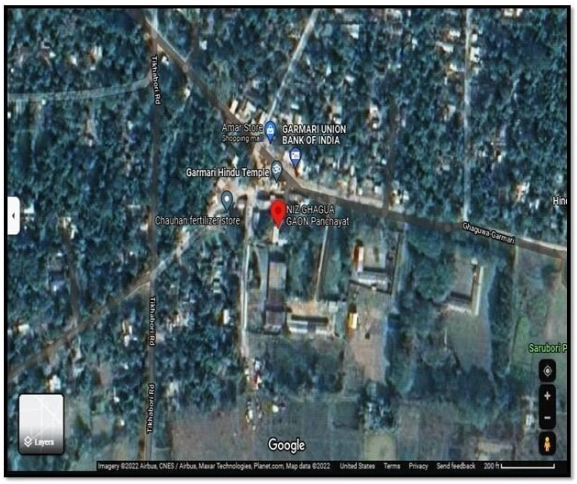
List of Pond holding farmers were selected by the CRPs with the support of Gaon Panchayat representatives, Village head, Women SHG leaders, Progressive fish farmers etc. Accordingly, 2000 fish farmers. households were selected irrespective of caste and communities for the study in 6 GPs namely Baghjap, Jhargaon, Monoha, Dungabori, Jagibhakat Gaon and Ghogua with the total area of 1708.28 ha in the Agroclimatic zone of Central Brahmaputra Valley. The table below displays the locations where the study was conducted and the proportion of representation from each location.

Location	Total no. of fish farmers	Percentage (%)
Baghjap	569	28
Dungabori	331	17
Ghagua	201	10
Jagibhakat Gaon	248	2
Jhargaon	275	14
Manaha	376	19
Total	2000	100

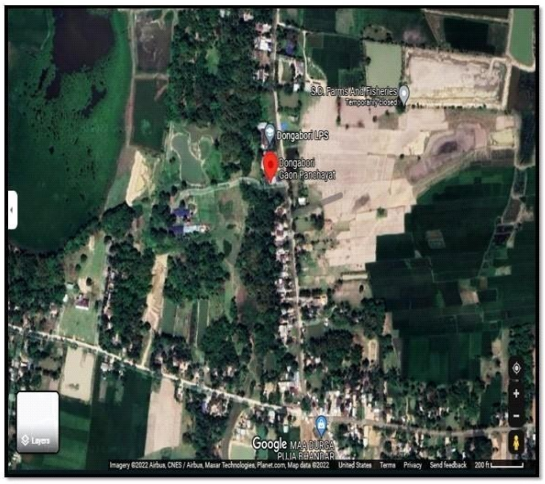
Satellite images of identified GPs (Gaon Panchayat):

GP: JAGIBHAKAT GAON

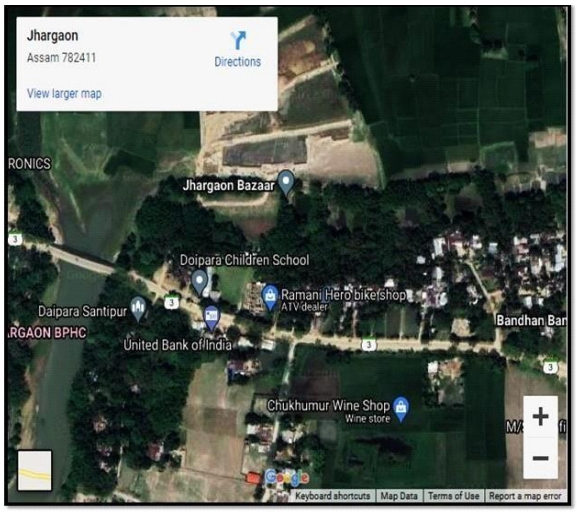
GP: BAGHJAP



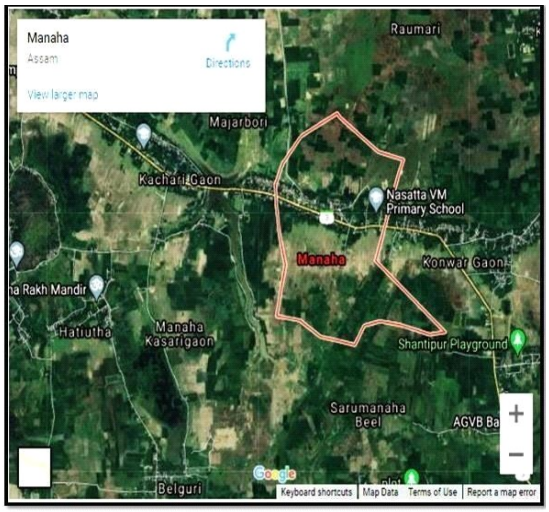
GP: GHAGUA



GP: DUNGABORI



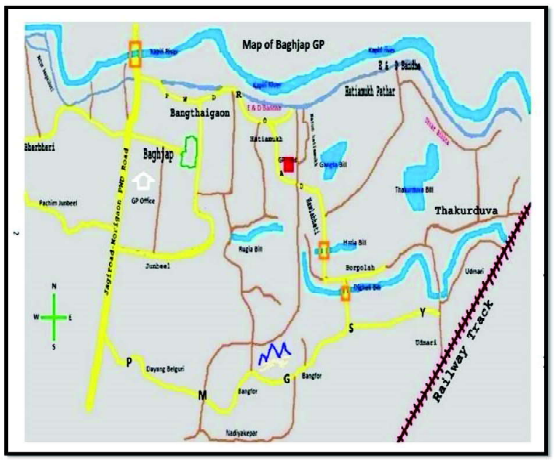
GP: JHARGAON



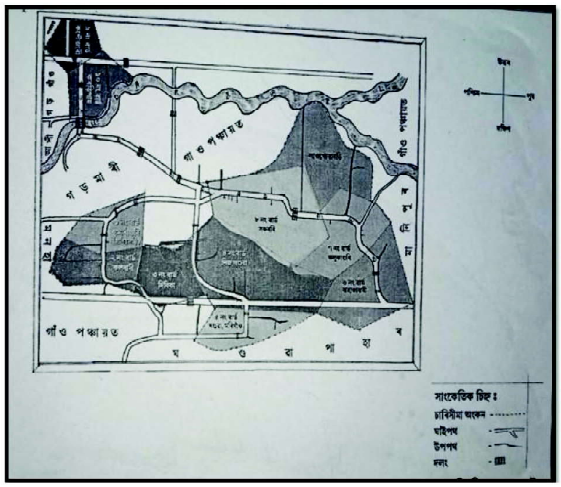
GP: MANAHA

Revenue Map of identified GPs:

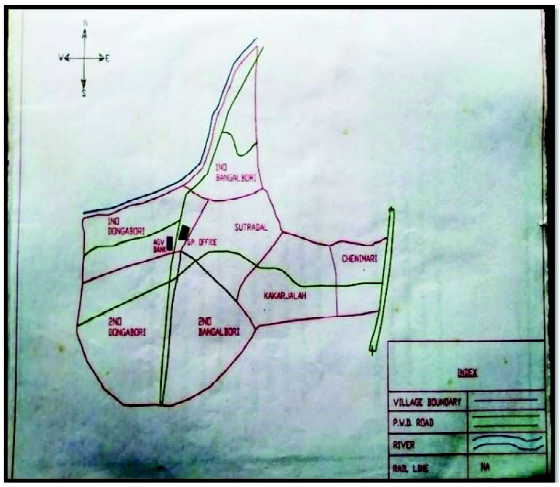
GP: Jagibhakatgaon



GP : Baghap

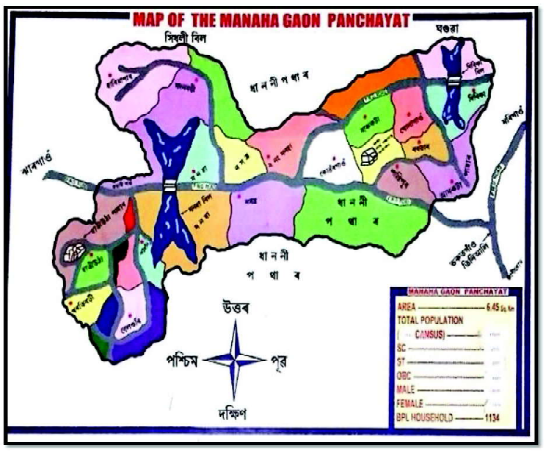


GP : Ghagua



GP : Dungabori

GP : Jhargaon



GP : Mahana

Chapter 3: Demography of the Study Area

3.1 Ages of the Respondents

The study revealed that fish farming in the targeted area is dominated by only 5% people with an age group >25 years old, and 24% people were within the age group of 25-35 years. But the graph dominated with 50% where people between the ages of 35-50 years were highly observed. 21% of people with an age group of >50 years own a pond. It was found that the major role of adults within the age group of 35-50 years are mostly engaged in the aquaculture business including the maintenance of ponds and feeding of fish. It reflects that there is a scope of engaging youth in the sector to create employability in the state of Assam, and thereby stop non beneficial migration.

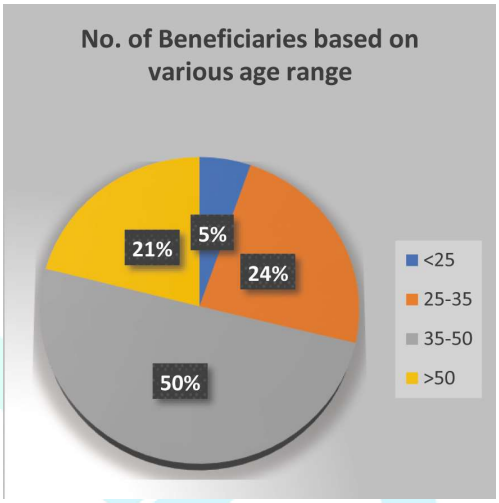


Fig. 3.1

3.2 Education Qualification

Based on the findings of the study, 64% respondents were below class 10th level whereas 25% respondents are 10th pass and above and 11% of respondents were illiterate. It indicates that 89% of respondents were literate. It indicates that training for the fish farmers should be practical oriented rather than theoretical training.

No. of Beneficiaries based on various age range.

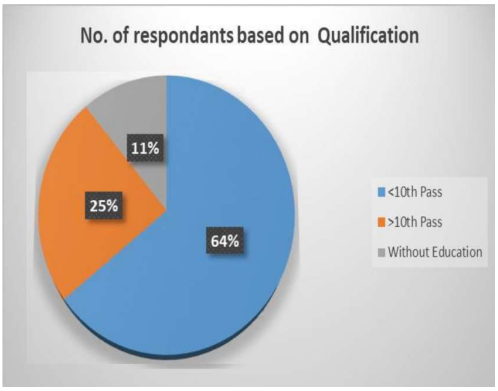


Fig. 3.1

3.3 Respondents from different caste and communities

Among all the targeted respondents, 16% belonged to the General caste whereas 37% belonged to OBC, 16% were SC and 31% from ST community of the total respondents in the area covered under the study. It indicates that special thrust is required amongst the OBC, SC and ST to boost the fishery sector.

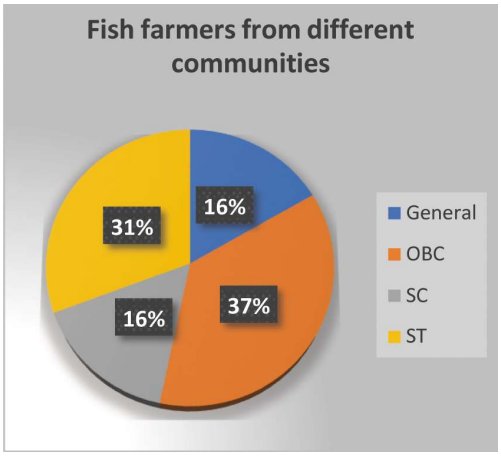


Fig. 3.3

3.3 Economic Category

According to the study 43% fish farmers belonged to APL (Above Poverty Level) and 57% were from BPL (Below Poverty Level). It indicates that a separate scheme is required to engage the BPL section in the fish supply chain as well as to maintain the nutrition of a poor family.

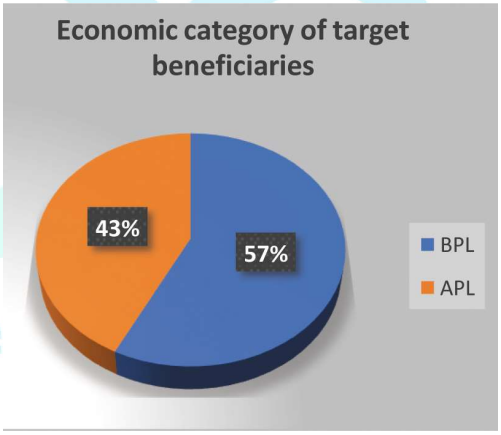


Fig. 3.4

Chapter 4

4.1 Status of aquaculture practices of the respondents:

4.1.1 Number of ponds per farmer (Existing/Lease)

The respondent farmers were interviewed about the number of operational ponds and ownership of ponds. As can be seen in the figure 4. 1(a) and 4.1 (b), only 6% farmers owned more than 2 ponds. But the maximum number of farmers (94%) owned a single pond. It was also found in the study that 98% farmers had their own pond and 2% farmers had their ponds on lease. It indicates that there is a high scope of enhancement of income of the fish farmers having their own ponds.

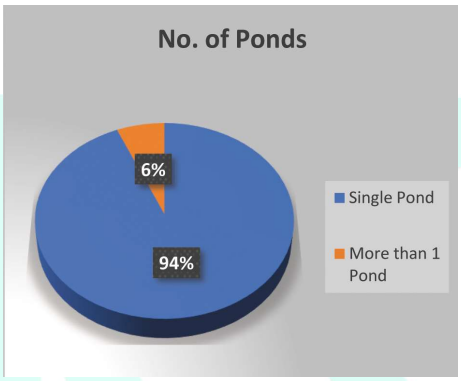


Fig. 4.1(a)

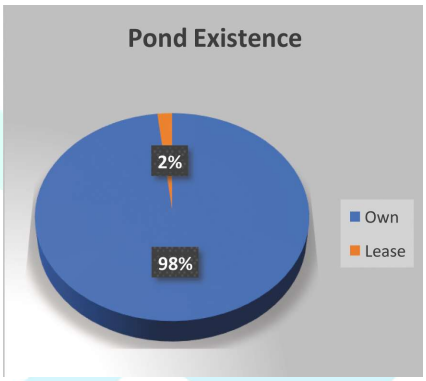


Fig. 4.1(b)

4.1.2. Size of the pond (total pond holding area)

From the graph it can be stated that 729 numbers of beneficiaries have ponds with an area of less than 1 bigha, 529 beneficiaries have ponds of 1 bigha, 162 beneficiaries have ponds of 2 bighas, 734 beneficiaries have ponds of 3-10 bighas and 29 beneficiaries have ponds of more than 10 bighas. It indicates that there are a good number of pond fisheries to make the study area a fish hub and then connect them to larger markets by developing an institution of the farmers. Storage and carrying facilities can be initiated to minimize the loss of farmers during harvesting season.

Fig. 4.1.2

(*1 ha = 7.5 bigha)

4.1.2 Experience on Fish Farming

From the experience point of view, the study tried to understand the range of experiences gathered by the respondent farmers. As shown in the figure 4.2, 13% of farmers were new to fish farming, whereas 40% of them had an experience of 1-5 years. 28% farmers had an experience of around 5-10 years and 19% farmers had a working experience of more than 10 years. It indicates that there is a scope of peer learning and potential for the development of a self-driven ecosystem in the study area. Gram Panchayat and local fishery department can play a major role in such areas by identifying and listing the farmers for further strengthening of their capacity to compete in the market system.

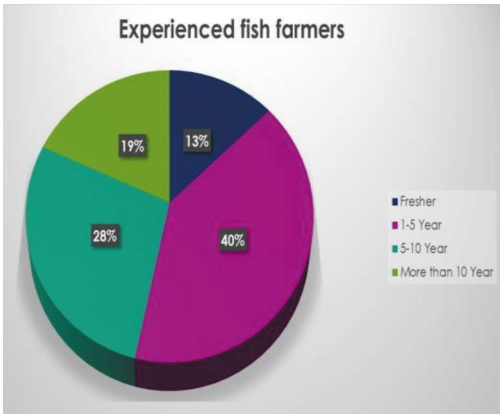


Fig. 4.1.3

4.1.4 Types of fish ponds

The study revealed that the farmers had three different types of ponds, namely: nursery, rearing and brood-stock. It was critically estimated that 3% of the farmers have nursery ponds, 88% farmers have rearing ponds and 9% of the farmers had brood-stock ponds. It shows that there is a scope of producing sufficient/ enough seeds through increasing the construction of nursery ponds in order to fulfill its demand and reduce the import of seeds and broods from distant areas, and thereby reduce the input cost of the farmers.

Types of Ponds 9%3% 88%

Nursery Rearing Broodstock

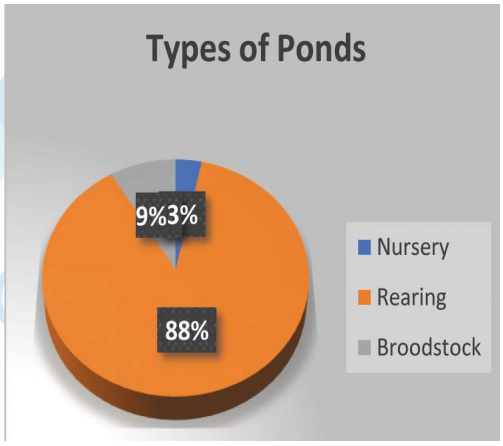


Fig. 4.1.4

4.1.5 Types of fish seeds

The farmers stocked their ponds with spawn/fry, fingerling and yearling. Among all these, 87% farmers stocked fingerlings, whereas spawn/fry was stocked by 5% farmers, and yearling was stocked by 8% farmers.

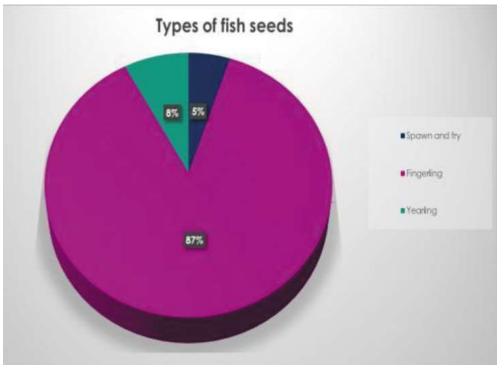


Fig. 4.1.5

4.1.6 Types of common fish culture practices and feed-based culture practices

In the study area, it was found that the fish farmers were involved in three types of culture practices that could be highlighted as composite farming, integrated farming and monoculture accounting as shown in figure 4.5 (a) as 76%,15% and 9% respectively. Depending upon the type of feed used, the culture practice could be classified into traditional, semi-intensive and intensive culture practices. These accounted for 14%, 83% and 3% respectively as shown in the figure 4.5 (b). It indicates that there lies a huge scope for integrated farming practices with other crops.

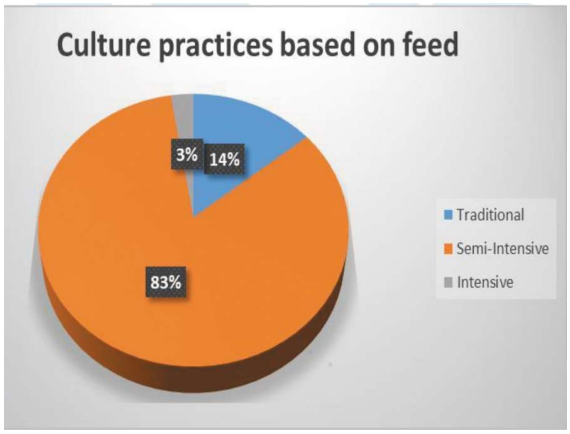


Fig. 4.1.6(a)

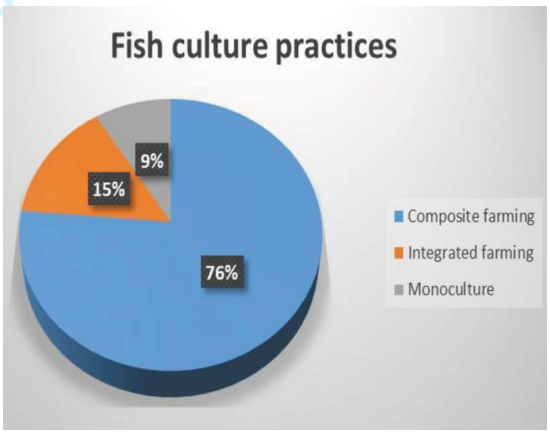


Fig. 4.1.6(b)

4.1.7 Commonly cultured fish species

As per the study, farmers found 94% stocking density along with exotic carps. On the other hand, the air breathing and other fishes were stocked at around 6% by the local farmers as depicted in the figure 4.6. This indicates that, apart from IMC, people can be influenced to adopt the culture of other species by proper training.

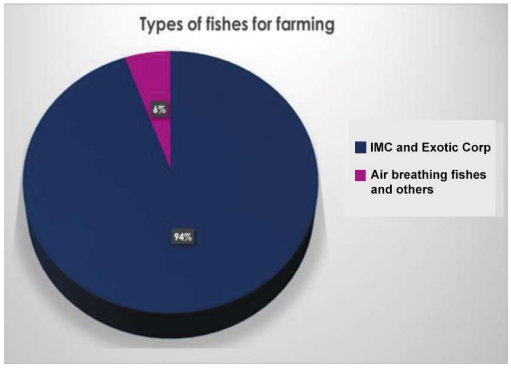


Fig. 4.1.7

4.1.8 Fertilizer used in pond

As per the study and shown in the figure 4.7, 47% farmers used farm manure in their fish pond. 48% farmers used both farm manure and urea. 3% farmers used urea whereas 2% farmers used Tri-super phosphate in their fish pond which indicated that half of the farmers mostly used organic manure.

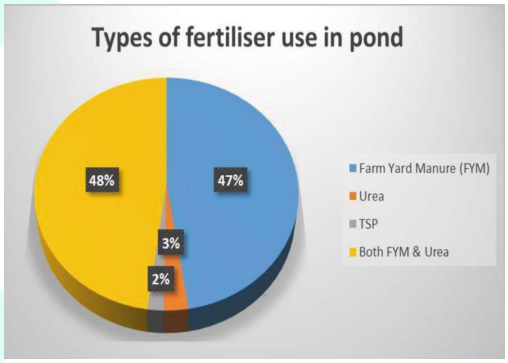


Fig. 4.1.8

4.1.9 Fish farmers who have undergone any training related to fish farming:

As shown in the figure 4.8, it was estimated that 99% of the farmers have not had the privilege of attending any departmental fish management training, disease training, extension related training. Only 1% of farmers have undergone the said training. It indicated that there were no such direct training impacts in the study area.

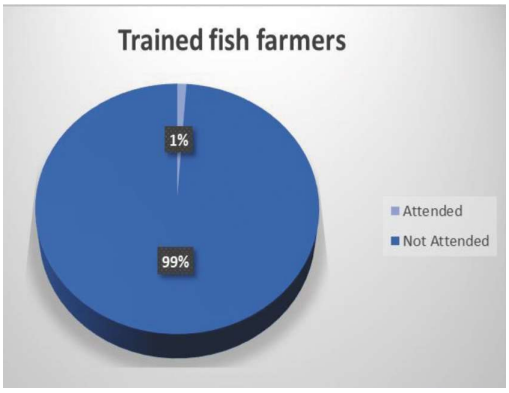


Fig. 4.1.9

4.1.10 Gender distribution related to Fishery Activities

The study sought to understand the gender composition of the fish farmers. Among 2000 respondents 100% were female and were involved in household level fish farming. There was a further enquiry into the role of women in fish farming. As much as 80% of the respondents indicated that women assisted in feeding the fish in the pond whereas the rest of 20% were involved in preparation of feed at home, smoking of fish, preparation of gears and indigenous bamboo traps, selling of fish etc. It specified that women are not directly involved in fish harvesting and marketing etc.

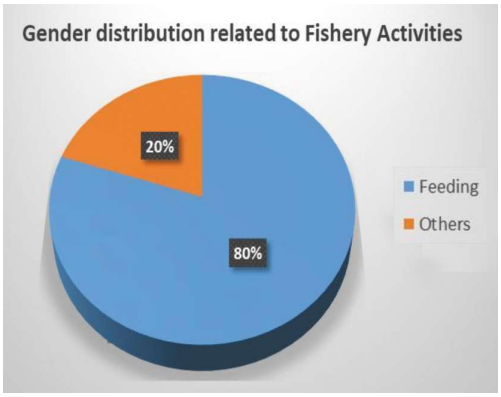


Fig. 4.1.10

4.1.11 Fish disease encountered in the operational area

The following diseases were identified by the respondent farmers during the study.

Sl. no	Disease Identified in the target area	Symptoms
1	Argulosis (Causative agent: *Argulus foliaceus*)	◆ Infected fish show erratic swimming behavior. ◆ Parasites are visible with naked eye and ulceration is seen at the attachment site.
2	Lerneaosis (Causative agent: *Lernaea*)	◆ Fish become restless. ◆ Parasites penetrate into the scale and attach to the nostril. ◆ Clearly visible to the naked eye and attachment site shows ulceration.
3	White Spot Disease (Ich) (Causative agent: *Ichyophthirius multifilis*)	◆ Presence of small whitish cysts on the skin, gills and fins. ◆ Hyperplasia of epidermal cells around the site of infection. ◆ Reddish color of gills fades away. ◆ Fish become very weak and emaciated.

4	Fin Rot & Tail Rot (Causative agent: *Pseudomonas fluorescens*)	◆ Whitening on the outer margin of the fin that progresses towards the base. ◆ Lesions develop on the outer margin of the fin. ◆ Fin margin becomes frayed due to disintegration of the soft rays.
5	Hemorrhagic Septicaemia (Causative agent: *Viral hemorrhagic septicemia virus*)	◆ Red hemorrhagic spots on the body surface. ◆ Dropsy, glisters, abscesses and scale protrusion. ◆ Oozing of blood through base of the anal fin.
6	Dropsy (Causative agent: *Aeromonas bacteria*)	◆ Accumulation of fluid in epidermis and body cavity leading to bulging of belly. ◆ Scales protrude out from pockets. ◆ Prevailing severe anemic condition.
7	Epizootic Ulcerative Syndrome (EUS) (Causative agent:*Aphanomyces invadans*)	◆ Small hemorrhagic spots are formed over the body which ultimately turns into big ulcers the size of a coin. ◆ Sloughing of scales and degeneration of epidermal tissue.

4.1.12 Average production in last year

Since the farmers harvest their stocks depending upon the stocking density, size of the fish and situation of the market, it was proven that 69% of the farmers have an average production of less than 100 kgs while 31% farmers have an average production of 100 kgs and above. It indicates that, due to lack of enough training, farmers were not aware of appropriate inputs like rate of stocking density, liming, manuring, feeding etc. which results in nadir production.

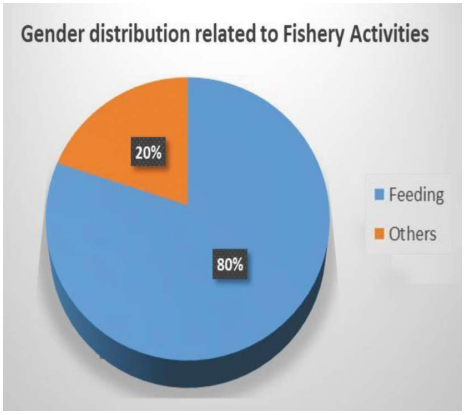


Fig. 4.1.12

4.1.13 Approximate annual income from fish farming activities

The study showed as depicted in figure 4.13 ,40% of the farmers have an annual income of Rs. 10000-20000, 35% of the farmers have an annual income of Rs. 20000-40000 and 25% of the farmers have an annual income of more than Rs. 50000. It was calculated that the average annual income of maximum farmers is Rs. 37,200 which is due to the lack of adopting scientific PoP and there is a need to increase the current income through appropriate farming practices.

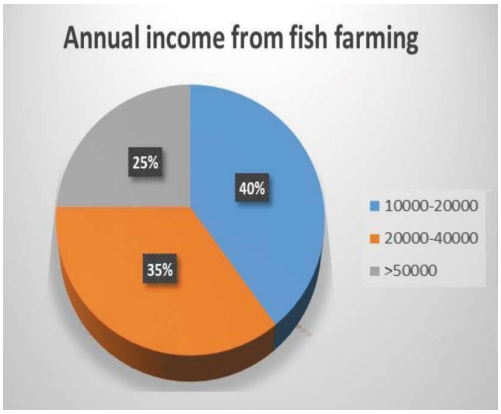


Fig. 4.1.13

4.2 Means of financing input cost of fish farming

4.2.1 Sources of fish seed

Quality fish seed is one of the most important factors in successful fish farming practice. In the area of survey, it was found that 75% farmers purchased seeds from the local vendor/farmer, 1% of the farmers purchased fish seed from outside the state, 17 % purchased from local hatchery and 7% collected the seeds from the natural water source. It indicated that instead of purchasing seeds from outside, increased seed production is required through construction of nursery ponds within the cluster.

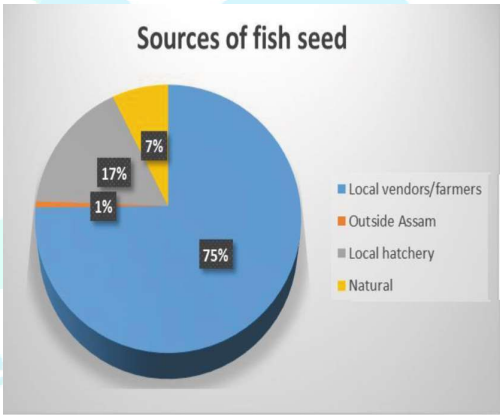


Fig. 4.2.1

4.2.2 Types of feed and Cost per kilogram of supplementary feed

Feeding the fishes with a proper diet will lead to good growth and development. This will lead to having a good market value. For getting good growth, 45% of the farmers used supplementary feed like rice bran, oil cake, rice polish etc., 25% farmers fed processed feed, 20% farmers fed both processed and supplementary feed and 10% farmers fed natural feed for their

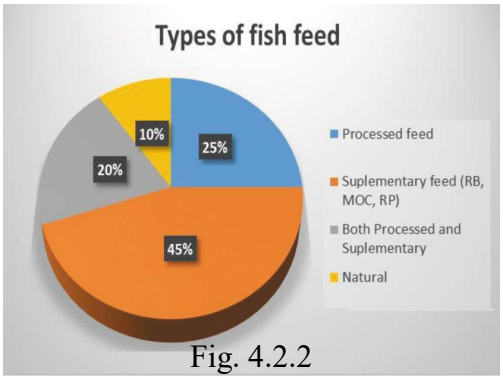


Fig. 4.2.2

profit in the market. It indicated that awareness among the farmers about proper feeding is needed. The prices of the above said feeds are as follows:

Fish feed	Price (Rs/Kg)
Processed feed	90
Rice Bran	15
Mustard Oil Cake	29

4.3 Fish harvesting gears and one-time cost for netting.

Depending upon the source of water, different types of harvesting gears are used for the operation of harvesting. It was found that 52% farmers used cast net for harvesting, 8% farmers used chinese dip net, 4% farmers used gill net and 36% farmers used traps. From the survey it was also estimated that the one-time cost for netting is Rs. 1500-2000. It showed that all farmers used indigenous gear for harvesting. During the study an important factor came to light that the farmers avoided destructive fishing in natural water bodies which aided towards protecting the natural breeding ground of fishes.

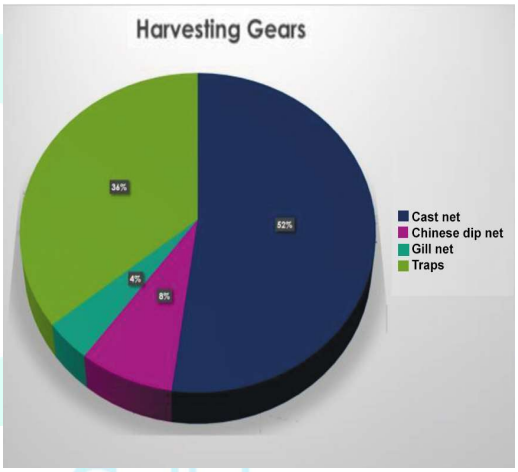


Fig. 4.3

4.4 Price of Fish

The price of the fish, especially IMC and exotic carp, varies from time to time in the market depending upon various social factors. When a farmer sells his harvested fish directly from his own pond, he earns within a range of Rs 150-180 but sometimes the price goes up to Rs. 160-250. In case of retail price, on an average a farmer earns Rs. 200-250 and in festive season it may go upto Rs. 260- 350. It indicated that maximum farmers did not get the proper price due to lack of proper marketing channels.

4.5 Marketing Channel

The marketing channel is an important factor in gaining profit in this business. 97% of the farmers sell their fish in the local fish market whereas 3% of the farmers sell their harvested fish in fish mela. It was also found that most of the farmers sell their fish through middlemen. It reflected that minimization of middlemen in the market is necessary and the farmers need to be directly facilitated access to proper markets.

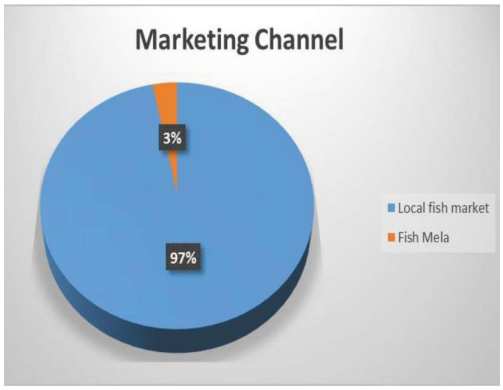


Fig. 4.5

Chapter 5 : Support from Organizations

5.1 Loans from Financial Institutions

Since most of the farmers are marginal farmers, taking financial assistance from a reputed organization becomes a vital support in their business. It was found after the survey that 10% of the farmers got financial assistance from Assam State Rural Livelihood Mission, another 10% from the Fishery state department, 3 % from NABARD, 2% from NGO.s, 5 % from others and rest 70% farmers do not take any kind of financial assistance. It may be stated that more knowledge has to be implemented among the farmers because many of them are unaware of such kind of financial support and henceforth their businesses face crisis and ultimately loss.

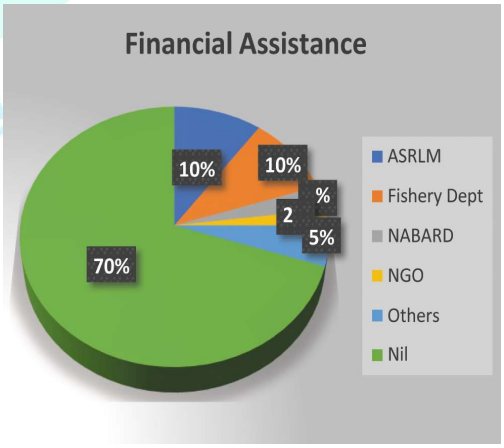


Fig. 5.1

Findings from the PRA exercise

Tools	Purpose	Observation
Transects walk and resource mapping	◆ To understand the overall perspective of the availability of existing resources and history of the area. ◆ To understand the status of utilization of available natural resources like wetlands, swamps etc.	48 villages were covered under this exercise. It was found that about 10 „beels' (wetlands) with the approximated areas of 80 ha. It was also observed that there is a huge scope of aqua-tourism in the studied area. While performing the activities, the participants also mentioned the availability of small fish like- Molla, Puthi etc. in monsoon season in natural water bodies. Few participants also showed the ornamental fishes, but it seems that they are not aware of the values of ornamental fish. It was also observed that ASRLM Block office, KVK, District Fishery Development office are situated in the study area.
Market Mapping	◆ To understand the local market and current market scenario	It was found that the maximum quantity of fish goes to the markets of Jagirod and Guwahati through middlemen. Also, fish were sold in the local markets of Bhakatgaon and Jhargaon.
Venn diagram	◆ To identification of problems and possible solutions by the community	The majority of the participants expressed that they are not aware of the scientific way of fish farming, which leads to under-production in the cultivable area.

Tools	Purpose	Observation
Seasonal calendar of fish farming	◆ To get a clear	It was found that the maximum number of picture on their existing pattern and monthly activities under fish farming farmers did not follow the seasonal calendar of fish farming which results in less fish production and this affects their annual income. It was also expressed by the participants that they had a habit of eating homemade smoked fish, generally made during the rainy season, when small fishes come with flash floods.
Daily activity calendar related to fish farming.	◆ To get a clear picture on daily activities of farmers related to fishery	Very few farmers followed the daily activities needed in rearing fishes in ponds like- feeding, monitoring etc. Out of 500 participants, 25 expressed that they follow the daily activities
Existence and importance of middleman	◆ To understand the perspective of the local people on the importance of middleman	The majority of the farmers sell their fish to the local market through middlemen. It highlights the need to reduce the number of middlemen and connect farmers directly to appropriate fish markets.

Chapter 6 : Constraints or Challenges during the Baseline Study

a. Since the study was carried out in the post second wave of Covid-19, the mobility of the interviewers (CRP) and acceptance of the respondents. household to allow an outsider to conduct the interview caused a great constraint.

b. During the study, it was revealed by the localities that many people including government officials had promised to provide them with services from various schemes but they were not provided with any govt. support due to which they were not willing to share their details.

Chapter 7 : Recommendations

Assam with its vast fishery resources in the form of rivers, streams, lakes, ponds and tanks, beels, marshy lands offer tremendous scope for fisheries. Apart from sustaining a large number of commercially important food fishes it also supports wide varieties of ornamental fishes. In Spite of having such a huge potential and promising avenues in fisheries, the state of Assam is not able to utilize the natural water bodies to meet the demand of the state. This study tried to understand the underlying reasons for the same and came up with certain recommendations.

Lack of scientific fish rearing: The study showed that approximately 40% followed the practices of scientific fish rearing. Training and constant supporting mechanisms through departments, NGOs can boost the production and income of the farmers.

Quality Distribution of fish seed: Fish seed is the critical input in aquaculture which determines productivity or the outcome. Most of the ponds in the study area are left un-stocked with fish seed by the farmers because of not getting the same at the right season and time. During PRA it was found that most of the farmers purchased fish seed from local vendors without prior observation of their quality. Since seed is not readily available locally, farmers find it difficult to manage it from outside because of high transportation cost, uncertainty in terms of breed and quality.

Awareness creation on ornamental fish, development of aqua-tourism and access to the potential market of the ornamental fish: Collection, propagation and marketing of ornamental fishes are potential ventures. State.s open water resources are repositories of ornamental fishes. The breeding and rearing of ornamental fish doesn.t require much space

and can be undertaken even in small areas as backyard activity. The focus in this area might be on development of technical and entrepreneurial skill among women and unemployed youth to take ornamental fish culture on a business model encompassing supplementary activities such as manufacturing of Aquaria, Packaging and marketing of aquarium fish and aquarium accessories and providing periodical maintenance services to aquarists.

Strengthen the skills of the fish farmers based on the current practices: Most of the people culture IMC in their ponds but the practices are not scientific. It was also found that the natural resources are not utilized properly by the people as well as the state fishery department. The people of this locality are unaware of any post harvesting technologies and other recent technologies of the aquaculture sector. Due to the lack of knowledge in fishery management, the fishes are encountered with disease in the study area which remains untreated for several days. One of the main causes of underdevelopment of this sector is that only a few farmers get the facility to attend any departmental training for fish farming. And due to such lack of knowledge, the quality of the fish seed deteriorates resulting in low production rate. So, the above said points have to be considered in order to develop the sector to a higher level for the betterment of the villagers.

Scope of enterprise development through pond fisheries: In the study area, it was found that there were 2037 number of ponds amongst 2000 fish farmers with the sizes varying from less than 1 bigha to more than 10 bighas. These small and marginalized farmers are dependent on quality inputs like seed and feed. Also, they are dependent on the middleman who buys their products at unfair and undervalued prices. There is a high scope of developing their institution in the selected pockets/areas, wherein at least 500 pond fish farmers are available in the same locality to minimize their input costs and can sell their products through institutional channels. There is also a high scope of developing their institute to minimize their input cost, so that the farmers can negotiate. It seems that most of the farmers have a pond size of less than 1 bigha. They should be included under KCC loan keeping certain clauses as per the banking system.

Awareness creation on fishery schemes: It was found that the farmers were not aware of some fishery schemes like insurance of seedlings and farmers, one time assistance schemes, PMMSY, CMS-GUY. There is a need for the involvement of Gram Panchayats and their representatives to disseminate information on the same. NGOs can also be involved for the same, if the existing mechanism is not sufficient to spread the messages.

Involvement of the students of Fishery college with the farmers: To facilitate the fish farmers, the students of fishery college can be deployed for 2 months in the ratio of 5:1

MGNREGA for construction and cleaning of ponds: The fund of MGNREGA can be utilized for the construction of new ponds and cleaning of existing ponds in fishery-dominated areas.

Registration of household-level pond fisheries: With complete address along with water under Gram Panchayat should be compulsory for the benefits of fish farmers, which in turn will be beneficial for the stakeholder organizations

Establishment of Integrated fish farming model in each of the Gram Panchayats in the district like Morigaon: While doing a transect walk around 48 villages of the study area, it was seen that very few farmers practiced integrated fish farming. Although there is scope in many households of the study area. Such integrated models can be demonstrated in the Gram Panchayat through scientific approach by bringing different relevant stakeholders into one platform so that the interested can replicate the same as per their potential.

Utilization of existing wetland, marshy and swampy lands for scientific fish production: Morigaon is full of wetlands and other natural water bodies. Wetlands are natural breeding grounds for many migratory fish which give immense natural stock and provide livelihood to nearby people. So, there needs to be proper management and utilization of existing wetlands in the study area through community enterprise or departmental intervention. Communities can be empowered for proper utilization of such water bodies.

Engagement in Post-Harvest Technology like pickle preparation, fish finger, fish cutlet etc: Current study also revealed that sun drying of fish, fermentation of fish etc by the ST people is an aged old practice. But, it is not prepared in a hygienic manner. Hence, it.s value even in the local market is low. There is scope to utilize their existing strength for making market driven products by applying S&T intervention.

Enhancement of income of small and marginal fish farmers through their pond fisheries: As per the norms of the fishery department of Government of Assam, the average annual fish production from one hectare should be 3500 Kg, and the approximate market price is 6,30,000 INR (six lakh thirty thousand only, calculated 180 INR/Kg). In the study area, it was only 1550 KG of production per hectare, and the annual average income of the farmer was only 37,200 INR. There is a high scope of increasing the production level of the farmers by imparting training and constant facilitation.

Convergence among various stakeholders: The study found that almost all the respondents were members of Assam State Rural Livelihood Mission. Krishi Vigyan Kendra also has a good presence in the study area. Hence, there is a high scope of convergence among the stakeholder organizations to bring greater impact in the lives of fish rearing people.

Chapter 8 : List of References

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