



**A LIVELIHOOD ASSESSMENT OF SHRIMP POST
LARVAE COLLECTORS AT REZU KHAL, COX'S
BAZAR COAST, BANGLADESH**

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Roll No.: 0120/21

Registration No.: 873

Session: 2020-2021

**A thesis submitted in the partial fulfillment of the requirements for the degree of
Master of Science in Fisheries Resource Management**

Department of Fisheries Resource Management

Faculty of Fisheries

Chattogram Veterinary and Animal Sciences University

Chattogram-4225, Bangladesh

JUNE, 2022

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The Author

June, 2022

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This is to certify that we have examined the above Master's thesis and have found that is complete and satisfactory in all respects, and that all revisions required by the thesis examination committee have been made

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ABSTRACT

A study on the livelihood strategy of shrimp post larvae collectors was undertaken at Ukhiya upazila in Cox'sbazar district. The study goals included determining the socioeconomic situation and issues related to post larvae collectors alternative method of subsistence as well as the status of their current means of subsistence. A survey was carried out in the Rezu khal of the Ukhiya upazila through an open-ended and closed-ended questionnaire from February to September 2021. The majority of families in the research region (52 percent) consisted of five to six people, with a maximum age range of 31 to 40 years. In the group of people who collected the post larvae, 78% of them were men and 22% were women. Approximately 32% of families belonging to larvae collectors were extended, whereas 68% of families were nuclear. A small percentage of the larval collectors could only sign (22 percent), while the majority (64 percent) were illiterate. About 32% of collectors resided in homes constructed of bamboo. The peak period for capturing PL was March to May. The larval catchers typically operate for 10-15 minutes every haul and go out twice a day, often from 4 am to 10 am and 3 pm to 5 pm. The majority of PL collectors have been at it for at least ten years. About 8% family had a highest income of Tk.15000-20000 and only 2% family had an income of Tk.20000 above. About 80% of the collectors used fishing as a secondary source of income during the off-season. The study will help to identify livelihood status of shrimp post larvae collectors and the alternative works of PL collectors during the off-season.

Keywords: Livelihood status, PL collectors, Alternative livelihood, Rezu Khal, Ukhiya Upazila.

APPENDICES

Name of the area:

Date:

Name of Respondent:

A. Human capital

1. Age:	2. Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female
----------------	--

3. Religion: <input type="checkbox"/> Muslim <input type="checkbox"/> Hindu <input type="checkbox"/> Buddhist <input type="checkbox"/> Christian

4. Education: <input type="checkbox"/> Illiterate <input type="checkbox"/> Primary <input type="checkbox"/> Literate (Class:) <input type="checkbox"/> Can sign only

5. Family type: <input type="checkbox"/> Nuclear <input type="checkbox"/> Joint
--

6. Number of family member:

7. Number of earners in the family:
--

8. Family income per month:

9. Role of women in your family: <input type="checkbox"/> House wife <input type="checkbox"/> Maid <input type="checkbox"/> PL collection <input type="checkbox"/> Labor <input type="checkbox"/> other

If she works outside, how long she work:	Type of work	Time/Day	Income/Month
	PL collection		
	Maid		
	Labor		
	Other		

10. Role of children in your family: <input type="checkbox"/> Student <input type="checkbox"/> PL collector <input type="checkbox"/> Labor <input type="checkbox"/> Other work <input type="checkbox"/> Do nothing
--

If work outside, income from this work:	Type of work	Time/Day	Income/Month
	PL collection		
	Labor		
	Other work		

11. PL collecting experience: _____ years.

B.Physical capital

12. Housing condition: Bamboo/straw made Tinshed
 Semi-pucca Pucca

13. Amount of land Area (decimal)z	Type	Own	Khas	Leased-in	Total
	House area				
	Agricultural				
	Pond				
	Other				

14. Household power source: Electricity Kerosene lamp
 Solar power other

15. Cooking energy: Wood/straw Oil Natural gas
 Cylinder gas Dry cow dung

16. Transportation facility: Un-metal led road Brick made road
 Metal led road

17. Drinking water source: Own tubewell Shared tubewell
 Neighbor Govt./NGO's tube well Pond water River/Canal water

18. Sanitary latrine: Modern latrine (with water seal) Slab latrine (without water seal) Pit latrine Kancha Other's latrine

19. Medical facilities: Upazila health complex
 Pharmacy Other Village doctor

20. Household distance from facilitate hospital:

21. Do you have any PL collecting craft?

If yes,	Type	Cost
	Own	
	Rent/ day	

22. Do you have any PL collecting gear? <input type="checkbox"/> Yes <input type="checkbox"/> No						
If yes,	Types	Length(m)	Width(m)	Mesh size (mm)	Cost(tk)	If no, rent/day

C.Natural Capital

23. Season of collection		Month											
		J	F	M	A	M	J	J	A	S	O	N	D
	PL												
	Hilsha												
	Other												

24. Time of PL collection/day: <input type="checkbox"/> Once <input type="checkbox"/> Twice <input type="checkbox"/> Thrice <input type="checkbox"/> More
--

25. Average operation time/haul:

26.PL collection per day:

Name of shift	Hauling number	No. of shrimp PL/haul	No. of other PL/haul	Total no. of shrimp PL	Total no. of other PL
Morning (6.00am-2.00pm)					
Evening (2.00pm-10.00pm)					
Night (10.00pm-6.00am)					
Total/day					

27. Price of collected PL

Types of PL	Price/PL	Destination
Shrimp PL		<input type="checkbox"/> Depot <input type="checkbox"/> Discarded

Other PL (Name)		<input type="checkbox"/> Depot <input type="checkbox"/> Discarded
----------------------------	--	---

D. Financial Capital

28. Monthly income:	29. Monthly income from PL:
----------------------------	------------------------------------

30. Expenditure/month	Food	Other (Cloth, medicine, transportation)
	Tk.	Tk.
	Total:	

31. Amount of savings/month:	Tk.
-------------------------------------	-----

32. Types of livestock you have	Name	Number
	Cow	
	Goat	
	Chicken	
	Duck	
	Other	

33. Do you have alternative livelihood beside PL collection?		
<input type="checkbox"/> Yes <input type="checkbox"/> No		
If yes, what is that?	Name	Income/month
	Fishing	
	Agriculture	
	Day Labor	
	Other	

34. If you are a fulltime fisherman besides collecting PL, in banning period, what do you do?	Name	Income/month
	Agriculture	
	Day labor	
	Migration	
	Other	
<input type="checkbox"/> Do nothing		

35. Do you take any financial loan? <input type="checkbox"/> Yes <input type="checkbox"/> No					
If yes, what's the source of taking loan?	Bank	Mohajon	Dadon	NGO	Other
Amount of interest of the loan (%) in month					

36. Have you receive any govt. assistance in fishing work? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If "Yes" what types of help they do?	Name
	Amount

E.Social capital

37. From whom you learn PL collection? <input type="checkbox"/> Family <input type="checkbox"/> Neighbor <input type="checkbox"/> NGO <input type="checkbox"/> None

38. Any types of help from NGOs? <input type="checkbox"/> Yes <input type="checkbox"/> NO
If yes, what kinds of help they do? <input type="checkbox"/> Give loan <input type="checkbox"/> Give training <input type="checkbox"/> Provide child education <input type="checkbox"/> Supply drinking water <input type="checkbox"/> Help in sanitation <input type="checkbox"/> Infrastructure development

39. Are you a member of Co-operative society? <input type="checkbox"/> Worker Cooperatives <input type="checkbox"/> Financial Cooperatives <input type="checkbox"/> Not a member
--

40. Major Constrains of your life:

Chapter 1

INTRODUCTION

Bangladesh is located between 20° 34' and 26° 38' north latitude and 88° 01' and 92° 41' east longitude. The country is verged on the west, north, and northeast by India; on the southeast by Myanmar; and on the south by the Bay of Bengal. The country's entire bounds is 147,570 square kilometers with 7% of it permanently submerged (BBS, 2007a; CIA, 2008). The population is 153 million people with a quarter of them living in cities (CIA, 2008).

It is one of the Bay of Bengal's peripheral coastal countries, with a prolific tidal inundated coastline bounds excellent for shrimp farming. In Bangladesh, coastal shrimp aquaculture is mostly composed of 2 main areas: the southwest (Khulna, Satkhira, and Bagherhat) and the southeast (Cox's Bazar). On an average, 2 billion shrimp fry are harvested annually from nature, according to estimates (Banks, 2003). More than 90% of the total PL in freshwater prawns (*M. rosenbergii*) comes from natural sources, while more than 50% of the total PL in black tiger shrimp (*P. monodon*) comes from wild sources (Banks, 2003).

At present production of hatchery can supply 20% of all out interest, the remainder of the post larvae come from wild sources (Muir, 2003; Khondaker, 2007). Shrimp ranchers begin to stock in gher when the post larvae become accessible in nature, regularly in April, and keep loading until June (Ahmed, 2001).

Shrimp Larvae Harvesting in the Coastal Belt of Bangladesh:

The catch of wild post hatchlings to broth in aquaculture activities is a basic purpose in shrimp cultivating (Paez-osuna, 2001). Despite the fact that incubation facility delivered post hatchlings are currently accessible in numerous nations in Asia and Latin America, crazy fry actually gives the critical wellspring of seed in numerous areas (World Bank, 2002). Shrimp cultivation in Bangladesh basically relies upon wild source post hatchlings (PL) both for goliath new water prawn (*Macrobrachium rosenbergii*) and dark tiger shrimp (*Penaeus monodon*). It has been assessed that roughly 2 billion shrimp fry are gathered every year from nature (Banks, 2003). On account of new water prawn (*M. rosenbergii*) over 90% of all PL is gotten from normal creation and with regard to dark tiger shrimp (*P. monodon*), over half is gotten from

nature (Banks, 2003). Shrimp post larvae assortment has offered work chance for large number of beach front baseless and jobless individuals (Angell, 1990; Islam and Wahab, 2005). Worldwide, there are exceeding 1 million individuals connected for only part of the usual working day or week premise gathering wild source post larvae (World Bank, 2002). A USAID (2006) concentrated on assessing that around 0.42 million gatherers were associated with shrimp PL assortment by the estuaries and edge of Bangladesh. Then again, wild post larvae collecting has expected a famous picture for being naturally damaging (Primavera, 1998; Islam et al., 1999).

Livelihood assessment:

The livelihood assessment focused on the local area concerning assets, gatherings, designs and establishments and fosters a sound comprehension of livelihood resources and their openness as seen by the local area.

Because of appeal, low venture, and beneficial business, looking for hatchlings has turned into a significant type of revenue for some individuals. Today, a huge number of landless poor and jobless are straight forwardly or in a round about way drawn in with looking for shrimp hatchlings (Islam et al., 1999). An expected 400,000 individuals, large numbers of them women and children, are related with shrimp post larvae looking for their vocations in the waterfront area of Bangladesh (USAID, 2006). A couple of months of the year by the getting of post larvae they can contribute a significant piece of their yearly pay (Ahmed, 2005; Hoq, 2007). Fry collectors are the most minimized individuals in waterfront networks in view of remaining socially, monetarily, and instructively impeded, and coming up short on their monetary assets.

In September 2000, in view of aimless fishing of post larvae with elevated degrees of by-catch (for example non-target species got unexpectedly) the Department of Fisheries (DOF) forced a prohibition on wild post larvae assortment (DOF, 2002). As a result of the restricted accessibility of hatchery fry, this ban has not been completely upheld which forces a requirement on the volume and worth of commodities of prawn. Moreover, the absence of elective vocations for destitute individuals took part in post larvae getting is one of the principal imperatives on carrying out the ban (Alam et al., 2005). Yet, a limitation is kept up with by the power to limit the deficiency of biodiversity.

Significance of the study:

From the conservative and topographical perspective, the Rezu khal is a vital stream of Ukhiya under Cox'sbazar area. It was found to have incredible commitment as nursery grounds, giving plentiful food and relative wellbeing to numerous business significant species. Shrimp seed assortment from Rezu khal has offered work chances for many seaside individuals. Yet, data on the pl collection of the neighboring individuals is inadequate. There is no huge report on the occupation examination of neighborhood networks who are connected with the assortment of Shrimp post hatchlings from the Rezu khal estuary.

A number of intensive examination on coastal fisheries, fry gathering and biological systems have been guided recently in different nations (Graaf and Xuan, 1998; Turner et al., 1999; Hoq, 2000; Hossain, 2001). The peak time of shrimp post larvae collecting is the middle of March- May in Cox's Bazar. Among them many individuals in the contiguous coast eroded their positions because of occasional changes. Individuals who eroded their positions undergo no elective functional choice. Because of this, they get post larvae in the ocean. This study will help comprehensively to comprehend shrimp post larvae fishing and its suggestions for the livelihood of the seaside poor. It likewise investigates vocation limitations looked by the post larvae fishers, with business results in the wake of prohibiting the fishing procedure.

Objectives of the study:

- To assess livelihood status of shrimp post larvae collectors.
- To know the major social and economic constraints of their life.
- To know the alternative works of PL collectors during the off-season.

Chapter 2

REVIEW OF LITERATURE

Recently, several thorough evaluations of coastal capture fisheries, fry collecting, and biological systems have been conducted in various countries (Graaf and Xuan, 1998; Turner et al., 1999; Hoq, 2000; Hossain, 2001). However, very few studies have focused on the instances of livelihood of the fishermen and fry gatherers (Hoq et al., 1995).

The Socioeconomic Status of Shrimp (*Penaeus monodon*) Post-Larvae (PL) Collectors in Cox's Bazar with emphasis on violation on wild PL collection was studied by Mostafa et al. in 2007. Around 1000 people live in the adjacent area, distributed among 130–140 households. The majority of the fry authorities did not own any land or homes. On public (khas) property along the coast, they construct homes, which are mostly made of clay, bamboo, or polythene. It was discovered that 48.3 percent of fry authority lack latrines but 30 percent spend 5000–6000 taka each month. In addition, it was discovered that 43.3 percent of respondents had two suppers per day. Shrimp post-hatchling gathering, little skipping, day labor, hilsha fishing, fishing employment, fish drying, salt creation, and producing are the main jobs in this region.

On the Socio Economic Status of Fry Collectors in the Sundarban Region, Islam et al., (2005) published a study. The average family size in the study area was five members per family. The 20–30 age range was the most severe. Among the fry collectors, 66% of them were men and 34% were women. Among them, 62% were Muslims and 38% were Hindus. In the study area, over 78% of absolute fry authorities lack access to land. Female schooling was at a 28 percent proficiency rate, while male proficiency was at a 72 percent rate. The great majority of them can sign, in a sense. Around 63 percent of the gatherers lived in mud-walled homes with golpata sheds. Approximately 73% of households had two employees, whereas 68% have just one family. The best fry selection was available from March through May. Push net and set pack net are mostly used for collecting fry. For around 6 to 8 hours each morning and afternoon, they harvest fry. In prime season, men gather 150–200 fry pieces each day, but women only gather 40–60 fry bits. Per thousand golda fries, prices range from 800-3500 Tk. From March through May, prices are higher. Fishing was a voluntary source of income for almost 52% of gatherers during the off-season. Maintainable agribusiness, broiler

farming, chicken farming, planned fish development, cow and goat farming, etc. are their finest sources of elective income.

The livelihood options of tiger shrimp post larvae collectors in Bangladesh's Cox's Bazar were studied by Hasan et al., 2007. There were around 1000 individuals and 130 to 140 households living nearby. The majority of fry collectors do not own property or a home. They construct houses on government (khas) land along the seaside, using mostly earthen/bamboo or polythene materials. It was discovered that 30% of fry collectors have a monthly salary of 5000-6000 taka and 48.3% have no toilet. In addition, 43.3 percent of respondents only ate two meals per day. The main industries in this community are shrimp post larvae collection, small trading, day labor, hilsha fishing, fishing labor, fish drying, salt production, and farming.

Paul and Christian (2013) work on Organic shrimp aquaculture for sustainable household livelihoods in Bangladesh. Shrimp farming expertise and gher size were observed to influence the income from organic shrimp aquaculture, they claimed. All of the farmers in this area were very vulnerable to cyclones, floods, and illnesses, as well as salty water pollution from untreated water sources, market and price instability, all of which limit economic development. The study suggests that through increasing farmers' capacity to cope with unpredictable events, new possibilities for molding livelihoods can be accomplished. Shrimp farming done organically had increased farmers' assets and decreased their susceptibility, enabling them to maintain their way of life.

Sajeeb (2021) reported that about 93% fishermen were found as married. There are several occupations represented, such as fisherman, shopkeepers, fish sellers, and drivers. The majority of them had a primary educational background, while some had various levels of higher education. Most of the villagers had their own nets (72%), and boats (60%). The literacy rate in the country was at 63 percent. Most of the house was constructed of straw and tin bamboo. The poorest fishermen live in houses constructed of plastic. Tubes-well was used by people for home tasks. There were no training facilities available to the people from any agencies. In terms of health and sanitation, approximately 79 percent of the fishermen were affected by various ailments such as malarial fever, dysentery, jaundice, malnutrition, stomach, diarrhea, and fever, while the remaining 21% were unaffected. They were unable to consult with doctors regarding

their health. Villagers were unable to meet their nutritional requirements. During the off-season, poor fishermen borrow money from money lenders at exorbitant interest rates. When fishing was scarce, it makes ends meet by working as a day laborer. Taking out a loan from "mohajon" (the local name) and performing other tasks. Alternative sources of income should be made available to them. In addition, suitable training facilities for their livelihood should be provided.

According to Sathi et al., (2019) the majority of fishermen were middle-aged (31-40), 53 percent were uneducated, and 40% lived in tin-shed dwellings. According to the survey, 20% of the fishermen used kacha hygienic and 66 percent sought treatment from local doctors, and 40 percent of the fisherman's monthly income was made up to ten thousand and five hundred Taka. The fishing community of the Turag River had a precarious economic situation. Concerned authorities should take steps to help the Turag River's fishing community expand and improve.

Minar (2012) worked on the Barisal town's livelihood status. The majority of the fishermen (56.00 percent) was between the ages of 31 and 40, with 88 percent of them being Muslims. The average family size in the fishing community was 5-6 individuals, with the medium family being the most common (70 percent) among the fishermen (84.00 percent). Fishing was the principal occupation of almost 80% of the fishermen, with agricultural and everyday labor activities accounting for the remaining 10%. About 12% of the fishermen could only write their names, while the remaining 80%, 8%, and 0% of the fishermen were illiterate at the primary, secondary, and tertiary levels, respectively. About 70% of the fishermen received health care from village doctors, 24% from the upazila health complex, and 6% from MBBS doctors. Approximately 74% of the fishermen utilized kacha sanitary, 10% used semi-pucca sanitary, and 16% did not have access to sanitary facilities. Approximately 14% of fisherman used their own tube well for drinking water, 62 % used a communal tube well, and the final 24 % utilized a neighbor's tube well.

In Bangladesh's south west region, the majority of the involved fishermen (45 percent) was between the ages of 16 and 30, and the majority of them were Hindu (62 percent). Around 75% of the fishing population was illiterate, while only 24% was literate. Furthermore, it was reported that 78 percent of the fishermen were treated by village doctors (who have little medical knowledge and are mostly quacks), while only 20% of

the respondents were concerned with doctors from the upazila health complex, and the residual 2% received health care from MBBS doctors outside the upazila. It was discovered that 61 percent of the houses were Kacha (mud and straw construction), 37 percent were Semi-pucca (tin shed construction), and only 2% were pucca (constructed of bricks) about 23% of fishermen had access to electricity, while the remaining 77% did not. In some places, the government did not supply them with Vulnerable Group Feeding cards. The key restrictions were a lack of basic education, illiteracy, and a lack of government backing (Tarafdar et al., 2015).

Chapter 3

MATERIALS AND METHODS

The goal of the study was to be accomplished by the research. This chapter covers methodology and shows how to choose research instruments, data gathering techniques, research areas, target populations, and analytical techniques that were employed in the study. The research was grounded in a field survey.

This chapter's goal was to provide a thorough explanation of the methods used for the current investigation. The investigation was a routine, comprehensive field research. Below is a description of the approach used and the materials used for the examination.

Study area:

Rezu khal is a very important PL collection zone at Ukhiya in Cox'sbazar district, located in between 21°08' and 21°21' north latitudes and in between 92°03' and 92°12' east longitudes. The community of PL collectors lives in the Sonarpara village, which is close to the Rezu Khal (Fig 3.1).

Location of the study area:

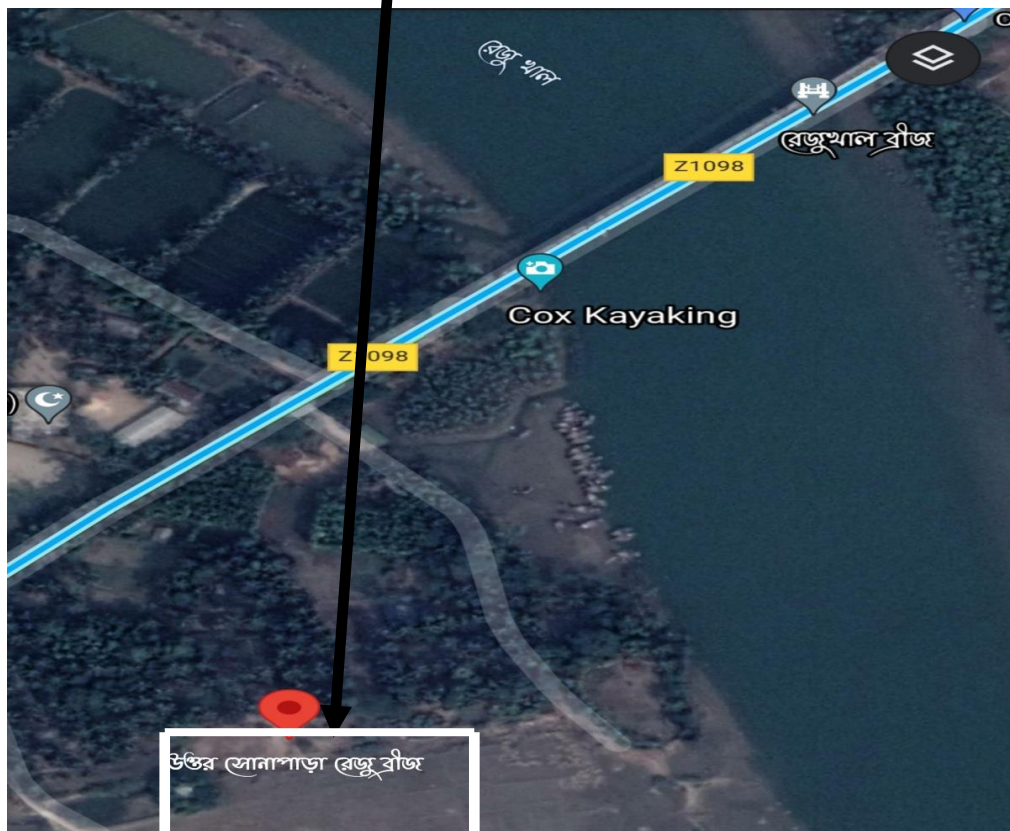
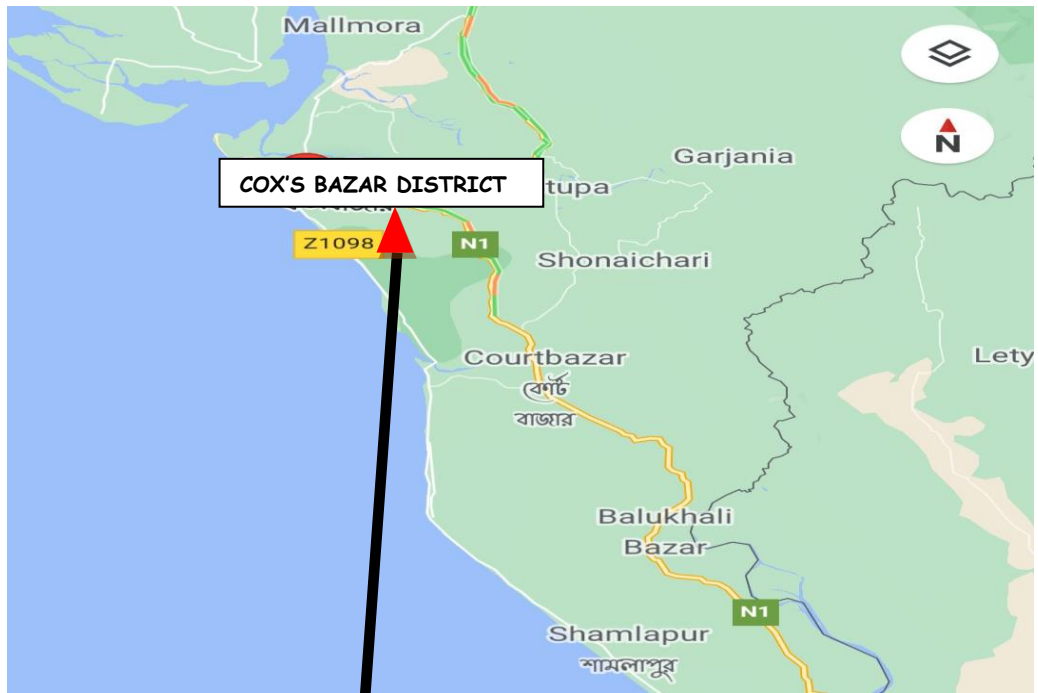


Fig 3.1: Location of the study area

Study period:

The study was conducted for eight months. Data was collected from 50 post larvae collectors during the period of February to September, 2021.

Data collection method:

The study was based on a survey, and data were gathered directly from shrimp post larvae collectors. The information was gathered with a focus on understanding the livelihood of shrimp post larvae collectors and the alternative jobs that PL collectors performed during the off-season.

Primary data collection:

Both qualitative and quantitative techniques was used to gather primary data. Primary data was gathered by direct interview using a standardized questionnaire, observation, interview schedule, and focus group discussions. According on the type of material, the questions had either an open-ended or a closed-ended format to allow respondents to express oneself openly (Fig 3.2).



Fig 3.2: Personal interview

In accordance with this, Focus Group Discussions (FGD) and questionnaire interviews with the pertinent PL collectors was conducted (Fig 3.3).



Fig 3.3: Group discussion

Data processing and analysis:

Before the actual tabulation, the acquired data were thoroughly examined and summarized. Due to the respondent's familiarity with these units, some of the data were gathered in local units. Graphs and tables were represented in Microsoft excel 2013. The Microsoft Excel 2013 was used to plots graphs for dissemination of the results.

The whole study procedure is given below through a flowchart (Fig 3.4).

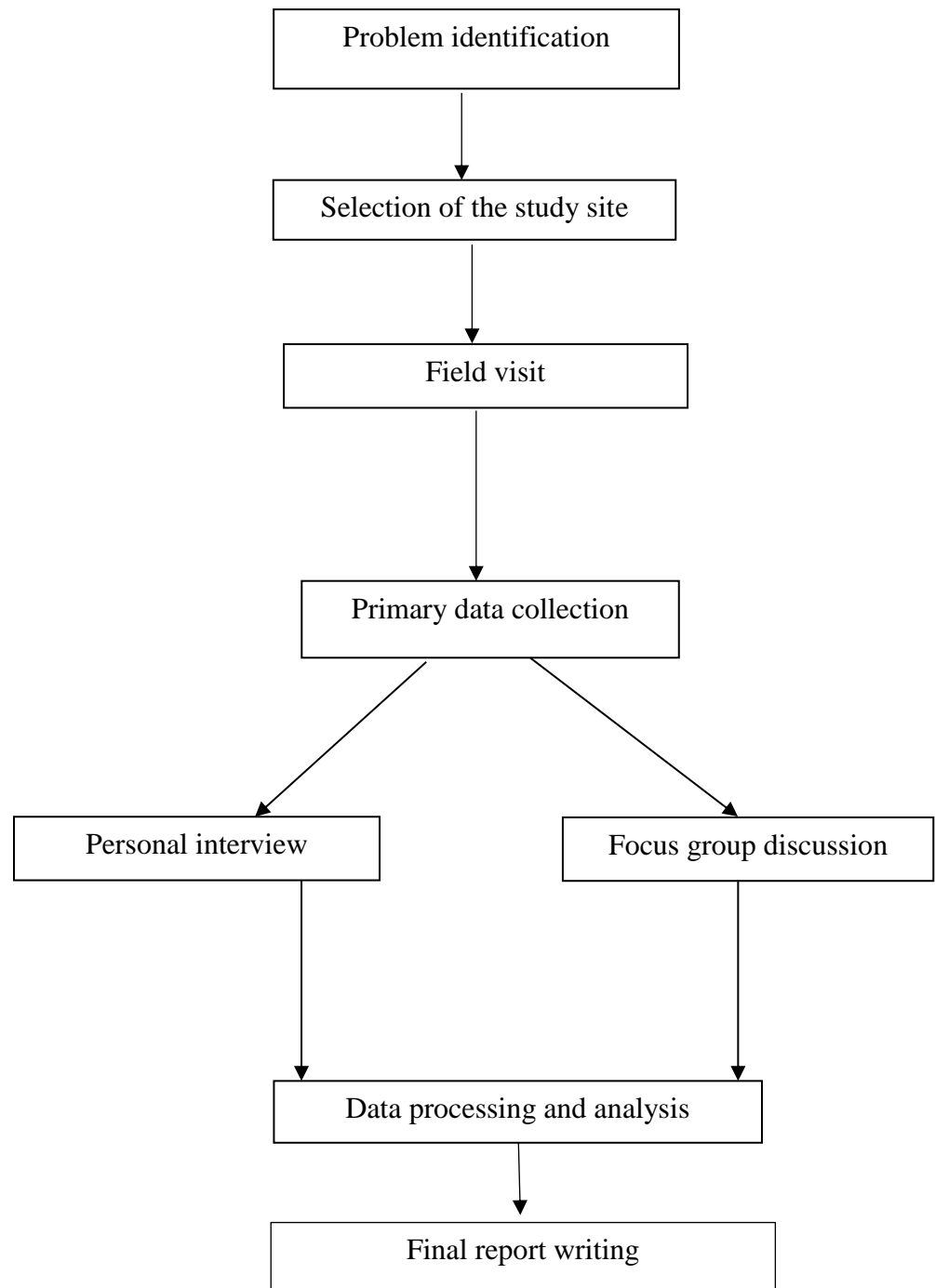


Fig 3.4: Flow chart of study procedure

Chapter 4

RESULTS

Livelihood status of the shrimp post larvae collectors at Rezu Khal: 50 shrimp post larvae collectors were all questioned about various parts of their daily lives. The following parameters were subjected to a thorough examination, which is reported in this section.

4.1 Human capital

4.1.1 Age distribution: To analyze the age distribution, several age groups including children (10–20), the young (21–30), the middle aged (31–40), and the elderly (41–60) were taken into consideration. When all PL collectors were taken into account, it revealed that the age group of 31 to 40 years was the most (52 %), 10 to 20 years was the least (10 %), and 21 to 30 years was 20 %. (Fig. 4.1).

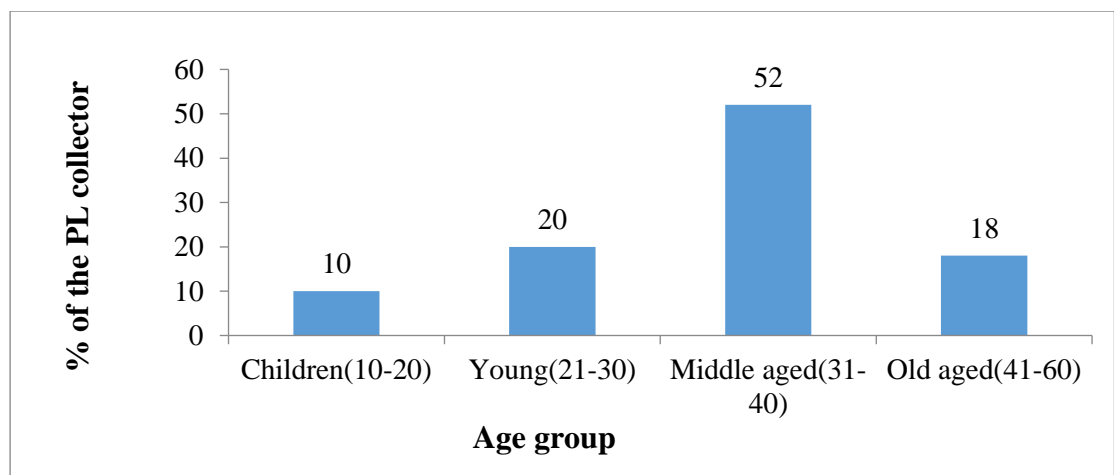


Fig 4.1: Age distribution of the PL collector

4.1.2 Population Ratio: In the present study, it was found that 78% of the people were male and 22% were female. (Fig 4.2).

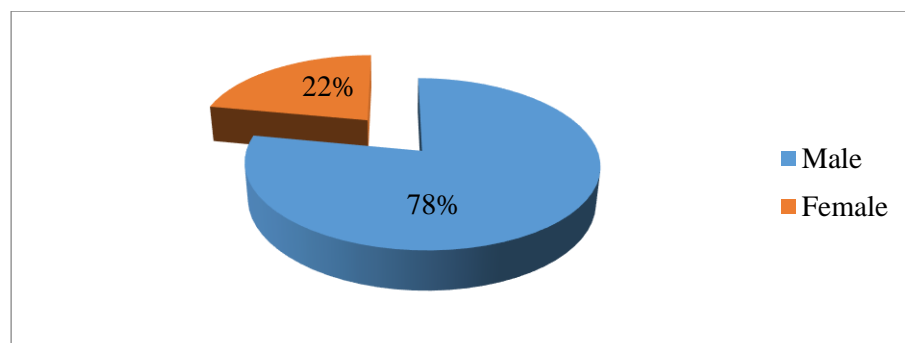


Fig 4.2: Population ratio of the PL collector

4.1.3 Family type: In the study it was found that 68 percent of families were nuclear and 32 percent of larval collectors families were extended (Fig 4.3).

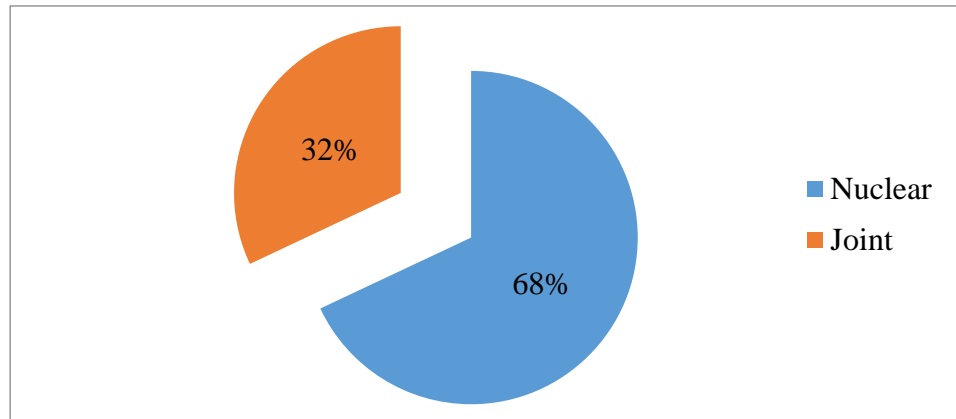


Fig 4.3: Family type of shrimp post larvae collectors

4.1.4 Family size: Three categories—small, medium, and large—were used to categorize the family sizes of the larval collectors. According to this study findings, medium-sized families, which make up 70% of all families, were those with five to six individuals. A very small percentage of families (12%) were large families (7–10 people), whereas 18% were small families, 2 to 4 members (Table 4.1).

Family size	No. of people(n=50)	Percentage (%)
Small(2-4)	9	18
Medium(5-6)	35	70
Large(7-10)	6	12

Table 4.1: Family size of shrimp post larvae collectors

4.1.5 Educational status: Most of the people who gather larvae were illiterate (64%). Among them, just a small percentage could sign only (22%). Some just had primary education (12%). Only 2% of students finished their studies and were literate (Fig 4.4).

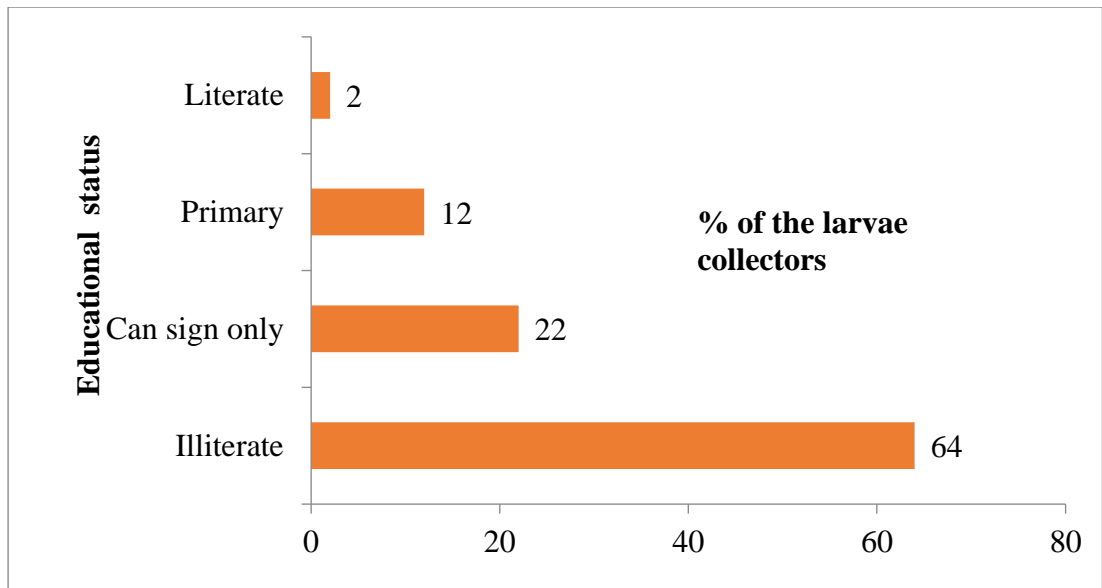


Fig 4.4: Educational level of shrimp post larvae collectors

4.2 Physical capital

4.2.1 Housing conditions: The kind of a person's home reflects their social standing. In an effort to learn more about the people living conditions, a survey was conducted. According to the study, bamboo made up 32% of the homes of PL collectors, tin made up 60%, semi-pucca homes made up 6% and only 2% households were pucca (Fig 4.5).

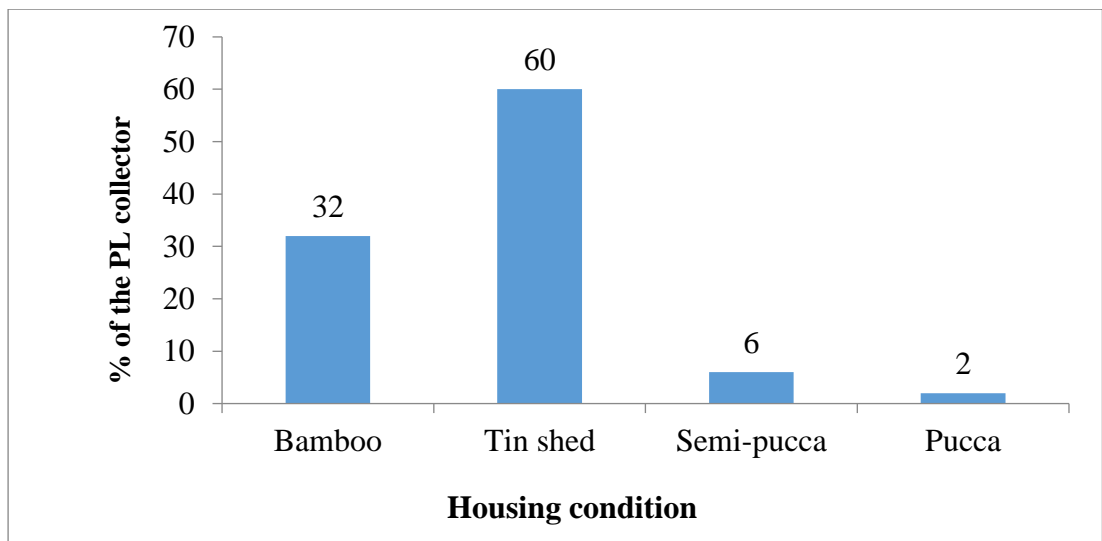


Fig 4.5: Housing condition of the PL collector

4.2.2 Household power source: The study revealed that only 44% households had electricity access while majority (46%) used kerosene lamp and 10% used solar power (Fig 4.6).

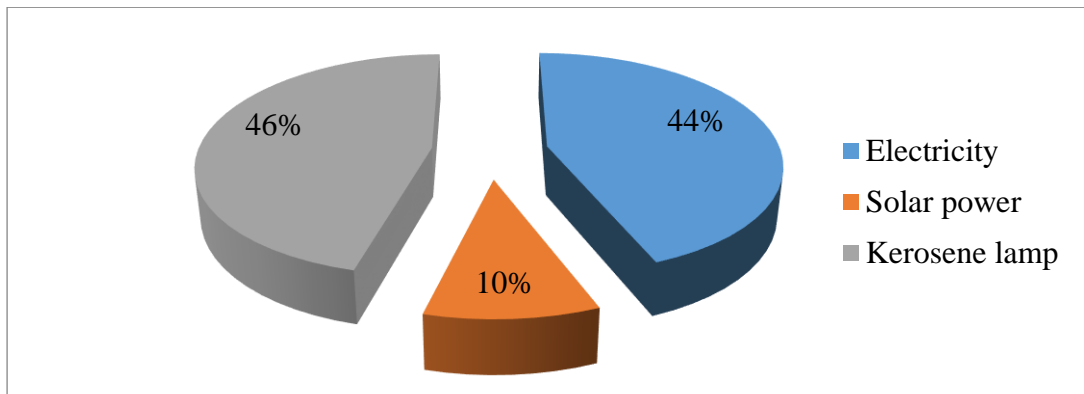


Fig 4.6: Household power source of the PL collector

4.2.3 Cooking energy: From the present study, it was found that 76% used wood for cooking purposes while only 24% used cylinder gas (Table 4.2).

Cooking energy	No. of people (n=50)	Percentage (%)
Wood	38	76
Cylinder gas	12	24

Table 4.2: Cooking energy used by shrimp post larvae collectors

4.2.4 Drinking water facilities: One of the most cherished aspects of civilization is the availability of clean, safe drinking water. All homes with PL collectors used tube wells to get their drinking water, with 64 percent using their own tube well, 16 percent using a shared tube well, and the other 20 percent using neighbors tube wells (Fig 4.7).

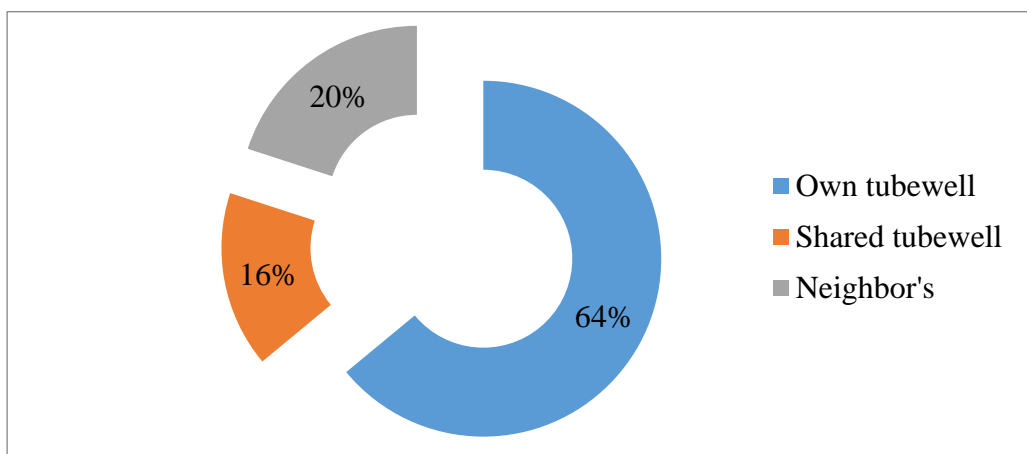


Fig 4.7: Drinking water facilities of the PL collector

4.2.5 Sanitary facilities: The post larvae collectors living circumstances were found to be exceedingly unhygienic. 92 percent of the toilets in the research region were kacha, compared to 2 percent modern latrines with water seals and 6 percent used other latrines (Fig 4.8).

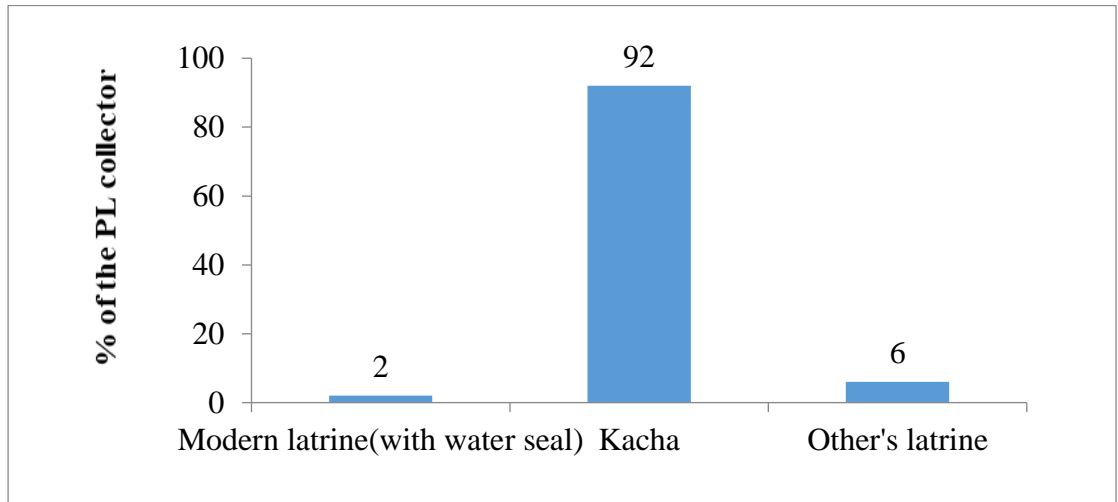


Fig 4.8: Sanitary facilities of the PL collector

4.2.6 Medical resources: Health care facilities for PL collectors were inadequate in the research region and 74 percent of families that caught larvae were found to be following village doctors who had no knowledge of or training in medical science, upazila health complex provided healthcare for 24% of the larval collectors while the residual 2% received healthcare from Kobiraz. (Fig 4.9).

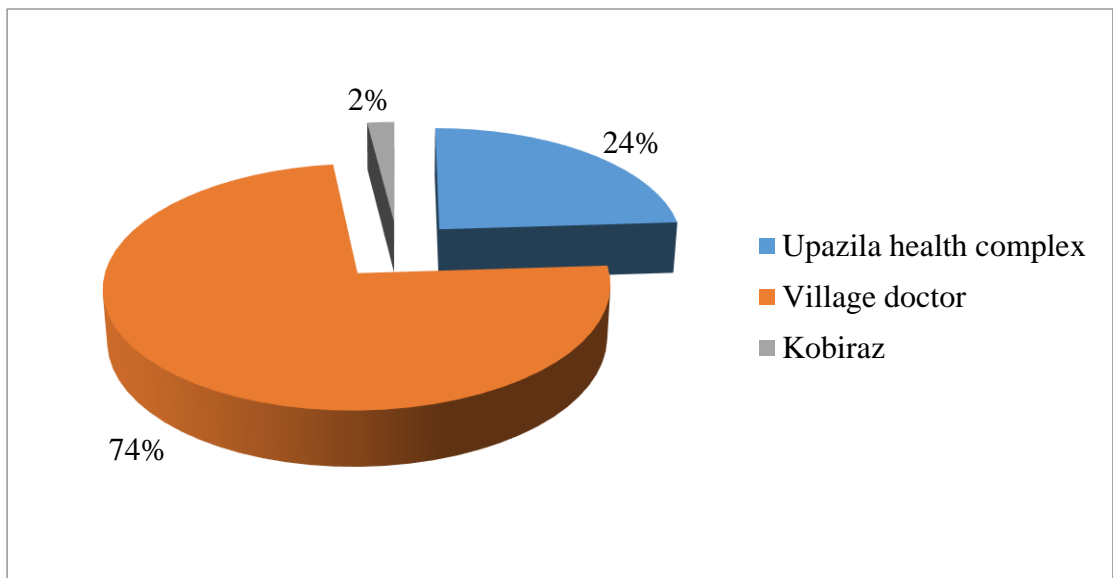


Fig 4.9: Medical facilities of the PL collector

4.2.7 PL collecting gear: The present study revealed that 76% have their own net and only 24% rent the net for collecting larvae (Fig 4.10).

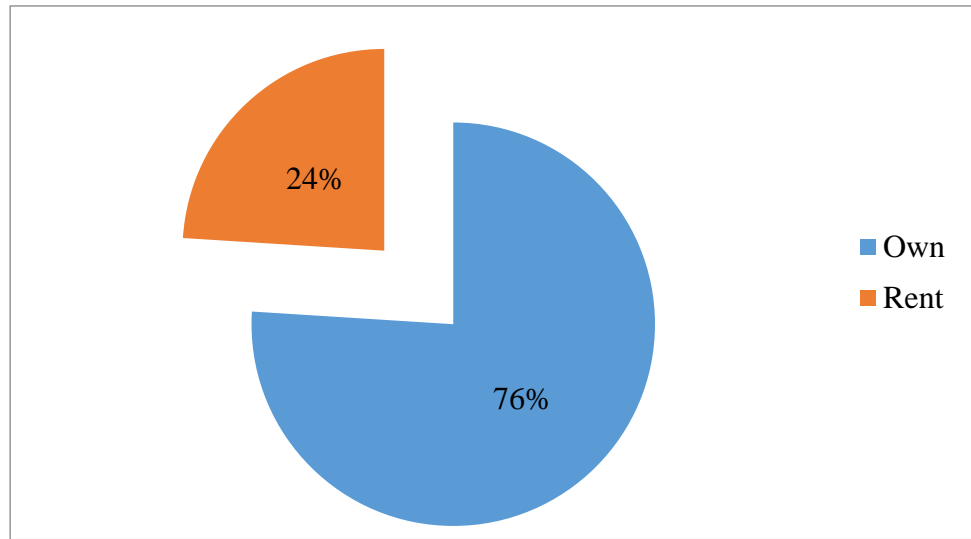


Fig 4.10: Availability of PL collecting gear

4.2.8 PL collecting experience: Most of the PL collectors are involved in collecting at least 10 years. 36% involved 5 to 10 years, 14% are involved more than 30 years. Below 5 years are 8%, 10 to 20 years are 20% and 20 to 30 years are 22 % (Fig 4.11).

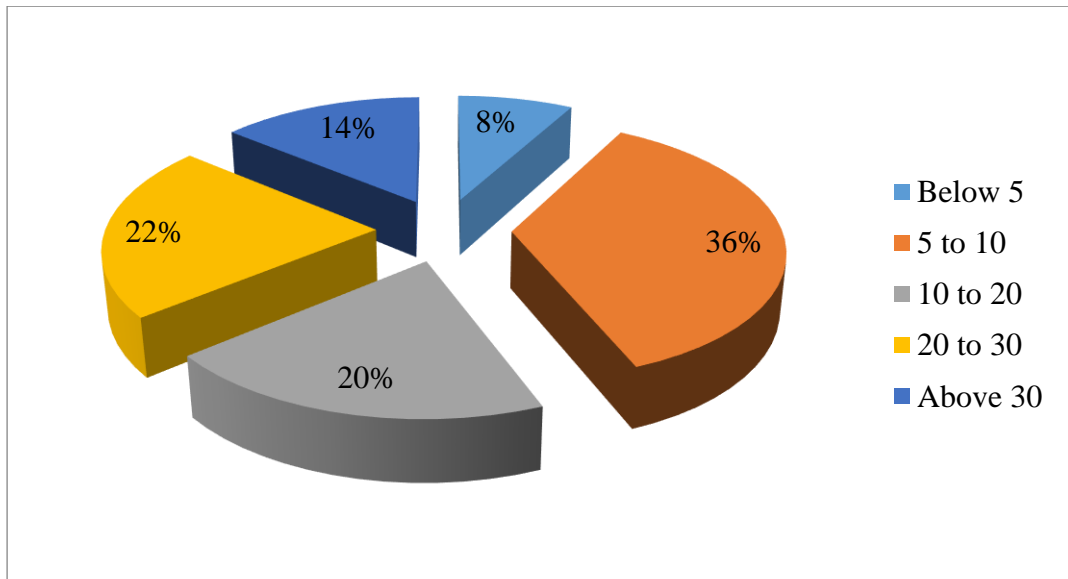


Fig 4.11: PL collecting experience of the PL collector

4.3 Natural capital:

4.3.1 Fry collecting period and duration: December to June was the primary fry collection season. The price was higher at the start of the season than it had been in previous months, even though the prime season for collecting shrimp PL was from March to May. Larvae collectors typically go out twice a day, generally from 4 am to 10 am and 3 pm to 5 pm and average operation time 10-15 min/haul.

4.4 Financial capital:

4.4.1 Monthly income of the PL collectors household: Approximately 74% of families made between Tk. 5000–10,000, 16% made between Tk. 15000 -20000, 8% made between Tk. 15000 and Tk. 20000 and just 2% made Tk. 20000 or more each month (Fig 4.12).

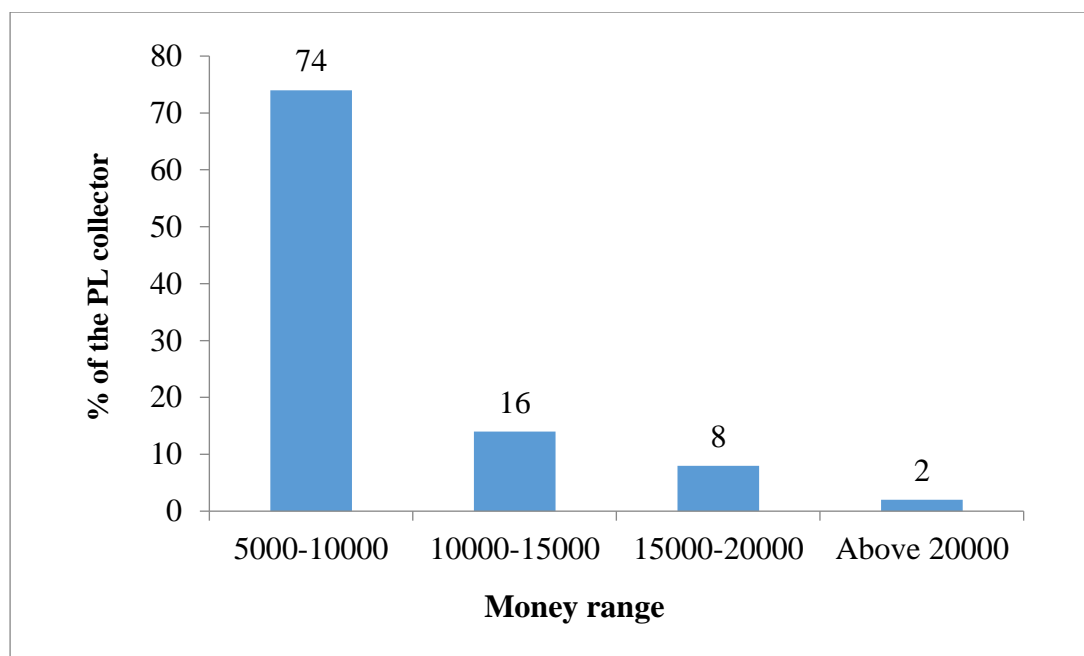


Fig 4.12: Monthly income of the PL collectors

4.4.2 Alternative livelihood: The bulk of PL collectors in the Rezu khal region work as fishermen in addition to their primary vocation. However, some people also worked in day labor and agriculture as a second line of work. The current study found that 8% of larval catchers worked as day laborers, 12% engaged in agriculture, and 80% fishing as a secondary profession (Fig 4.13).

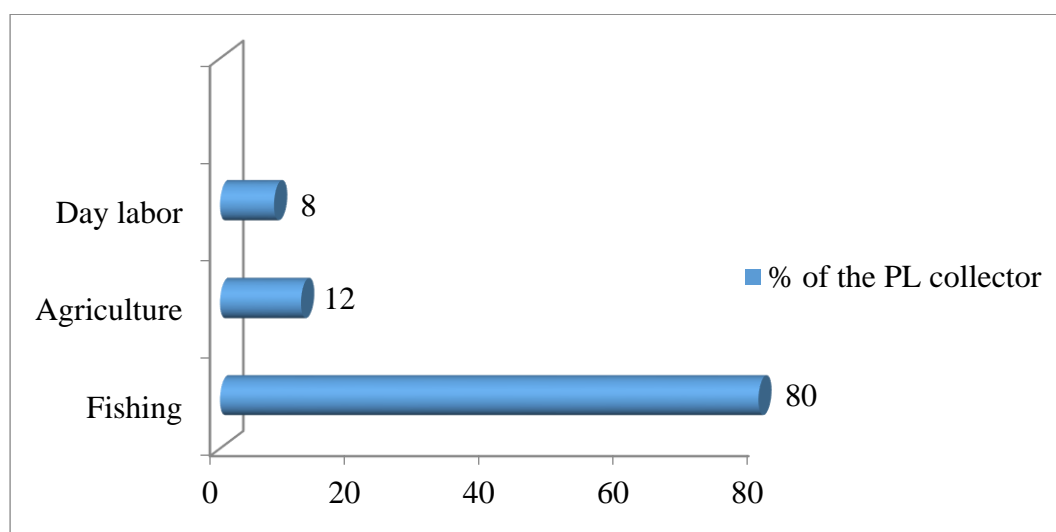


Fig 4.13: Alternative livelihood of the PL collectors

4.4.3 Financial loan: The poor shrimp post larvae collector had to manage loan from the dadon. About 88% borrow money from dadon, 10% from NGO's and 2% from bank for their livelihood purposes (Fig 4.14).

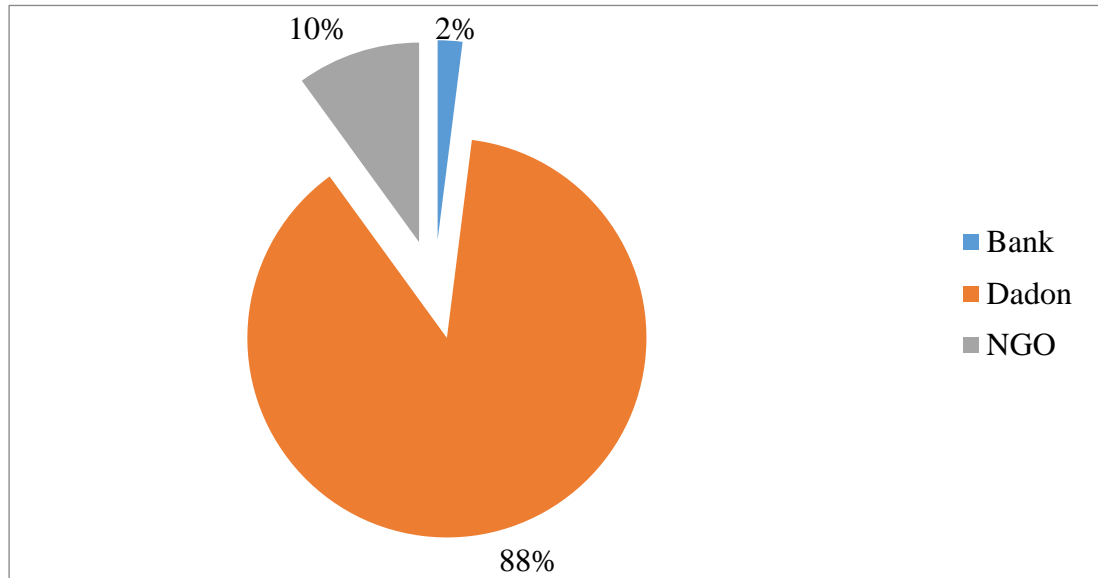


Fig 4.14: Financial support of PL collectors

4.5 Social capital

4.5.1 Learning of PL collection technique: Most of the people learn PL collection technique from their family. In the present study, about 84% learn from family and 16% from their neighbor (Fig 4.15).

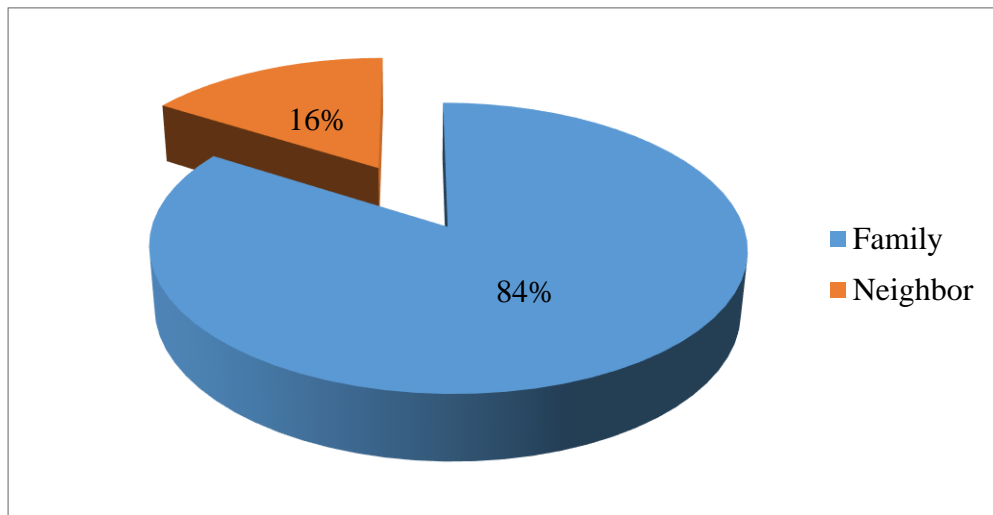


Fig 4.15: Learning of PL collection technique

4.5.2 Support from NGO: In the study area, majority of the larvae collector did not get any help from local or national NGO. About 90% did not get any help from NGO and only 10% take loan from NGO (Fig 4.16).

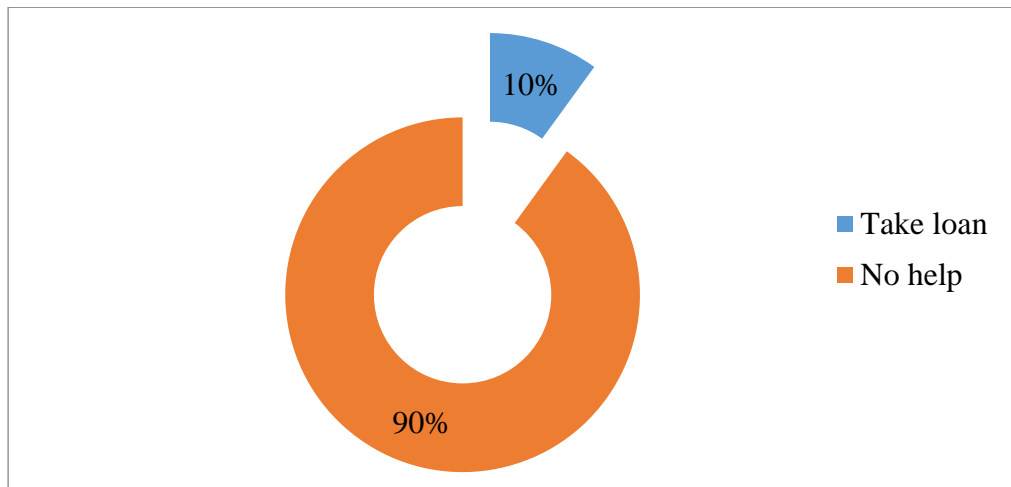


Fig 4.16: Support from NGO

4.5.3 Co-operative society: It was found that about 64% were member of a financial co-operative society named “Motso somiti”, 16% were a member of worker cooperatives society and 20% were not a member of any society (Fig 4.17).

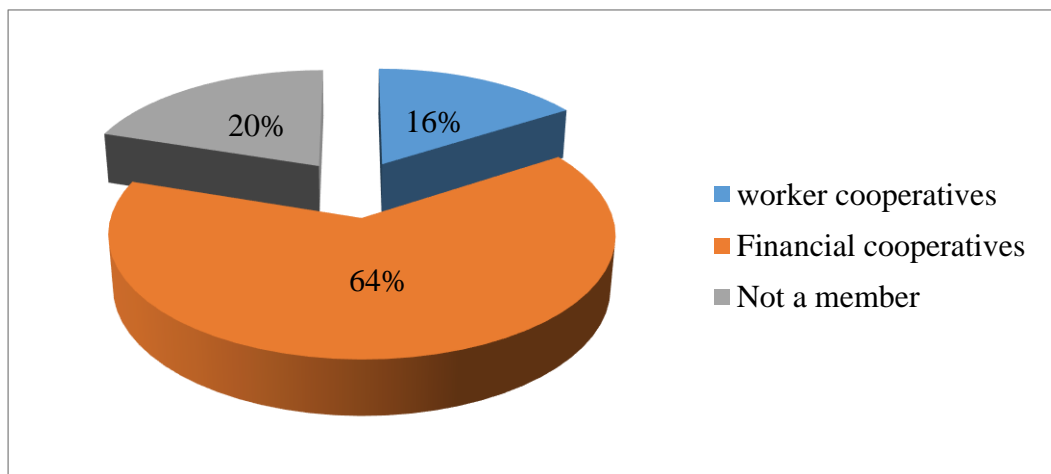


Fig 4.17: Shrimp post larvae collector's membership of society

4.5.4 Present Condition of larvae collection: They have been working on this for 10 - 20 years. They therefore had extensive knowledge of wave forms, water movement, high tide, even low tide. Collectors of larvae said that the PL price was insufficient to improve their socio-economic circumstances. Only 10% of fisherman were reacting adversely, according to 90% of fishermen who stated that PL harvesting zones were shifting. They also mentioned the water levels in Khal was declining.

Result	Price of PL is satisfied? (%)	Collection zone alter (%)	Decreasing water condition (%)
Yes	6	90	100
No	94	10	0

Table 4.3: Present Condition of larvae collection

Chapter 5

DISCUSSION

Around 78 percent of the respondents who worked as PL collectors in the current study region were men, whereas 22 percent were women. Percentage of women was increasing because men are restricted from fishing, women can readily catch near river places. Because wild PL harvest is typically a family affair, multiple family members are involved in the process. In the Sundarban region, Islam et al., (2015) discovered that 66% of PL collectors were men and 34% were women.

The findings revealed that 20% of the PL collectors were between the ages of 21 and 30, while only 18% were over the age of 40. Most middle-aged collectors have greater ability to collect PL than older collectors, and they use it as a source of income. In the Sundarban region, 32.81 percent of PL collectors were between the ages of 20 and 30, and just 4.32 percent were beyond the age of 50 (Islam et al., 2015), which is similar to the findings.

According to the findings of the current study, 22 percent of the PL collectors in the study region can only sign, 12 percent have just a primary school education, and 64 percent are completely illiterate. Only 2% had completed a bachelor's degree. Ahmed et al., (2005) discovered a 10% literacy rate in Bagherhat district, and a 31% literacy rate in Sundarban region, according to Islam et al., (2015).

According to the survey, roughly 32% of PL collector families were jointed, while 68 percent of families were nuclear, indicating that nuclear families dominated the PL collector community.

According to the survey, 60 percent of PL collector's dwellings were tin sheds, 32 percent were bamboo constructed, 6% were semi pucca, and 2% had pucca in the survey region. Mahmood et al., (2013) reported that shrimp fry catchers in the southwest part lived in four distinct types of housing, all of which are the same as those in the study: pucca and semi-pucca houses, mud wall incorporating golpata sheds, and mud wall cum tin sheds.

According to the research, only 44% of families had access to electricity, with the majority (46%) using kerosene lamps and 10% using solar power. Only 7.4 percent of the housing households in the Sundarban region have access to power.

One of the most important aspects of every community is the provision of pure and secure drinking water. According to the reading, 64 percent of the PL collection households had their own tube wells, 16 percent of the families were shared tube wells, and 20 percent utilized neighbors' tube wells. This meant that around 100 percent of the households used tube wells for drinking water. Nobody was discovered drinking water from pools or waterways. According to Islam et al., (2015), in the Sundarban region, 7 percent of families collect sufficient rainwater for drinking purposes, compared to 27 percent who use pool water, 44 percent who use filter water or PSF, 22 percent who have used tube well water, and 27 percent who have used pool water.

The hygienic conditions of the PL collectors were found to be average, not particularly developed. The study area has 92 % kacha latrines and only 2% modern latrines with water seals. 6% of families relied on the latrines of others. According to Hasan et al., (2012), 48.3 percent of households in Cox's Bazar did not have a latrine, 33.3 percent had a bamboo constructed or kancha latrine, and only 18.3 percent had a sanitary latrine.

Because of the lack of natural gas, it was discovered that 76 percent of the PL collectors in the study area relied on wood for cooking. LPG cylinders were accessible in that area, but because of high cost, only 24% of PL collectors used cylinder gas.

It was discovered that 74 percent of the PL collector's household relies on village doctors who have no comprehension or expertise of medical science, 2% rely on kobiraz, and 24% receive health care from the upazilla health complex in the research area.

According to Islam et al., (2015), the main season for fry collecting in the Sundarban region is from December to June, which corresponds to the findings that the peak season for shrimp post larvae accumulation is from March to May. More shrimp fry were found at the start of the season than in previous months, and the price was similarly higher. The fry catchers are normally dispatched twice a day, from 4 am to 10 am and 3 to 5 pm., with an approximate haul time of 10-15 minutes.

The majority of people learn how to collect PL from their family. According to the findings, 84 percent of people learn from their family and 16 percent from their neighbors. The study discovered an elderly PL collector with over 30 years of expertise.

The majority of the collectors stated that they can collect 200-250 PL per day. In the Sundarban region, Islam et al., (2015) discovered the same result.

According to the survey, 76% of PL collectors had their own PL collecting net (Moijal, Chomkajal, and Behundijal) and 24% had rented both the net and the boat to collect larvae. Ahmed et al., (2010) discovered that two types of net (set bag net and pull net) were used for PL collection in Bagerhat district.

The family of the PL collector has a poor monthly income. Because women are frequently involved in PL collection because they have no other feasible option, the majority of the families had two earners (DOF and DFID, 2002). Only 2% of families earned more than Tk. 20,000 per month, while 16 percent earned between Tk.10000 and Tk. 15,000. However, Hasan et al., (2012) found that in Cox's Bazar, 30% of PL collectors had a monthly income of 5 to 6 thousand, 26.7 percent had less than 5 thousand and 20% had a monthly income of 9 to 10 thousand.

Fishing was the alternative occupation of 80 percent of the PL collectors in the research area. However, some people choose to work in agriculture (12%) or as day labor (8%) as an alternate occupation. However, Hasan et al., (2012) found that 26.7 percent of people in Cox's Bazar pull rickshaws, 25 percent do little trading, and 28.3 percent "do nothing."

In terms of credit, it was shown that 88% of people received money from dadondars. For their livelihood, about 10% borrowed from non-governmental organizations (NGOs) and the remaining 2% borrowed from banks. Islam et al., (2015) found that in the Sundarban region, about 75% of PL collectors received money from dadondars, with the amount ranging from Tk. 5000 to Tk. 10,000, which is similar to the findings, and Ahmed et al., (2005) found that in Bagerhat district, 39% of PL collectors received small credits ranging from 1000 to 5000 tk.

The bulk of PL collectors in the studied area received no assistance from GO or NGO. NGOs simply provided financial assistance to the coastal poor and did not engage in any other social development activities. Only 10% of PL collectors took out a loan from an NGO. Because of a political issue, the government's VGF help was not reaching the coastal poor.

Chapter 6

CONCLUSION

The collection of wild PL for seed in the aquaculture and shrimp farming sector is a significant feature of aquaculture activities and stay a troublesome point in the shrimp cultivation activities in different countries globally (Paez-Osuna, 2001). Although hatchery emanated PL seed is now obtainable in various countries in Asia and Latin America, wild PL nevertheless be the momentous and always laid source of semen for the comprehensive way especially among the rural impoverished population globally (World Bank et al., 2002; FAO, 1995). In Bangladesh, the wild PL lie the primary source of semen for the shrimp (*Penaeus monodon*). In addition, the gathering of wild PL is a leading employer for millenary of coastal baseless and permeable groups of the coastal people especially women and children.

This reading was conveyed to perceive the livelihoods and socio-monetary situation of shrimp PL collector of Rezu khal adjacent people. The research work was carried out in Rezu khal area in Ukhiya upazila under Cox's Bazar district. The study was conducted from February to September through questionnaire interview with 50 people. This survey was accomplished within the well-formed questionnaire. In social survey part in this research, social mapping, questionnaire, daily activities, seasonal activity, activity during banning periods, monthly income were done to find out the present livelihood involvement with the PL collection. Crosscheck interviews with key informants, it was found that the surrounding people of the area were dependent for their livelihood mainly on fishing and PL collection in the season as well as some local production such as foods, agriculture and others. Women members of the study area remain unemployed from any income generation activities but most of them engaged in PL collection during the peak season. On the other hand, most of the children were engaged in the PL collection during the PL collection season and other different activities such as day labor in the normal season.

It was discovered through the analysis of the livelihood options of the community members of the Rezu khal adjoining areas under Ukhiya that socio-economic limitations such as limited income, a lack of own land area, a poor educational context, low employment, and an insufficient funds are the main issues for people. The majority of them suggested the government should make provisions to better their socio-

economic circumstances. Among the several other points suggested by them notables are development of street and intimation, facility of electricity and support from different NGO. It is essential to improve socio-economic condition of them such as financial supports as well as increase of fund facilities, raising of their way of living, sanitation and health situation, housing situation, children study, busting water facilities etc.

The major constraints were identified from the study are listed below:

- Lack of public awareness about the biodiversity loss.
- Lack of alternative livelihood during the banning season.
- Insufficient governmental help to the coastal poor.
- Insufficient educational and medical facilities.
- Low price of PL.
- Lack of credit facilities.
- No PL collector association for betterment of their condition.
- Children are deprived from education for involvement in PL collection or other work.
- Many tourists regularly visit this area along with Bay of Bengal & Rezu khal. Jet Ski (Tourist speed boat) and kayaking destroying the net and gear.

Chapter 7

RECOMMENDATION AND FUTURE PERSPECTIVES

According to this research work, the following recommendation may be done:

- Alternative livelihood options should be ensured during the banning period.
- Monitoring system should be strong during ban season.
- To improve their living condition efforts should be taken by GO and NGO to ensure the proper sanitary, drinking water, health security, education facility.
- Marketing, middleman and related facilities should be improved so that the PL collector can get fair prices of their catches.
- Adequate bank loan under easy terms should be ensured by the Government for PL collector.
- Increasing the awareness of mass people about the biodiversity loss for indiscriminate PL fishing.
- Making primary education mandatory to all children.
- More study should be carried out to know more about the livelihood status of PL collector.

BRIEF BIOGRAPHY OF THE AUTHOR

Pria Banik, daughter of Jugal Banik and Titashi Banik, was born on April 1, 1996, at Mirsharai, Chattogram in Bangladesh. She passed the Secondary School Certificate Examination in 2011 and Higher Secondary Certificate Examination in 2013. She graduated in 2017 from the Faculty of Fisheries, Noakhali Science & Technology University (NSTU), Noakhali, Bangladesh. Now, she doing her MS in Fisheries Resource Management, Faculty of Fisheries, CVASU. She is looking forward to carrying out research in her area of interest and has enormous enthusiasm to develop her skills and expertise in the area of sustainable management of different aquatic bodies. She is also keen to deliver her intense observation for drawing the outline of different new-based aquaculture management systems in the near future.

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