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PRESENT STATUS AND PROBLEMS OF FISH SEED MARKETING IN SYLHET DISTRICT, BANGLADESH

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ABSTRACT

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This study was conducted to explore the present status and problems of fish seed marketing system in Sylhet district, Bangladesh. Data were collected through questionnaire interview from the selected areas during April to September 2016. Brood fishes were collected from wild sources as well as hatchery produced brood fishes also used for seed production. Good length, weight and age of brood fishes were selected for spawning and induced breeding. In nursery, hatchlings were reared for 30-40 days and 37.7% nursery owner practiced single cycle production/year where the average stocking density of seed was found 24.65 ± 3.94 g/decimal (mean \pm SD). Six different fish seed marketing channels were identified where hatchery owners, nursery owners, forias (retailer) and fish farmers were main stakeholders. The highest (6520 Tk/day) and lowest (355 Tk/day) average income were found in hatchery owner and fish farmer, respectively. Oxygenated bag, big aluminum bowl/container and plastic barrels with continuously agitate the water were used for seed transportation. Maximum 17.67% seed mortality was noticed in hatchery owner and minimum 5.67% in fish farmers. Late breeding season, lack of capital, lack of technical knowledge on hatchery operation and management, poor transport facilities, high transportation cost, high labor cost, lack of training and high price of spawn are identified as some major problems.

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INTRODUCTION

Bangladesh is a riverine country having lots of rivers, canals, floodplains, ponds, beels, haors, reservoir, manmade lakes and a long coastline etc. These waterbodies are valuable sources of fish. Both capture and culture fisheries play an important role for animal protein supply in Bangladesh. Aquaculture sector of Bangladesh is expanded rapidly with respect to both the quantity and variety of species. In the year of 2014-2015, total fish production of the country was 3.68 million MT of which inland aquaculture sector provides 2.06 million MT (DoF, 2016). Development of aquaculture is influenced by good quality seed and good quality feed. In the year of 1985, spawn production from natural and hatchery sources were 19,362 kg and 4,962 kg (Hussain and Mazid, 2001). The demand of substantial supply of quality fish fry and fingerlings are increased day by day. At present private fish hatcheries and Government Fish Seed Multiplication Farm (FSMFs) with hatchery facilities contributed 5,36,983 kg and 10,566 kg hatchlings respectively (FRSS, 2016). Department of fisheries (DoF) of Bangladesh is encouraging people to enhance the fish seed production by setting up hatcheries and nurseries. On the other hand 800 private hatcheries all over the country mostly help fish farmer to reduce the dependency on nature for fish seed. This large numbers of hatcheries created a new marketing system all over the country to reach their fish seed to fish farmer.

A market system is the network of buyers, sellers and other actors that come together to trade in a given product or service. In this marketing system there are different actors such as nursery owners, foria, hawkers, wholesalers, fry traders etc. The marketing channels are the alternative courses of item flows from producers to consumers (Kohls and Uls, 1980). Marketing channel may be small or long for a particular product depending on the type and quality of the relevant factors. Fish seed marketing of the country largely depends on private sector and a large number of people are associated with this system for their livelihoods. But, stress from transportation caused 6200 MT fish seed mortality in a year over the country (Hasan and Brat, 2006). Besides, lack of capital, lack of technical knowledge, high lease value, high price of production inputs, violence, intense market competition, the lack of policy support etc. have impact on stakeholders on this marketing system. Sylhet (north western district of Bangladesh) district is endowed with numerous natural inland water bodies such as rivers, canals, ponds, beels etc. A special wetland ecosystem of the country is found in sylhet region named haor having huge possibility of aquaculture. There are about 5 fish hatcheries and 152 fish nurseries in the Sylhet region. In 2014, two government fish seed multiplication farm, one government nursery, private hatcheries and nurseries are produces 950 kg hatchling and 81.94 million fry and fingerling (DoF, 2005). But, the marketing channel and problems associated with marketing of fish seed in Sylhet region has not been yet quantified. The objectives of the study were to know about the existing fish seed marketing system and identify the problems of the fish seed marketing system in Sylhet region.

MATERIALS AND METHODS

Selection of study area, Target groups and Period of the study

Four upazillas of Sylhet district were selected for this study and the target groups were hatchery and nursery owners, fish seed hawkers as well as fish farmers. Production season of fish seed generally started from 1st week of April and ends up by 1st week of September every year. However, the survey was carried out for six months from April to September 2016.

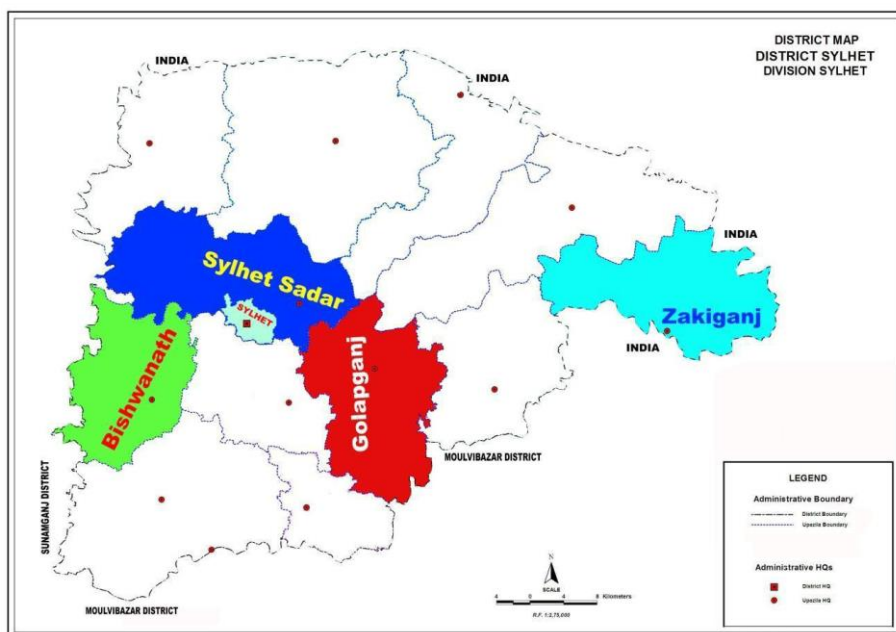


Figure 1. A map of selected study areas of Sylhet District. (source: www.lged.gov.bd)

Selection of sample and sampling techniques

In order to meet the objectives of the study, different types of fish seed and fingerling producers and hawker were selected. The sample size for the present study is given in Table 1.

Table 1. Sample size of the present study

| Types of stakeholders | Sylhet District | | | | Total |
|-----------------------|-----------------|-----------|----------|------------|-------|
| | Sylhet Sadar | Golapganj | Zakiganj | Bishwanath | |
| Hatchery owner | 1 | 2 | 2 | 2 | 7 |
| Nursery owner | 10 | 10 | 10 | 10 | 40 |
| Fish seed hawker | 10 | 10 | 10 | 10 | 40 |
| Fish Farmer | 10 | 10 | 10 | 10 | 40 |
| | | Total | | | 127 |

Collection of data, Data processing and analysis

Data were collected from the respondents by using the pre-prepared questionnaire interview. All the collected data were summarized and scrutinized carefully and recorded. Data were presented mostly in the tabular form, because it is simple in calculation, widely used and easy to understand.

RESULTS AND DISCUSSION

Hatchery Status

At present, there are only 5 private fish hatcheries and 2 Governments Fish Seed Multiplication Farm (FSMFs) in Sylhet district. The hatcheries are situated at Sylhet Sadar, Golapganj, Bishwanath, Osmaninagar and Zakiganj. Among 5 private hatcheries, one was Catfish hatchery, three was Carp hatchery and other one was Tilapia hatchery. During the study period spawn production was 431 kg carp fishes, 220 kg catfishes and 567 kg Tilapia (Figure 2). In the present study it was found that the carp hatchery activities start from 1st week of April and continued up to 1st week September. Peak seasons of seed production were late-April to mid-

June. It was also found that the Catfish hatchery activities start from 1st week of April and continued up to 1st week September. Peak seasons of seed production were late-April to mid-June. The only one Tilapia hatchery in Golapganj produced only tilapia fry throughout the year. After 4 days hatchling was fed feed treated with 17 α -Methyltestosterone. The brood fishes were produced in the on hatchery.

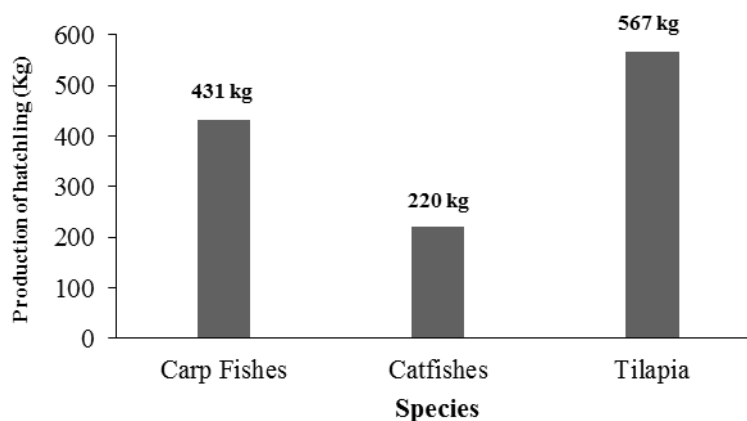


Figure 2. Hatchling production in Sylhet District

Above result was relevant with the Sharif and Asif (2015) reported that hatchlings production of Indian major carps were 24,720 kg, Exotic carps were 21754 kg and other species were 2966 kg respectively in 2013 at Jessore sadar. Rahaman (2007) also got that 85 hatcheries in Jessore area were produced 4211.5 kg hatchling at study period of which 80% were reared in the same area.

Facilities used in Hatchery

Smooth operation of hatchery mainly dependent on facilities of hatchery. Good production of hatcheries depends on appropriate number of brood ponds, breeding tanks with other facilities, cisterns, incubators, fry rearing tanks etc. Besides, there is difference between capabilities used in Carps Hatchery, Catfish Hatchery and Tilapia Hatchery. A short list of facilities used in hatcheries was shown in the Table 2.

Table 2. Lists of facilities used in hatchery

| Facilities | Fish Hatchery | Tilapia Hatchery | Catfishes Hatchery |
|---------------------------|------------------------------|---------------------------------|--------------------|
| Brood fish pond | 5-1 | 5 | 3 |
| Breeding Tank | 7-1 | 1 | 5 |
| Cistern | 8-1 | - | - |
| Incuba Bottle | 13-8 | - | - |
| tor Tray | - | 60 | - |
| Hormone | Ovaprim, PG, HCG | 17 α -Methyltestosterone | Ovaprim, Ovatide |
| Brood Transport materials | Plastic drum, Aluminum patil | Aluminum patil | Aluminum patil |

Brood management

A good number of spawn productions from hatchery mainly depends on the selection and successful management of brood fishes. Best quality and higher number of spawns can be obtained from the good quality brood fishes. The criteria and management activities for brood fishes were followed by the hatchery owner show in the Table 3.

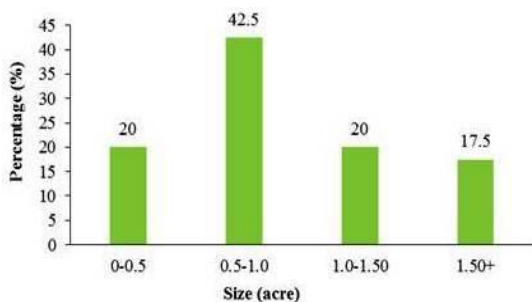
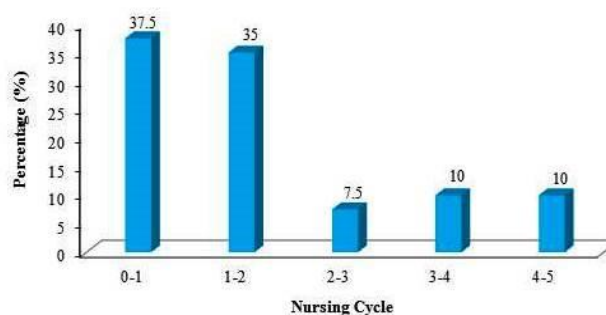
Table 3. Criteria and management of brood fishes are maintained by the hatchery owner

| Criteria | | Indian Major Carps (Rui, Mrigal, Kalibaus, Gonia) | Catla | Exotic Carp | Tilapia | Catfishes (Shing & Magur) |
|-----------------|--------|---|-----------------|-------------------|------------|---------------------------|
| Av. Male | | 500 gm - 2kg | 1200 gm to 3 kg | 500 gm to 2 kg | 400-50 kg | 160 gm |
| Wt. Female | | 700 gm - 2 kg | 1400 gm to 3 kg | 700 gm to 2 kg | 250-500 gm | 200 gm |
| Age | Male | 2-3 years | 3-4 years | 2-3 years | 2 years | 3 years |
| | Female | 2-3 years | 3-4 years | 2-3 years | 2 years | 3 years |
| Source of Brood | | River, Own farm, Other farm | | Own or Other farm | Own farm | Own farm |
| Feed for brood | | 24 hour composted mustard oil cake with rice bran and wheat bran or commercial feed | | | | Commercial feed |
| Feeding rate | | 1-2 times in a day | | | | 3 times/night |

This result supported the result of Dwivedi and Zaidi (1983) who reported that brood stock is a prerequisite for all types of hatchery production and proper brood stock management will lead to better breeding responses and increased fecundity, fertilization, hatching and larval survival rates and more viable fish seed. Sultan (2008) also identified that maximum hatchery owners (80%) in Chachra collected broods from the Halda and the Jamuna rivers to avoid inbreeding and all of the hatchery owners practiced induced breeding in their hatcheries.

Nursery operation

About 61.18% (93 of total 152 nurseries) nursery of Sylhet district are situated in study areas. Nursery of Sylhet district mainly produces fry or fingerlings of Rui, Catla, Mrigal, Bata, Kalbasu, Sarpunti, Bighead carp, Silver carp, Grass carp, Tilapia, Pangas etc. The size of the nursery depends on capital for nursery operation, land, knowledge about nursery operation etc. The highest 42.5% of nursery was found in a range of 0.5- 1.0 acre size while lowest 17.5% nursery was found in a range of 1.5-above acre (Figure 3).

**Figure 3.** Size of nursery in acre**Figure 4.** Number of nursery cycle by nursery owner per year

In this region nursing cycle varies from highest 4-5 cycle/year due to collection of spawn from outside of the district, high price of spawn than other region and nursing mostly for grow out of fish. It was observed that 37.7% farmers completed single cycle/year, 35% farmers completed 1-2 cycle/year and only 10% farmer completed 4-5 cycle/year (Figure 4).

Fish Farm

Fish hatchling, fry or fingerling are reared up to table size for selling in the market or home consumption. In the fish farm of Sylhet region mostly cultured species are Tilapia, Koi and carps like Rui, Catla, Kalbasu, Mrigal etc. The size of the farms depends on the economic condition of the farmer. The highest number of farms was covered area 2-4 acre (Figure 5).

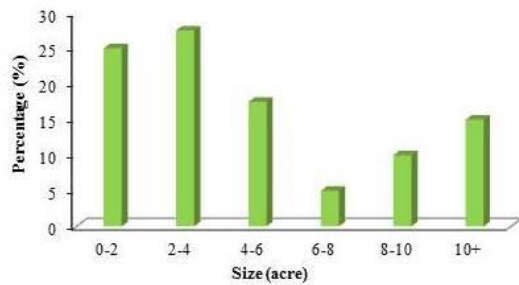


Figure 5. Size of fish farm in acre

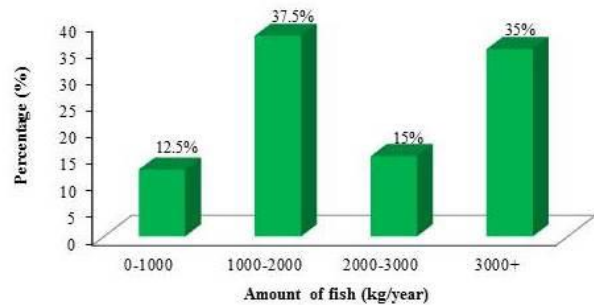


Figure 6. Total fish production in fish farms

Islam (2010) revealed that average pond size was 0.11 ha in Moulvibazar district. The most of the farmer (55%) found to operate nursery in their farm for fry or fingerlings to grow-out. The productions of farms rely on quality of fish seeds, management activities followed by the farmers, the size of the farms and knowledge of farmer on fish culture. The highest number of farm 37.5% produced fish between 1000-2000 kg/year (Figure 6).

Fish seed marketing channel

The marketing channels are the alternative routes of product flows from producers to consumers (Kohls and Uhl, 1980). Fish seed marketing channel starts from hatchery owners, passes through some intermediaries and ends with the fish farmers who culture table fish. In the present study, fish seed marketing channels lunched with the brood fish collection to fish farmers through proper channels (Figure 7).

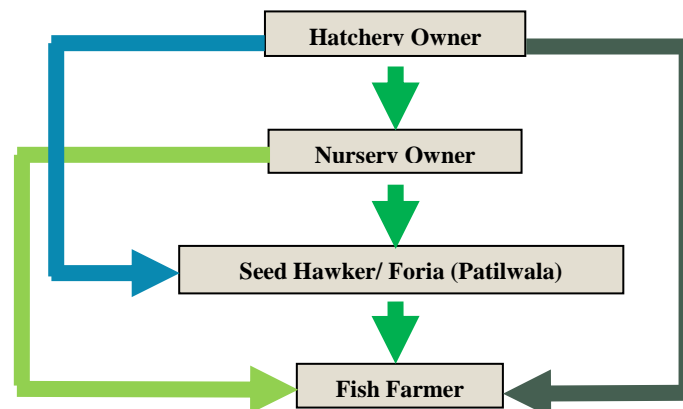
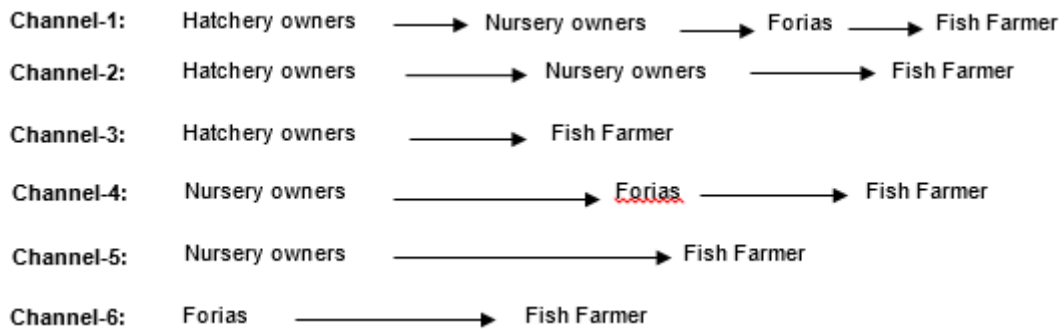


Figure 7. Flow chart of fish seed marketing channels in Sylhet district

Channels of commercial fish seed marketing in Sylhet area

About Six different fish seed marketing channels were identified in Sylhet area. Among them, channel-3 was best. It's because, there is no middleman between hatchery owners and fish farmers. That's why; fish farmers can buy their quality seeds in low price. Abdulla-Al-Asif et al., (2015) reported that marketing channel of fish fry and fingerling is start with brood pond and continues with hatchery, nursery, fry and fingerling traders, intermediates, buyer, farmer, then farming pond or rearing pond. Malek (2007) identified seven marketing channels where hatchery and nursery owners, wholesalers, forias and fish farmers were major stakeholders. Similar findings were reported by Sharif and Asif (2015).



Transportation

Fish seed or fingerlings were found to transport by vehicle like pick-up, auto-rickshaw, bus, truck, van etc. About 80% foria (retailer) used bus to transport fry or fingerlings to the district and sell the fingerlings to the fish farmers door to door on foot hanging the aluminums bowl/container on their shoulder. Pickups and auto-rickshaws were found to be the main means of transportation of fry to the distance places. Fish spawns were transported in polythene bag by using auto-rickshaw, pickup and truck. Brood fish were transported by aluminum patil and plastic drum by pickup or vans. Similar result was showed by Haque *et al.* (1991), Abdulla-Al-Asif *et al.* (2015) and Sultan (2008).

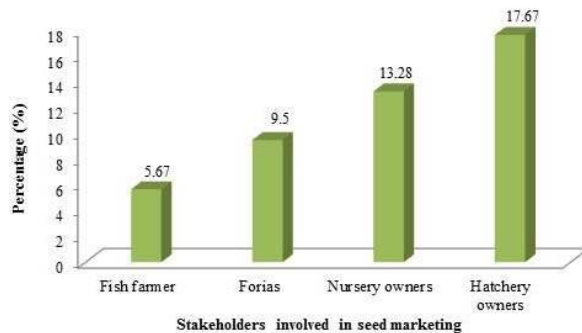


Figure 8. Mortality of fish seed of different stakeholders in marketing channel

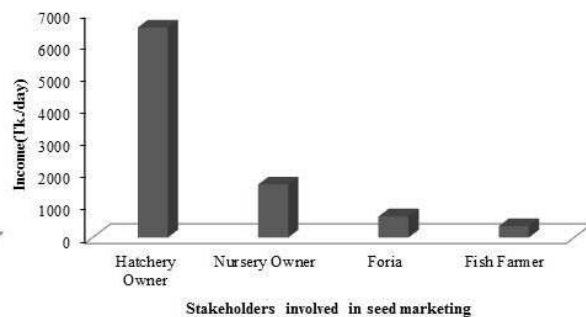


Figure 9. Average income (Tk./day) of Stakeholders involved in fish seed marketing

Mortality of fry due to transportation

It was observed that fries were transported by polythene bag and aluminum patils. Polythene bag were filled with oxygenated. Fries in aluminum patils were transported with agitation by hand and change water. Sometimes due to high density, longer duration and improper transportation method caused mass mortality which result into loss of overall business. In the study area average mortality was 17.67%, 13.28%, 9.5% and 5.67% for hatchery owners, nursery owners, forias and fish farmer respectively (Figure 8). Malek (2007) found average mortality was 15.67%, 11.25%, 8.5%, and 4.67% for hatchery owners, nursery owners, wholesalers and forias respectively in the seed marketing channel in Mymensingh area.

Income of different stakeholders in fish seed marketing channel

The income of hatchery and nursery owners in fish seed marketing system is more than the income of the fry traders, wholesalers and fish farms. The average income of hatchery owners were found at Tk.6,520 day/hatchery owner, average net profit of nursery owners were estimated at Tk. 1,646/day, average income of forias were estimated Tk. 655/day and average profit of fish farmers were estimated Tk. 355/day (Figure 9).

Malek (2007) found similar result that the average income of hatchery owners were Tk.8,375 day/hatchery owner, nursery owners were Tk. 1,660/day, Tk. 1,362.17/day for wholesalers and forias were Tk. 490/day in Mymensingh area.

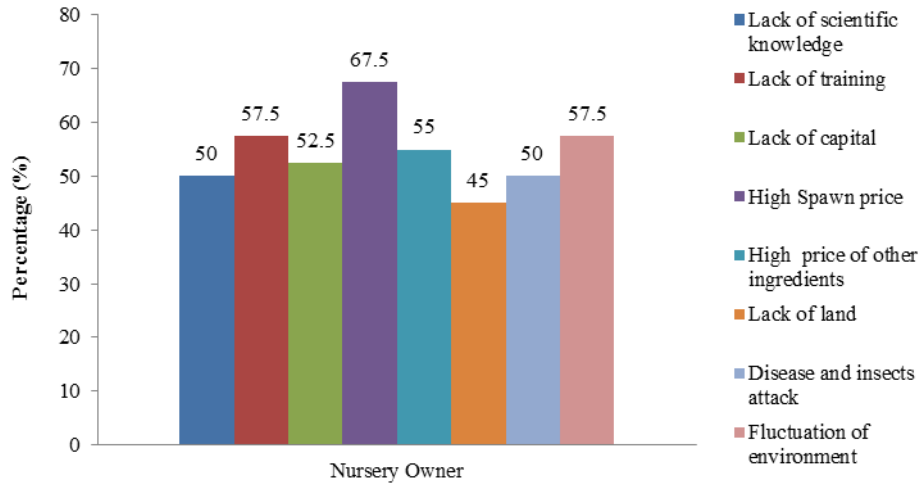


Figure 10. Problems faced by nursery owners

Problems and constraints of production and marketing of fish seed

Major problems of nursery owners includes- high price of spawn, lack of training on nursery operation, fluctuation of environmental condition, diseases of fingerlings, price fluctuation etc. Among the problems, high price of spawn was highest (67.5%), followed by lack of training (57.5%) and fluctuation of environment (57.5%) were crucial constrains for nursery operation (Figure 10)

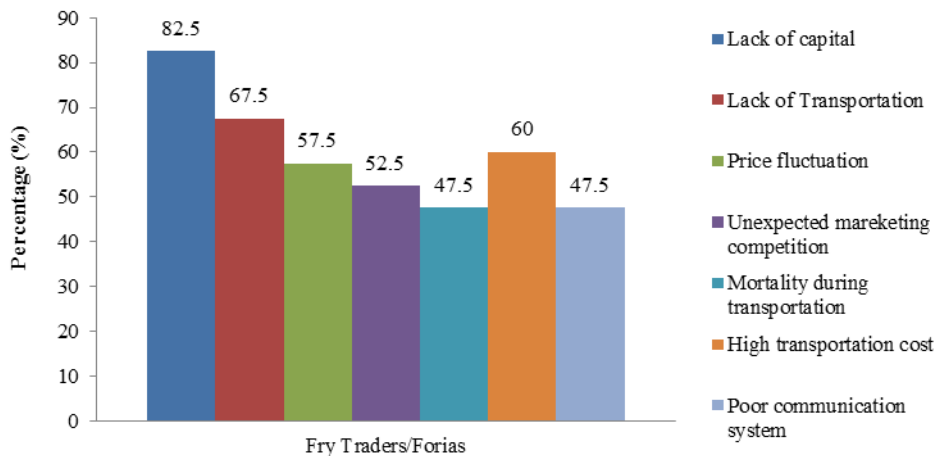


Figure 11. Problems faced by fry traders/retailers

Fry retailers maintained link between the producer (Hatchery owner, Nursery owner) and Fish farmer. The problems which are faced by the fry retailers/forias include lack of capital (82.5%) was most important. Among others lack of transport facilities (67.5%) and high transportation cost (60%) could be mentioned (Figure 11).

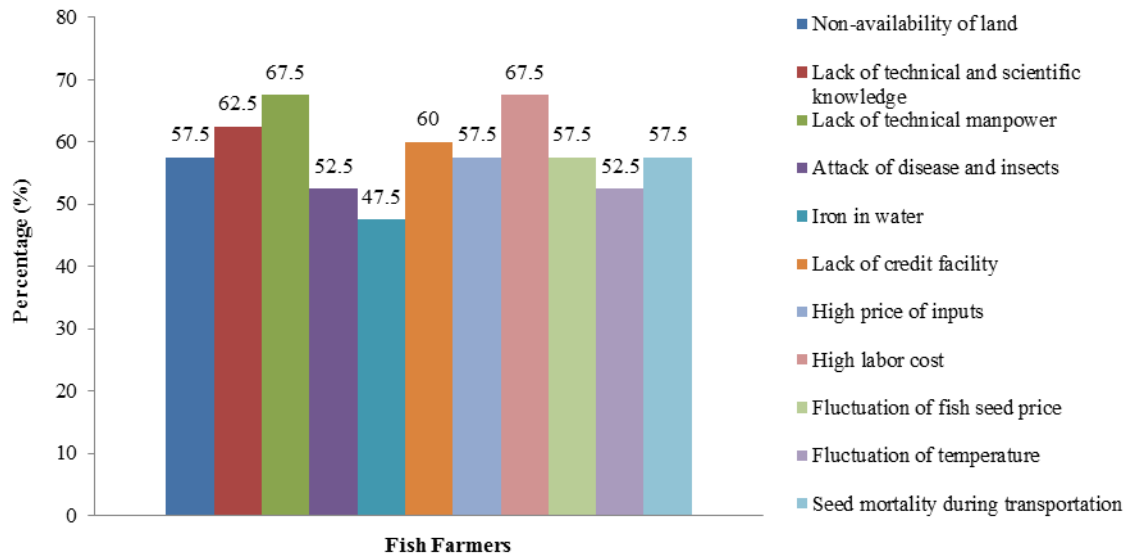


Figure 12. Problems faced by fish farmers

In this region 55% fish farmer collected seed directly from hatchery. Most of the farmer collected seed from outside of the district. In our study, it was observed that fish farmers faced a lots of problems. Among them, lack of technical man-powers (67.5%) and high labor cost (67.5%) were noticeable problems (Figure 12).

Similarity was found by Malek (2007) stated that problems faced by hatchery owners in Mymensingh area included lack of disease tolerant brood, inbreeding problems, lack of technical knowledge, price fluctuation and unexpected market competition. On the other hand, the lack of capital, lack of transportation facilities was the main problems for nursery owners. Rahaman et al., (2007) also stated that the main constrains were lack of capital (35%) followed by lack of technical knows-how (27%) faced by fry traders. The nursery operators faced the problems like lack of capital (31%), high lease value (25%), high price of production inputs (17%), violence (12%), intense market competition (9%) and the lack of policy support (6%) in Jessore. Sharif and Asif (2015) also claimed *Argulus* disease as the main problem, 95% of hatchlings mortality is caused by *Argulus* disease in Jessore.

CONCLUSION AND RECOMMENDATION

Aquaculture activities are rapidly increased in the Sylhet region. The supply of good quality fry and fingerlings for successful aquaculture activities depends on a good seed marketing system. But, some problems are evident in the marketing channel and transportation system of fry. Traditional transportation system, involvement of multiple middlemen, high fry mortality, lack of technical knowledge of hatchery and nursery operators are major problems. For developing an efficient fish seed marketing the following recommendations should be followed through participatory approaches with hatchery owners, farmers, traders, government agencies, and NGO stakeholders. In this regard, quality brood should provide to the hatchery owners by government arrangement through establishment of live brood banks. Formal fry and fingerling trading networks should be developed locally and regionally by the government and other developing partners so that fry and fingerling producers and farmers can get their actual benefit. To produce quality brood stock, quality seed and an effective seed marketing system, institute-industry research partnership should establish along with hatchery and nursery operators.

REFERENCES

1. Abdulla-Al-Asif M, A Samad, MH Rahman, M Almamun, SMY Farid and BS Rahman, 2015. Socio-economic condition of fish fry and fingerling traders in greater Jessore region, Bangladesh. *International Journal of Fisheries and Aquatic Studies*, 2: 290-293.
2. DoF, 2005. Matsha pakka sankalon. Department of Fisheries, Matsha Bhaban, Dhaka. pp. 133-139.
3. DoF, 2016. National Fish Week 2016 Compendium (In Bengli). Department of Fisheries, Ministry of Fisheries and Livestock, Bangladesh. p. 148.
4. Dwivedi, SN and GS Zaidi, 1983. Development of carp hatcheries in India. *Fishing Chimes*, 3: 1-19.
5. FRSS, 2016. Fisheries Statistical Report of Bangladesh. Fisheries Resources Survey System (FRSS), Department of Fisheries, Bangladesh. 32: pp. 57.
6. Haque MZ, MA Rahman and MS Shah, 1991. Studies on the density of Rohu (*Labeo rohita*) fingerlings in polythene bags for transportation. *Bangladesh Journal of Fisheries*, 14: 145-148.
7. Hasan M and AN Bart, 2006. Carp seed traders in Bangladesh: Sources of livelihoods and vulnerability resulting from fish seed mortality. *Asia-Pacific Journal of Rural Development*, 16: 101-124.
8. Hussain MG and MA Mazid, 2001. Genetic improvement and conservation of carp species in Bangladesh. Mymensingh: Bangladesh Fisheries Research Institute.
9. Islam S, 2010. Studies on pond fish farming and livelihoods of rural farmers in some selected areas of Maulvibazar district. M. S. Thesis. Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, pp. 36.
10. Kohls RL and JN Uhl, 1980. Marketing of Agricultural products (5th edition), Macmillan publishing Co. Inc., New York.
11. Malek MA, 2007. Fish seed marketing in Mymensingh area, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, pp. 64.
12. Rahaman MM, MA Sayeed, A Paul and M Nahiduzzaman, 2007. Problems and Prospects of Fish Fry Trade in Jessore District of Bangladesh. *Progressive Agriculture*, 18: 199-207.
13. Sharif BN and AA Asif, 2015. Present status of fish hatchlings and fry production management in greater Jessore, Bangladesh. *International Journal of Fisheries and Aquatic Studies*, 2: 123-127.
14. Sultan MS, 2008. Present status of hatchery operation and fry marketing system at Chachra, Jessore. MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, pp. 54.