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Article

Status of fish culture in Rajshahi City Corporation of Bangladesh

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Abstract: The present study carried on 16 sampling ponds in Rajshahi City Corporation, Rajshahi, Bangladesh during the period from August, 2005 to April, 2006. The main theme of this work was to find out the impact on present status of improved traditional culture and mixed culture in various pond. This study involved the observations made on physical characteristics, ownerships system, ponds preparation, stocking combinations of fish seeds, post stocking management and maintenance, harvesting and cost analysis of 16 improved traditional managed ponds in Rajshahi City Corporation. The primary data for the study was taken from the growers of these ponds. After collecting primary data, it was analyzed by suitable statistical method. Physical characteristics of the sampling pond were found. Water depth more or less sufficient, water colour greenish, presence of sunlight was sufficient, water source was mainly drain and rain and various shaped of pond was found. Pond was prepared by traditional method using pesticides (Phostoxin, Rotanone, Sumithion, Quick fume), lime and fertilizers (Urea, TSP., Cow dung). The fish seed were stocked in different ponds. In Sac fry was stocked in 4 nursery ponds. Post stocking management and maintenance were included inorganic fertilizer (Urea, TSP), organic fertilizer cow dung, applied weekly and supplementary feeds were used daily. It was observed that 15 ponds were made profit and one pond had loss. Two types of ownership were found (three years and five years) in the study period. During the study time two types of harvesting method were found. They were partial and final harvest. Mainly two types of production cost such as variable cost (lease, pond preparation, pesticide use, fertilizer etc.) and fixed cost (cost of net, net preservation, tax of pond etc.) were observed in the study period.

Keywords: culture; fertilizers; carps; pond; management

1. Introduction

Bangladesh is a riverine country. Though the total area of the country is small but it is enriched with vast and diverse water bodies and fisheries resources. In reality most of the people of our country are victims of fish protein deficiency. Because, increased demand of fish is not possible to full fill for the growing production of the country by capturing from the natural resources only. In this situation the fish culture in a potential sector and we ought to use these water bodies properly for fish culture. Though improved culture and management of these natural resources may not only contribute to economic gain and poverty alleviation but also contribute significantly towards the eradication of micro nutrient deficiencies and other disease due to malnutrition particularly in resource poor rural house hold. The fish specializes are researching to discover new and appropriate technology for the development of the fish culture.

The geographically Bangladesh is situated in such a position that the environmental condition of it suitable for fish culture. The average annual production of fish from culture and cultivable ponds are 296 to 1160 kg/ha,

which is approximately 17% of total fish production in the country and the average annual production from a swamp is 185 kg/ha. Fish production from a semi-intensive and extensive managed ponds was 2305 kg/ha. It also found that from an improved traditional part stocking managed ponds the average net production was 3679.09 kg/ha/yr (Mohsin, 2000). At present the average production of fish per amount from closed water body (culture) is 1496.37 kg/ha, which is 40.37% of the total fish production (DoF, 2001).Most of the fish farmers of Bangladesh follow the traditional carp culture method. However, a number of pond owners are now trying to improvise the traditional culture method by fertilizing the water bodies with supplementary feeding of fish (Mohsin, 2000). Post stocking management has been producing higher quantity of fish (Alikunhi *et al*., 1971; Singh *et al*., 1975; Dinesh *et al.*, 1986; Uddin *et al.,* 1998).

The recent decline fish production from inland open water is due to increasing fishing pressure and environmental degradation. It is possible to produce 3-4 mt. fish ha. per year by using the improved traditional method of fish culture of Bangladesh play an important rolein providing employment and per capital consumption of fish.

Simply the productivity of pond for carp culture depends on various physico-chemical parameters, plankton, aquatic vegetation etc. It's are related to various types of water temperature, pH, dissolved O_2, free CO_2 alkalinity and some other salts for growth and development (Nikolsky, 1963). Any charges of these parameters may affect the growth, development and maturity of fish (Nikolsky, 1963).

The carp fish production from a pond also depends on stocking density of fry, Fertilizing and finally as well as the proper management of the ponds. In Bangladesh the common culture able carp species are-Rohu, Catla, Marigal, Silver, Bighead, Common carp etc. The present study helps to know the present status of culture in pond of the study area. It is also to select the suitable carp culture method in the pond and also the cost analysis of this culture method. The proper production of these selective ponds can be estimated with focusing the importance of pond in fresh water in land fish culture. Better carp production of ponds would be able to supply fish protein to the poorer section of the population and thus will increases the annual intake of protein of the population of our country.

2. Materials and Methods

The present study on the improved traditional methods and production of Carps were made in Rajshahi City Corporation. The primary data needed for the study were collected through the survey method by detailed questionnaires. This survey on the investigation of study areas, physical characters of ponds, pond preparation, stocking of fishes seeds, stocking rate and density, post stocking management and maintenance, harvesting and cost analysis.

2.1. Sampling method

The survey program was carried on the ponds of Rajshahi City Corporation. Samples were taken from selective sampling pond and grower of these ponds.

2.2. Data collection

In selective sampling ponds and the interview was taken from seven growers of sixteen ponds. Out of six parts of questions five are collected from the growers and rest one question is collected from the direct inspection of those ponds.

2.3. Study place and period

The present study on the improved traditional culture methods and production of different species of carps will be made from 16 ponds at Rajshahi City Corporation. Rajshahi City Corporation in the North West part of Bangladesh. This study was carried out during the period June 2005 to March 2006.

2.4. Data analysis

Data analysis were performed with MS excel statistical methods.

3. Results

3.1. Physical characteristics of the sampling ponds

Different physical characteristics of the sampling ponds (N=16) such as water area, water depth, shape, Dyke condition, depth of mud, soil type, water color, source of water and vegetation of the bank were recorded by direct inspection and observation. The obtained data of the physical characteristics of the sampling pond were analyzed and detailed result shown in the following Table1.

Table 1. Physical characteristics of the sampling pond.

No	Parameter	Minimum	Maximum	Mean±SD
1	Water area(deci)	4.6	130	58.42±39.38
2	Average water depth(m)	1.25	3.87	2.16±0.79
3	Water depth at rainy season(m)	1.5	5.39	2.80±1.19
4	Water depth at dry season(m)	1	2.52	1.47±0.48
5	Depth of mud	1.2	95	54.03±29.41

3.2. Ownership of the sampling ponds

14 sampling pond were leased pond. The lease condition, duration and deposited money were varied. Duration of money during tease period minimum 15 Tk/deci and maximum 1,111 Tk/deci with a mean value 311.93±250.41.

3.3. Pond type

Out of 16 sampling ponds 4 were nursery, 7 were rearing and 5 were stocking ponds. Most of the pond 08 were rectangular rest of irregular 05 the round shape and square shape respectively.

3.4. Pond preparation

At first, either pesticides used and retting alone or dewatering was done for removing carnivorous and unwanted fishes and insects. After one or two days, lime was added to make the pond free from any fish parasites and to bring about suitable environment necessary for better health of fish. Four to six days after liming the pond were mannered with inorganic and organic fertilizers. Later, seven to ten days after manuring these ponds were made ready for stocked fish feeds in Table 2.

Table 2. Quantity of the pesticide, lime and fertilizer which use during pond preparation.

Items		N	Minimum	Maximum	Mean±SD
Pesticides	Phostoxin (piece/deci)	5	0.16	14	6.91±5.20
	Rotenone (kg/deci)	2	0.08	0.08	0.08±0.00
	Sumithion (mU/deci)	4	3	20.2	0.05±8.22
	Quick fame	2	6	11.77	8.89±4.08
Lime	Dolomite (kg/deci)	15	0.29	2.0	0.92±57
Inorganic fertilizer	Urea (kg/deci)	11	0.2	2.02	0.98±0.65
	TSP (kg/deci)	10	0.3	1.8	0.78±0.50
Organic fertilizer	Cow dung (Kg/deci)	11	0.5	11	5.37±4.74

3.5. Stocking of fish seeds

A variety of fish species ware available in our country, but all were not suitable for culture in the ponds. From the very beginning Indian major carp was stocked and reared. Thereafter, some exotic species fish on assumption the names and stocking density of fish are given below in Table 3.

Table 3. Stocking density of fingerlings.

Sl. No.	Species	No. of Pond	Stocking density (no./deci)		
			Minimum	Maximum	Mean±SD
1	Ruhi	7	3	6	4.83±1.34
2	Catla	5	1.5	4	2.82±1.05
3	Mrigel	5	4	7.5	6.10±1.59
4	Silver carp	7	4	7	2.90±1.92
5	Common carp	5	1.4	3	1.88±0.67
6	Sarputi	5	1.4	3	1.40±1.21
7	Grass carp	6	0.3	1.5	0.73±0.57
8	Big head	7	0.2	4	1.73±1.36

3.6. Post stocking management

Most of the farmers were used urea and TSP during post stoking management period which is varied from 0.02 kg/deci/yr to 0.5 kg/deci/yr and 0.04 kg/deci/yr to 0.3 kg/deci/yr respectively. They also use organic fertilizer

like cow dung which was varied from 0.01 kg/deci/yr to 1 kg/deci/yr. Culture fish were feed with rice bran, wheat bran, wheat flower, maize flower, and mastard oil cake in Table 4.

Table 4. Quantity of fertilizer and supplementary feed during post stocking management. (kg/deci/yr).

Items.	Ingredient	No. pond	Minimum	Maximum	Mean±SD
Fertilizer	Urea	8	0.02	0.5	0.27±0.23
	TSP	5	0.04	0.3	0.21±0.11
	Cow dung	9	0.04	1	2.06±3.54
Supplementary	Rice bran	11	0.01	3	0.64±0.87
Feed	Wheat bran	4	0.03	0.5	0.21±.20
	Wheat flower	5	0.03	0.8	0.41±0.30
	Maize flower	3	0.01	3.5	1.34±1.89
	Mastard oil cake	13	0.01	0.42	0.19±1.89

3.7. Gross production of fish

Minimum and maximum gross production of Rohu, Catla, Mrigal, Silver carp, Bighead carp, Grass carp, Mirror carp and Sorputi was observed minimum 0.46, 0.97, 0.26, 2.38, 0.64, 0.56, 1.5, 0.42 kg/deci/year and maximum 6.31, 2.16, 1.57, 3.23, 0.94, 1.02, 1.5, 0.42 kg/deci/year respectively in Table 5.

3.8. Gross production of marketable fish

Gross production of marketable fish ware observed 5 sampling ponds. The following fish species are produced in Table 5.

3.8.1. Rohu

The gross production of Rohu from 4 sampling ponds ware observed the minimum is 0.46 kg/deci/year and maximum 6.13 kg/deci/year with a mean value of 2.76±2.47.

3.8.2. Catla

The minimum value of gross production of mrigal from 4 sampling ponds ware observed as 1.57 kg/deci/year and maximum 0.26 kg/deci/year with a mean value of 1.22±0.64.

3.8.3. Mrigal

The minimum value of gross production of mrigal from 4 sampling ponds ware observed as 1.57 kg/deci/year and maximum 0.26 kg/deci/year with a mean value of 1.22±0.64.

3.8.4. Silver carp

The gross production of marketable silver carp from 2 sampling ponds ware observed as minimum 2.38 kg/deci/year and maximum 3.23 kg/deci/year with a mean value of 2.81±0.60.

3.8.5. Big head carp

The gross production of big head carp from 2 sampling ponds ware recorded as minimum 0.64 and maximum 0.94 with a mean value of 0.79±0.21.

3.8.6. Grass carp

The gross production of grass carp from 2 sampling ponds ware recorded minimum 0.56 kg/deci/year and maximum 1.02 kg/deci/year with a mean value of 0.79±0.33.

3.8.7. Sarputi

The gross production of sarputi from 1 sampling ponds was obtained as minimum 0.42 and maximum 0.42 with a mean value of 0.42.

Table 5. Gross production of the marketable fish (kg/deci/yr).

Species	N	Minimum	Maximum	Mean±SD
Ruho	4	0.46	6.13	2.76±2.47
Catla	4	0.97	2.16	1.33±0.56
Mrigal	4	0.26	1.57	1.22±0.64
Silver carp	2	2.38	3.23	2.81±0.60
Big head carp	2	0.64	0.94	1.79±21
Grass carp	2	0.56	1.02	0.79±0.33
Mirror carp	1	1.5	1.5	0.59±0.33
Sarputi	1	0.42	0.42	0.69±0.33

3.9. Cost analysis

Different aspects of the economic analysis had state below. Mainly two types of production cost were observed such as- 1) Variable cost: The details of variable cost analysis were expressed in term of investment of pond to maintains uniformity between different pond size. 2) Fixed cost**:** (Cost of net, net preservation, guard shed, hons, tas of pond) were not added here. The following items were included in variable cost of the production cost.

3.9.1. Cost of ownership

The cost of this purpose (N=14) was minimum1 Tk/deci/yr and maximum 1111 Tk/deci/yr, with a mean value of 311.93±250.4.

3.9.2. Cost for pesticides

Out of the 16 sampling pond, phosjtoxin was used (N=5) the cost of this purpose was minimum 0.3 Tk/deci/yr and maximum 28 Tk/deci with a mean value 13.70±10.48.

3.9.3. Cost for stocking of fish seeds

Minimum and maximum fish seed cost of Rohu,Catla, Mrigal, Silver carp, Bighead carp, Sorputi Mirror carp and Grass carp, were observed minimum 7.5,1.5,4,0.25,0.32,1.2,0.6,0.3 kg/deci/year and maximum 18,9,10,105,12,7.5,7,9 kg/deci/year respectively in Table 7.

3.9.4. Cost for fertilizer and feed

Cost of inorganic fertilizer urea and TSP ware minimum 0.13 Tk/deci/yr,0.7 Tk/deci/year to maximum 3.6 Tk/deci/year, 5.4 Tk/deci/year respectively. On the other hand cost of organic fertilizer cow dung was minimum 0.08 Tk/deci/year and maximum was 27.5 Tk/deci/year. Five types of supplementary feeds ware used during post stocking management and maintenance. Minimum cost of rice bran, wheat bran, wheat flower, maize flower and mastard oil cake ware 0.08, 0.2, 0.6, and 0.8 Tk/deci/yr respectively. Maximum cost of rice bran, wheat bran, wheat flower, maize flower and mastard oil cake ware 6, 5, 6.4 and 3.75 Tk/deci/yr respectively in Table 6 & 8.

3.9.5. Cost of management maintenance

Two items were included in that purpose such as cost for netting and currying and cost for tax of sold fish. The cost of netting and currying was minimum 533.6 Tk/pond and maximum was 6396 Tk/pond with a mean value of 2236.38±1506.9. Cost for tax of sold fish purpose was minimum 15 Tk/pond and maximum was 120 Tk/pond with a mean 42.44±32.32.

Table 6. Cost for pond preparation (Tk/deci/yr).

Items		No. of pond	Minimum	Maximum	Mean±SD
Pesticides	Phostoxin	5	0.3	28	13.70±10.48
	Rotenone	2	25.6	25.6	12.70±10.48
	Sumithion	4	1.8	12.12	4.92±4.83
Lime	Dolomite	15	2.5	12	5.61±3.16
Inorganic fertilizer	Urea	11	1.5	12.14	5.94±3.91 _
	TSP	10	0.8	32.4	12.83±9.93
Organic fertilizer	Cow dung	11	0.75	17	7.94±7.40

Table 7. Cost for stocking fingerlings (Tk/deci/yr).

Items	No. of pond	Minimum	Maximum	Mean±SD
Ruho	7	7.5	18	11.74±3.90
Catla	6	1.5	9	4.25±2.82
Mrigal	4	4	10	5.85±2.79
Silver carp	7	0.25	10.5	3.39±3.88
Big head	7	0.32	12	3.47±4.20
Sarputi	5	1.2	7.5	3.08f2.56
Commoncarp	5	0.6	7	3.72±2.70
Grass carp	6	0.3	9	4.37±3.70

Table 8. Cost for fertilizer and supplementary feed used during post stocking management. (kg/deci/yr)

Sl. No.	Items	No. of pond	Minimum	Maximum	Mean±SD
1	Urea	8	0.13	3.6	1.55±1.40
2	TSP	5	0.7	5.4	3.35±2.02
3	Cow dung	9	0.08	27.5	3.81±8.92
4	Rice bran	11	0.08	6	2.20±1.94
5	Wheat bran	4	0.2	5	12.96±24.70
6	Wheat flower	5	0.6	6.4	3.54±2.06
7	Maize flower	3	0.8	3.75	2.77±1.70
8	Mastard oil cake	13	0.12	5	2.38±1.57

3.10. Gross return

Mainly eight species of fish were sold. Gross return of Rohu, Catla, Mrigel, Silver Carp, Big head carp, Sorputi, Mirror carp and Grass carp, gross return was minimum 60,70,40,82,60,15,46,45 Tk/deci/year and maximum was 3680,600,190,530,480,115,6000,250 Tk/deci/year respectively in Table 9.

Table 9. Species wise gross return of 16 sampling pond (Tk/deci).

Items	No. of pond	Minimum	Maximum	Mean±SD
Ruho	14	60	3680	613.93±909.99
Catla	13	75	600	288.56±125.42
Mrigal	11	40	190	112.7±58.07
Silver carp	12	82	530	200.46±147.60
Big head	9	60	480	218.42±153.55
Sarputi	4	15	115	45.75±47.00
Common carp	11	46	6000	664.42±1771.08
Grass carp	9	45	250	107.61±78.85

3.15. Net profit or loss

It was observed that 15 ponds made profit on the other hand one pond loss. The height profit of 4427.4 Tk/deci/year was recorded for pond no.-2. The mean value of gross return 1751.02±1344.79 Tk/deci/year as shown in Table 10.

Table 10. Total production cost, gross return and net profit (Tk./deci).

Items	No. of pond	Minimum	Maximum	Mean±SD
Total production cost	16	112.02	157.6	647.62±430.40
Total gross return	16	125	6000	1751.05±1344.79
Net profit	16	-35.5	4427.4	1103.40±1160.73

4. Discussion

Traditional system of pond culture has been existing in our country for centuries. However it is only necessity that a great deal of advancement has been made in our fish culture system. The recent decline in fish production

from inland open waters is due to increasing fishing pressure and environment degradation. The present study deals with the mixed fish culture of carps in improved traditional fish culture system in Rajshahi City Corporation district. The highest water area in 130 decimal and lowest 4.6 decimal is with a mean 58.42±39.38. It is observed that those ponds which water area is high are made low profit. Because the cost of culture at large size pond are very expensive. So it is a factor from making a better profit. Collins (1971) reported that pond size had certain influence on fish growth.

The highest water depth recorded 5.39m at rainy season and the lowest as 1.5m at winter. The highest averages water depth is 3.87m and lowest average water depth is 1.25m with a mean value of 2.16±0.79m. Ehsan et al. (1997) reported lower water depth during dry season. From the point of view of biological productivity of a pond Jhingran (1985) suggested 2m depths may be cogenial forms. Because the water of these pond are used for irrigation in the dry season. Thus, the point of view of average water depth, it can be said that most of the sampling ponds are adequate for carp culture. The shapes of the ponds are different dimensions. In the sampling ponds, rectangular shape is common. Which are suitable for fishing Mohsin (1999) reported that rectangular shape of pond suitable for culture. In the sampling ponds, rain is common source of water at the rainy season. Others are drainage. Hence, it is observed that the depth of water has direct relationships with rain.

The water color of the most ponds is clear and greenish which is suitable for fish culture. Two type of ownership system are found. These are personal pond and leased pond. In case of lease total money should be deposited during base agreement, years of lease duration and amounttotal money are varied between pond and owner.Pond preparation is one of the most important tasks for successful and pond culture operation. But they are the pond is removed off carnivores and unwanted fishes and insects by using pesticides and netting in 16 ponds.

In case of using pesticides and netting, five types of pesticide are used in different ponds. Mast of the ponds used rotenone at an average rate of 0.8 kg/deci. Bides sumithion is used at an average rate of 8.05 ml/deci.

After 1-2 days lime is added at an average rate of 0.98% kg/deci. Four to six days after liming two type of inorganic and one type of organic fertilizer are used in the study ponds Urea and TSP are used at an average rate of 0.98 and 0.78 respectively. Cow dung is used at an average rate of 5.37.

Polyculture of the Indian major carp to determine better methods of increasing fish production. The ponds were fertilized with organic andinorganic fertilizers and supplied artificial feeds. The ponds were stocked with 6000 fingerlingsper ha. After a year the gross production recorded for two ponds were 15.91 kg/deci/year respectively. Ling (1977) reported that through poly culturekg/deci/year could be obtained from heavily fertilized ponds as against 1.71 kg/deci/year obtained from the ponds without fertilizer.Later seven to ten days after manuring these ponds are made ready for stocking of fish seeds.Two group of fish seeds is stocked in different sampling ponds. Out of is sampling ponds, group-1 (Sac fry, fry) is stocked in 4 ponds.Out of the 16 sampling ponds, fingerlings is stocking in 7 ponds. Five to Eight (from 11 sp.) species are stocked in different ponds. Details stocking combination is given below. Six type of stocking combination of fingerlings are found. Chowdhury *et al.* (1978) reported fish production by application of composition of composite fish culture technology in ponds with a high stocking density of 53.92 fingerlings/decimal. The ponds recorded average gross and net production of 30.90 kg/deci and 30.14 kg/deci/year. Respectively, which was about 7 times the normal production of around 4.04 kg/deci/year reported by the ordinary fish farms.

Post stocking management and maintenance is included following phenomenon. Two types of inorganic fertilizers are used. Urea,TSP are used at an average rate of 0.27 kg/deci/year and 0.21 kg/deci/year orderly. The overall survival was highest is the medium urea treatment. Total net fish production was highest is the medium urea treatment (Dinesh *et al*., 1986) higher fish production could be achieved managing with the right type of notrogen fertilizers (Shah *et al.*, 1975). One types of organic fertilizer **is** used. Cow dung is used at an average rate of 0.06 kg/deci/year. Fertilizer is used mostly daily or weekly. Jhingran and Pullin (1985) suggested different does of organic and inorganic fertilizer for increasing growth and survival of fry and fingerlings Khan and Jhingran (1975) mentioned both organic and inorganic fertilizer used in the carp nursery ponds. Organic fertilizer used in daily.

Most of the ponds used supplementary feeds. Rice bran, wheat bran, wheat flour, maize flour, mustard oil cake are used as supplementary feed at an average rate of 0.64, 0.21, 0.41, 1.34 kg/deci/year respectively. Supplementary feed are used daily. Fertilizer and supplementary feed are sued regularly daily or weekly. In some times, fertilizers are used irregularity. Four groups of fishes are produced. These are Group-I (Sac fry) is produced at gross production 0.09 kg/deci. Group-II (fry) is produced at gross production 0.56 kg/deci and Group-Ill (Fingerlings) is produced at an average rate of 25.24 kg/deci. The highest gross production (Group-II) is 10.5 kg/deci/year for silvdr carp and the lowest is 0.3 kg/deci/year surputi. Mohsin (2000) recorded a fish production of 16.34 kg/deci/year from improved traditional and post stocking management ponds. He quoted that the average total weight of fish seeds was 14.89 kg/deci/year and maximum 25.85 kg/deci/year.The

production rate however is satisfactory. It may be considered as sufficiently to the other inland fish production countries and even to the present need for our country.Total production cost in included following main items, which are given respectively.

Cost of owner (lease) is varied from Tk. 15 to 1111 deci/year. The mean value of this purpose is Tk. 311.93 deci/year. The average cost for pond preparation is Tk. 93.68 deci. The highest cost is Tk. 68.60 deci pond no. 10 and the cost is Tk. 2.5 deci pond no. 12.The average cost for stocking of fish seed fingerlings 39.82 Tk/deci. The highest average cost of Rohu 18 Tk/deci and lowest cost of grass carp 0.3 Tk/deci. The average cost for post stocking management and maintenance is Tk. 24.11 deci. The average cost for harvesting and marketing is Tk. 72.13 deci. The highest production cost is Tk. 1572/pond. The highest net profits are Tk. 6000/pond. and lowest net loss 35.5 Tk/pond and mean value 1103.4 Tk/deci/year. From present findings it should be cleared that all the grower of the sampling ponds are made profit. The profit of the some pond is less due to the high production cost of these ponds.

5. Conclusions

In the present study, it is clearly indicates that the fish farmer at Rajshahi City Corporation are showing productivity and they have improved traditional method of fish culture. The environmental condition and socio economic condition of fish farmer are attraction them to work with improved traditional fish farming because the improved traditional method in respect of fish bio-mass production and net profit. It was it observed that 15 ponds are making profit and one pond is make loss. Two types of ownership were found (three years and five years) in the study period. During the study time two types of harvesting method were found. They were partial and final harvest. Mainly two types of production cost such as variable cost (lease, pond preparation, pesticide use, fertilizer etc.) and fixed cost (cost of net, net preservation, tax of pond etc.) were observed in the study period.

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Conflict of interest

None to declare.

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