EMERGING AVENUE - BIOFLOC FISH FARMING

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ABSTRACT

Fisheries and aquaculture remain an important source of food, nutrition, employment and income for millions, especially the rural populations. In fact, the sector provides Livelihood to about 25 million fishers and fish farmers at the primary level and twice the number along the value chain. Fish being is rich source of animal protein, is one of the healthiest options to hunger and nutrient deficiency. It has potential to enhance incomes and usher in economic prosperity to stakeholders. Hence it is essential that sustained and focused attention is given to the fisheries sector through policy and financial support to accelerate its development in a sustainable, responsible, inclusive and equitable manner. Biofloc Technology (BFT) is considered as new "blue revolution" since nutrients can be continuously recycled and reused in the Culture medium, benefited by the minimum or zero-water exchange. This system is also called as active suspension ponds or Heterotrophic ponds or even green soup ponds.

Keywords: *Fisheries, Biofloc Technology, water treatment*

1. INTRODUCTION:

The global population is expected to reach 9.6 billion by Yr. 2050 and as the demand for animal protein is increasing year by year it is a challenge to provide quality protein by safeguarding its natural resources for future Generations. In this context, aquaculture plays a key role in promoting health by providing Animal protein as well as generating employment and economic growth. Biofloc Technology (BFT) is considered as new "blue revolution" since nutrients can be continuously recycled and reused in the Culture medium, benefited by the minimum or zero-water exchange. BFT is an Environment friendly aquaculture technique based on in-situ microorganism Production. Biofloc is the suspended growth in ponds/tanks which is the aggregates of living and dead particulate

organic matter, phytoplankton, bacteria and grazers of the bacteria. It is the utilization of microbial processes within the pond/tank itself to provide food resources for cultured organism while at the same time it acts as a water Treatment remedy. Thus, this system is also called as active suspension ponds or Heterotrophic ponds or even green soup ponds. Fisheries and aquaculture remain an important source of food, nutrition, employment and Income for millions, especially the rural populations. In fact, the sector provides Livelihood to about 25 million fishers and fish farmers at the primary level and twice the number along the value chain. Fish being an affordable and rich source of animal protein, is one of the healthiest options to mitigate hunger and nutrient deficiency. It has immense potential to enhance incomes and usher in economic prosperity to stakeholders. Hence it is essential that sustained and focused attention is given to the fisheries sector through Policy and financial support to accelerate its development in a sustainable, responsible, Inclusive and equitable manner. Further, since majority of fisher folk directly depend on the sector, especially the small Scale and artisanal fishers.

2. REVIEW OF LITERATURE:

Ashfaqun Naharetal (2015) studied an experiment which was conducted for six months to demonstrate the suitability of biofloc technology in farming system of mono-sex GIFT tilapia Oreochrom isniloticus. The experiment was carried out with four treatments and three replicates of each. Three supplemental feeds such as commercial tilapia feed (CF), wheat bran (WB), biofloc technology (BFT) and rice bran + wheat bran (50:50) (RWB) were designated for this experimentation. Although overall production was the highest in CF (3803 kg/acre/6 months) receiving commercial tilapia feed, but the net profit was highest (Tk. 99,453.3/acre/6 months) in BFT receiving periphyton due to the lower cost for the production of periphyton. Based on the results of the study, the use of periphyton as feed is more economically profitable than wheat bran and even commercial tilapia feed for the culture of monosex tilapia in ponds. **Kimathi et al. (2013)** studied and investigated factors affecting profitability of fish farming under Economic Stimulus Programme in Tigania East The study was to determine the influence of marketing on profitability of fish farming in Tigania East, establish the importance of related extension services on fish farming; determine the host's community cultural practises that influence fish farming and

explore ways in which pond management skills influences fish farming. However, where adopted as business there were little returns from fish farming. Descriptive research design was employed in the study. The study applied descriptive research design by involving 200 fish farmers within Tigania East district. Stratified random sampling was used to select fish farmers. **Moataz and Mohamed (2013**) studies revealed that fisheries are required to grant convenient environmental conditions for fish growth with minimum cost afford. Providing these environmental conditions should essentially correlate fish type, pond dimensions, water properties, and weather conditions to the fish growth rate, feeding and metabolism. The large uncertainty margin of such parameters relations and effects drives the farmers to have economically inefficient practices in their farms. The present work was divided into two parts. The first part introduced an interactive Microsoft Excel spreadsheets as a decision support system (DSS) for the purposes of fish farm area planning according to the different required purposes of ponds, water evaluation to insure the most suitable environment of fish growth, and mechanical aeration management. The second part was a microcontroller based open loop control system for mechanical aeration process based on the calculations of the DSS. **Bosu et al. (2016)** study was conducted to determine fish culture techniques practiced by the farmers and cost-benefit analysis in terms of single and multiple ownership of fish farms in Mankun Union of Muktagacha Upazilla of Mymensingh District. For this study 5 fish farms: Ali Mia Fish Farm, Amin Uddin Fish Farm, Shaiful Fish Farm, Tanzil Fish Farm, and Shapon Fish Farm were selected covering the different areas of the study area. Data were collected for a production cycle starting from April, 2014 to November, 2014. The fish farms in the study area were established during 2000 to 2011. The maximum area of fish farm was found in Shapon Fish Farm (780 dec.) and minimum area of fish farm was found in Shaiful Fish Farm (123.5 decimal). The minimum size of the pond was 13 decimal and the maximum size of the pond was 84.5 decimal and average pond size was 47.97 decimal. The maximum net income of was observed in Ali Mia Fish Farm (7836 BDT/decimal), whereas the minimum was observed in Shapon Fish Farm (1631 BDT/decimal). The maximum BCR (1.483) and the minimum BCR (1.096) was found in Ali Mia Fish Farm and Shapon Fish Farm respectively. Average BCR was higher in single ownership fish farms (1.30) than multiple ownership fish farms (1.15).The major problem in the study area was high price of feed and low price of

fish. **Erick et al. (2020**) studied Aquaculture uses large volumes of water, which is generally discharged without treatment, possibly causing scarcity and contamination. The aim of this study was to identify the main factors that limit a Mexican aquaculture producer from adopting biofloc technology in their aquaculture production units (APUs). Strengths and weaknesses were methodologically analyzed through 248 questionnaires, applied to fish farmers in 16 states of the country with a mixed approach (quantitative and qualitative). Findings reveal that the main obstacles in the use of BFT are due to the following: low academic level, limited administrative capacity, scarce technological equipment in facilities, diversified productive activity, and obsolete regulations. **Jadhav and Borgave (2019)** studied to assess the marketing system and distribution channels, and constraints/inefficiencies of marine fish in India. The study was based on the secondary information from literature review. Marine fish marketing is almost controlled by the private sector where livelihood and socio-economic growth of a number of people (engaged directly or indirectly) are associated with the efficiency with which fish distribution and marketing systems run. The market chain from producers to consumers passes through a number of intermediaries' viz. local traders, agents/suppliers, wholesalers and retailers. Based on the results of the study it was revealed that in general the price of marine fish depends on market structure, species quality, demand, size and weight of fish species.

3. STATEMENT OF THE PROBLEMS:

Indian economy has been dependant on traditional farming from years ago. There is need in making changes in traditional farming and allied business to involve in new ventures for every individual. Farming is always been supported with animal husbandry for secondary source of income. Fisheries Unit assist to evolve Economy to both Individuals and Society. Thus there is also need in making change scenario from traditional fishery to modern fishery. Hence new avenue – Biofloc fishery is emerging opportunity for individual to have secured source of income. A fishery saves farmer's time to grow Seedling in Farm

4. OBJECTIVES OF THE STUDY:

1. To evaluate different techniques used for biofloc fish farming
2. To study the production cost of biofloc fish farming
3. To study the profitability of biofloc fish farming

5. RESEARCH METHODOLOGY:

This is an analytical study. This project focuses for a systematic study of the situations, problems and phenomenon and will attempt to find out the relationship between various aspects of the study. The present study relies on primary as well as secondary data. The Primary data have collected from interview schedule and observation method of selected unit as well as secondary data collected from various resources such as websites, research paper, articles and reports.

6. RESULT AND DISCUSSION:

A. Different Techniques Used For Bio Flock Fish Farming

METHOD 1:

For 15000 Litres of fresh water 150 Litres of inoculum is required for the floc development

Step 1

Take clean tub/can with 150 Litres of water and continue vigorous aeration

Step 2

Add 3 Kg of pond soil **+**1.5 gm of Ammonium sulphate /Urea **+** 30 gm of carbon source (Jagerry /Wheat flour /Tapioca flour)

Step 3

Mix it well with water in tub and provide adequate aeration

Step 4

The inoculum will be ready after 24-48 hrs and it can be transferred to main tank

Daily addition of carbon source is required for the development of floc. For every 1 kg of feed given (with 25 % of crude protein), 600 gm of carbon source is to be added to the system to maintain C: N of 10:1.

Once the floc volume reaches 15-20ml further addition of carbon source is not required

METHOD II:

Step 1

Take clean tub/can with 130 Litres of water and continue vigorous aeration

Step 2

Add 20 Litres of pond water/RAS water (before filtration) + 30 gm of carbon source (Jagerry /Wheat flour /Tapioca flour) + 10 gm of probiotic (with Bacilus Sp., Aspergilus Sp. etc with a total concentration of 10x109 CFU/gm). Follow the remaining steps as mentioned in method 1

***** NB: Well developed inoculums will be turbid with foam on the water surface (Ideal Volume of Floc in Inhofe cone for shrimp is 10-15 ml/L and for Fish 25-35 ml/L

B. 7 Tanks production cost of bioflock fish farming Technical Specifications- 100 m^3

Table No. 1

Sr. no	**Component**	**Details**
1	Area for 7 tanks	200 m2
2	Biofloc Tank size	4 metre diameter and 1.5 meter height (1.20 m water depth)
3	Water holding capacity of each tank	15,000 Litres capacity
4	Water quality parameters	Dissolved Oxygen-5mg/L,Temparature-26-34°C, pH-7.5 to 8, TDS-600ppm, Floc density-25-40 mg/l, Ammonia-0.5 ppm, Nitrite-0.3 ppm,Nitrate-150 ppm, Alkalinity-120-280 ppm
5	Tanks Made-up of	Tarpaulin/Fibre/HDPE

Sr. no	Component	Details
6	Stocking density	100 nos/m3 (1000 no.s per 15,000 litres tank - depending on species)
7	Species cultured	GIFT Tilapia (Oreochromis niloticus)
8	Survival (%)	80
9	Type of feed to be used	floating pellet feed
10	% of feed	2-3% per Average Body weight
11	Feeding frequency	4 times early stage, later 2 times per day
12	FCR	1:1.2
13	Duration of culture	12months
14	Size/weight of the species(gm)	500 gm average weight
15	No. of crops per year	1
16	Production	5720 kg
17	Farm gate price(Rs)	250- kg fish
18	Capital cost	6.00 Lakhs
19	Input cost	1.5 lakhs per one crop
20	Total project cost	7.5 lakh

C. Fixed Capital (Cost of Biofloc Unit with 7 Tanks)

Table No. 2

Sr. no	Component	Nos.	Cost (Rs.)	Total
1	Setup of Tarpaulin/Fibre tanks(15,000 Litres capacity)	7	25,000	1.75
2	Shed material and accessories fixing charges	200m^2	120000	1.20
3	Water supply borewell(3HP)	1	100000	1.00

Sr. no	Component	Nos.	Cost (Rs.)	Total
4	PVC pipe fittings for air, water Flow	LS	75000	0.75
5	Nets and accessories	5	3000	0.15
6	One Blower (1 HP), Air stones and other accessories	1	30000	0.30
7	Electrification	LS	10000	0.10
8	Power generator(2 KVA)	1	45000	0.45
9	Weighing balance	1	5000	0.10
10	Miscellaneous expenses			0.20
Total				**6.0**

D. Variable Cost

Table No. 3

Sr. No.	Particulars	Units	Quantity	Amount (Rs.) Lakhs	Percentage (%)
1.	Setup of Tarpaulin/Fibre tanks(15,000 Litres capacity)	year	7	1.75	23.33
2.	Shed material and accessories fixing charges	unit	200 m2	1.20	16.00
3.	Water supply borewell(3HP)	unit	1	1.00	13.33
4.	PVC pipe fittings for air, water Flow	set	total	0.75	10.00
5	Nets and accessories	set	5	0.15	2.0
6	One Blower (1 HP), Air stones and other accessories	set	1	0.30	4.00
7	Electrification	set	total	0.10	1.33
8	Power generator(2 KVA)	set	1	0.45	6.00
9	Weighing balance	set	1	0.10	1.33
10	Seed cost, Probiotics, etc.	Rs	Bag/culture	0.15	2.0
11	Feed Cost and test kits	Rs.	kit	1..35	18.00
	Total			**7.5**	**100**

D. Yield of Fish:

Table No. 4

Total Harvesting No	(Kg)	Amount (Rs.)
1	5720*250	1430000
Total	5720*250	1430000

E. Economics of Biofloc Project

Table No. 5

Sr. No.	Cost Estimation	Total (Rs.)
1.	Net Revenue = Gross profit	**1430000**
2.	Gross income = Net revenue – Cost of marketing = 1430000-12000	**1418000**
3.	Net income = Net revenue – Total cost =1430000-750000	**680000**
4.	Operating income = Gross income – Variable cost =1418000-150000	**1268000**

7. CONCLUSION:

Production of biofloc fish plays an important role in human diet because of its nutritive and medicinal value as well as economic benefits. On the basis of production techniques, we conclude that producer used proper techniques of production, properly handled the process, maintained oxygen, ph and other parameters for production of biofloc fish. Fisheries Unit is beneficial for both individuals and society. The total cost of this project for 7 tanks was estimated to be around Rs. 7.5 lakhs and total fixed cost was Rs. 6 lakhs. Thus, fisheries units are helpful to farmers and emerging entrepreneurs.

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