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Bio floc training for fish farmers: Measuring the impact on attitude

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Abstract

Fish farmers lack adequate information and understanding of BFT principles and practices. This includes a lack of awareness regarding water quality management, the importance of maintaining a balanced bio floc, and proper feeding strategies in BFT systems. Considering this context, a study was carried out to explore the attitudes of farmers toward both bio floc fish farming and the training designed to develop bio floc skills. In June 2024, the fishery unit of UBKV (Uttar Banga Krishi Viswavidyalaya) organized a skill development training program on bio floc fish farming for 75 experienced fish farmers from the Coochbehar district. Participants, each possessing at least five years of experience, were selected from three blocks: Cooch Behar-I, Cooch Behar-II, and Dinhata-II (25 farmers from each). The interview schedules were prepared in the regional language (Bengali) to ensure clarity and ease of understanding for all trainees. The training program primarily attracted middle-aged (31-45 years) male participants with education up to class 10, belonging to Hindu religion, and with a distribution across various caste categories. A significant majority (84%) had the most favorable attitude, while a smaller percentage (16%) had a moderately favorable attitude. Trainees generally have a positive attitude toward bio floc technology, recognizing its potential benefits in terms of profitability, efficiency, and environmental sustainability. However, there are some concerns regarding its accessibility to resource-poor farmers and potential negative impacts. The training program was well-received by the trainees, who found it informative, applicable, and likely to induce positive behavioral changes in their fish farming practices.

Keywords: Fish farming, bio floc, training, attitude

Introduction

As per FAO (2005) human population has grown from 1.5 to 6.4 billion and is expected to reach 9 billion by 2050. It has highlighted the need for diversified food production to combat malnourishment, estimated to have affected 840 million people globally. Protein rich food that can ensure the health of the world's population by providing nutritionally balanced meals is very much essential. Animal husbandry and fisheries are such two sources of protein that are considered to be the safest. However, at present the production and demand for fish, found to have a significant gap compared to the exponential growth of the world population. To meet the growing food demand, intensification is necessary in aquaculture. Thus, aquaculture is the only way to solve these problems, which involves culturing organisms under controlled water conditions. One of the best solutions is bio floc Technology. BFT is considered as new "blue revolution". It's an environment friendly aquaculture technique based on in-situ microorganism production, which has gained vital importance and popularity as an approach in aquaculture. Many fish farmers lack adequate information and

understanding of BFT principles and practices. This includes a lack of awareness regarding water quality management, the importance of maintaining a balanced bio floc, and proper feeding strategies in BFT systems. Without proper knowledge, farmers may be hesitant to adopt BFT due to perceived risks and complexity. Training in BFT may equip fish farmers with the skills to maintain meticulous records and monitor water quality and facilitate to adopt this "blue revolution".

Considering this context, a study was carried out to explore the attitudes of farmers toward both bio floc fish farming and the training designed to develop bio floc skills.

Methodology

In June 2024, the fishery unit of UBKV (Uttar Banga Krishi Viswavidyalaya) has organized a skill development training program in bio floc fish farming for 75 experienced fish farmers from the Coochbehar district. Participants, each possessing at least five years of experience, were selected from three blocks: Cooch Behar-I, Cooch Behar-II, and Dinhata-II (25 farmers from each).

Researchers collected primary data through pre-tested,

structured interviews in two steps to assess the farmers' attitudes towards bio floc fish farming and the training program:

Step 1: Before the training, data was collected to understand the farmers' existing profiles and attitudes toward bio floc fish farming.

Step 2: After the training, data was collected to evaluate the farmers' attitudes toward the skill development program they attended.

The interview schedules were prepared in the regional language (Bengali) to ensure clarity and ease of understanding for all trainees.

The tool used to measure attitude toward bio floc fish farming consisted of 10 statements with a five-point scale: Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree, scored 5 to 1, respectively. Negative statements

were scored in reverse. The tool used to measure attitude toward the training program included 15 questions, with five questions from each of these three domains:

- Perceived immediate reactions after training
- Perceived applicability after training
- Perceived behavioural changes after training

These responses were collected using a three-point scale: Agree, Uncertain, and Disagree, scored 3, 2, and 1, respectively.

Based on the collected data, trainees were categorized into three groups: those with least favourable, moderately favourable, and most favourable attitudes toward bio floc fish farming.

Results and Discussion

Table 1: Profile of the trainees of the skill development training (n = 75)

Attributes	Category	Frequency	Percent (%)
Age	Upto 30 yrs	21	28
	31-45 yrs	42	56
	>45 yrs	12	16
Gender	Male	60	80
	Female	15	20
	Others	0	0
Educational Qualification	Up to class 10	32	42.67
	>10-12	25	33.33
	>12 – Graduation	17	22.67
	Post graduation	1	1.33
Religion	Hindu	61	81.33
	Muslims	14	18.67
	Others	0	0
Caste	SC	26	34.67
	ST	10	13.33
	OBC	19	25.33
	General	20	26.67

This table outlines the demographic profile of 75 trainees who participated in the skill development training. The data indicates various characteristics such as age, gender, educational qualification, religion, and caste distribution among the trainees. This demographic data provides insight into the backgrounds of the trainees, which can influence their learning outcomes and attitudes toward bio floc technology.

The majority of the trainees fall within the age groups of 31-45 years (42%) and up to 30 years (28%), suggesting that the training appeals more to younger and mid-aged individuals. A substantial majority are male (80%), points to a significant gender disparity in fish farming in the Coochbehar district. This could be due to various socio-cultural factors that limit women's participation in agriculture and related activities. Most farmers have up to class 10 education (42.67%) or have education levels beyond that, indicating a relatively educated group and potential for absorbing training content. The high representation of Hindus in the training program likely reflects the demographic composition of the Coochbehar district. The distribution of trainees across different caste categories suggests that the training program is reaching individuals from various social groups.

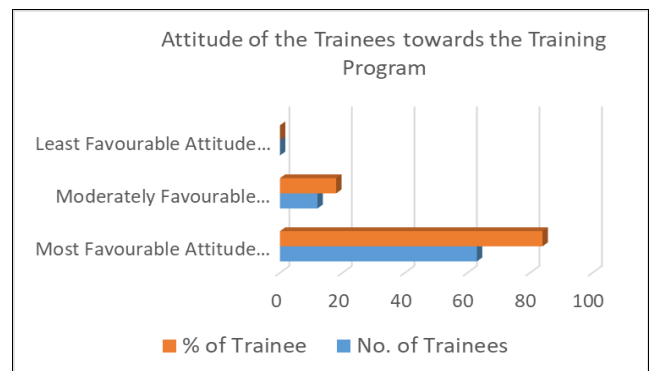


Fig 1: Distribution of trainees' (n=75) as per their attitude towards Bio Floc Fish Farming

This graph categorizes trainees based on their overall attitude towards bio floc fish farming. A significant majority (84%) had the most favourable attitude, while a smaller percentage (16%) had a moderately favourable attitude. No trainees exhibited the least favourable attitude. The high percentage of trainees with the most favourable attitude indicates a strong potential for the successful adoption of bio floc technology in their farming practices.

Table 2: Statement wise attitude of the trainees(n=75) towards Bio Floc Fish Farming n=75

Sl. No.	Statements	SA	A	UD	DA	SDA	Weighted Score	Weighted Mean Score
1	Bio floc technology is a profitable venture (+)	24	48	3	0	0	321	4.28
2	Bio floc technology is more than the normal method of fish cultivation (+)	30	30	9	0	6	303	4.04
3	It improves the land and water use efficiency (+)	33	36	0	0	6	315	4.20
4	It reduces water pollution and the risk of pathogen (+)	24	39	0	8	6	298	3.92
5	It promotes higher biosecurity (+)	18	48	9	0	0	309	4.12
6	It reduces the need of high- protein commercial feed thus lowering cost of standard feed (+)	39	30	6	0	0	333	4.44
7	Information about bio floc technology is widely available and accessible (+)	15	54	3	4	0	308	4.08
8	It cannot be explored by the resource poor farmers (-)	9	12	14	32	15.8	215.5	2.65
9	It should not be promoted as it is against the nature (-)	6	9	13	34	21.8	194	2.35
10	It's a future technology capable of feeding the growing population (+)	33	27	0	12	6	303	3.96

SA=Strongly Agree, A=Agree, UD=Undecided, DA=Disagree, SDA=Strongly Disagree

This document presents the attitudes of trainees (n=75) toward bio floc technology based on ten statements. The responses are categorized into Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (DA), and Strongly Disagree (SDA). The statements cover various aspects of bio floc technology, including its profitability, efficiency, environmental impact, and accessibility.

Most trainees generally agreed with the positive statements about bio floc technology. High scores for statements 1-7 indicate that trainees perceive bio floc as a profitable venture that improves resource efficiency, reduces pollution,

promotes biosecurity, lowers feed costs, and is generally accessible. Statements 8 and 9 express negative sentiments regarding bio floc technology, indicating concerns about its accessibility to resource-poor farmers and potential environmental impacts. The weighted mean scores for these statements are relatively low, suggesting that most trainees disagree with these negative views, but there is a notable level of disagreement. Statement 10 suggests that trainees view biofloc as a promising technology for feeding the growing population.

Table 3: Statement wise attitude of the trainees (n=75) towards the training n=75

Attitude Statements towards different dimension of the training program		A	UC	DA	Weighted Mean	Weighted Mean Score
A. Perceived immediate reactions after training						
1	I found training more informative and enjoyable	75	0	0	300	4
2	I found training to be useful to great extent	66	9	0	291	3.88
3	I found training content easy to understand	69	6	0	294	3.92
4	I found training facilities more adequate and comfortable	69	6	0	294	3.92
5	I found knowledge and skills of trainers satisfactory	75	0	0	300	4
B. Perceived applicability after training						
1	I found the acquired knowledge and skills compatible to my farming needs	63	12	0	288	3.84
2	I found the acquired knowledge and skills easy to apply	57	12	2	282	3.76
3	I can perform farm operations in faster and better way	63	9	1	288	3.84
4	I would certainly increase my farm production and income	66	9	0	291	3.88
5	I would expand my farm business network	66	9	0	291	3.88
C. Perceived behavioral changes after training						
1	I would certainly attend such kind of skill development trainings in future	60	6	9	291	3.88
2	I feel more motivated to do profitable fish farming	69	0	6	298	3.97
3	I would motivate fellow farmers to do profitable fish farming	75	0	0	300	4
4	This kind of skill development trainings should be given to all fish farmers	72	3	0	297	3.96
5	I would teach/guide my fellow farmers	75	0	0	300	4

A=Agree, UC=Uncertain, DA=Disagree

The weighted mean scores for all statements are relatively high, indicating a generally positive attitude toward the training program. Trainees found the training informative, enjoyable, useful, and easy to understand as well as the training effectively met the needs and expectations of the participants. They believed that the acquired knowledge and skills were compatible with their farming needs and easy to apply. They also anticipated improvements in their farm operations, production, income, and business network. They expressed a willingness to attend similar training in the future, felt more motivated to engage in profitable fish farming, and were inclined to motivate and guide fellow farmers.

Conclusion and Recommendations

The training program primarily attracted middle-aged (31-45 years) male participants with education up to class 10, belonging to Hindu religion, and with a distribution across various caste categories. Trainees generally have a positive attitude toward bio floc technology, recognizing its potential benefits in terms of profitability, efficiency, and environmental sustainability. However, there are some concerns regarding its accessibility to resource-poor farmers and potential negative impacts. The training program was well-received by the trainees, who found it informative, applicable, and likely to induce positive behavioural changes in their fish farming practices.

The study recommends the following

1. Implementing strategies to sustain the trainees' engagement and motivation beyond the training program. This could include establishing a community of practice, organizing follow-up workshops, or providing ongoing technical support.
2. Continuous monitoring and evaluating the impact of the training program on the trainees' farming practices, productivity, and profitability as well as using this data to refine the training curriculum and improve its effectiveness.
3. Scaling up the training program to reach more fish farmers and promote the widespread adoption of bio floc technology.
4. Showcasing the success stories of trainees who have successfully implemented bio floc technology in their farming practices. This can inspire other farmers and create a positive feedback loop.
5. Incorporating more content that addresses the specific needs and challenges of different types of fish farmers, including those with limited resources.
6. Establishing a mentorship program connecting experienced biofloc farmers with new adopters to provide guidance and support.

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