

RESEARCH ARTICLE

EFFECTIVENESS OF VOCATIONAL TRAINING IN INTEGRATED FISH FARMING ON TRAINEES' KNOWLEDGE ACQUISITION: AN IMPACT ASSESSMENT

S.K. Samantaray^{a*}, P.K. Panda^a, S.K. Satapathy^a, P.J. Mishra^b, H.K. Sahoo^b^a *Krishi Vigyan Kendra, Ganjam-I, OUAT*^b *Directorate of Extension Education, OUAT**Corresponding Author Email: santoshy2k@gmail.com

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ARTICLE DETAILS

Article History:

Received 23 August 2023
Revised 26 September 2023
Accepted 23 October 2023
Available online 26 October 2023

ABSTRACT

This research paper investigates the effectiveness of a vocational training program in integrated fish farming on the knowledge acquisition of participants. The study was conducted at Krishi Vigyan Kendra, Ganjam-I, with the aim of assessing the impact of this training on individuals aspiring to pursue integrated fish farming as a profession. The study involved a cohort of participants who enrolled in the vocational training program. Upon enrollment, respondents shared their intentions of integrating fish farming into their professional pursuits. The program was designed to impart knowledge and practical skills related to integrated fish farming practices. The assessment of knowledge acquisition was conducted immediately after participants completed the training. The findings revealed promising results. Specifically, 52.38% of the trainees demonstrated a high level of knowledge regarding integrated fish farming, while 38.10% exhibited a medium level of knowledge. This distribution indicates that a significant proportion of trainees acquired a substantial understanding of integrated fish farming concepts and techniques. These results imply that the vocational training program at Krishi Vigyan Kendra, Ganjam-I, was successful in its primary goal of enhancing the knowledge base of trainees in the domain of integrated fish farming. The program appears to have effectively equipped participants with the requisite knowledge and skills necessary for pursuing integrated fish farming as a profession. This assessment highlights the importance of vocational training programs in equipping individuals with practical knowledge and skills, thereby contributing to the development and sustainability of integrated fish farming practices. The study underscores the positive impact of vocational training in integrated fish farming and suggests that such programs play a pivotal role in building the expertise needed for this specialized field. These findings have implications for policy and resource allocation in the promotion of sustainable agricultural practices, specifically within the context of integrated fish farming. Further research may be warranted to explore the long-term effects of such training programs on trainees' professional success and the broader sustainability of integrated fish farming as an agricultural pursuit.

KEYWORDS

Integrated fish farming, training, knowledge, impact

1. INTRODUCTION

Agriculture and livestock farming are considered the backbone of the Indian economy, especially in rural areas where people depend on these practices for their livelihood. However, due to inflation, traditional farming practices may not be sustainable for farmers. To equip rural farmers with the latest knowledge, skills, and scientific techniques, Krishi Vigyan Kendras (KVK) serve a vital role. Integrated farming is a modern and sustainable practice that can improve productivity and resource efficiency while reducing risks for small-scale farming households (Ayyappan et al., 2011).

Integrated fish farming is a sequential link between fish farming and agriculture or animal husbandry, where fish farming is the primary commodity (Ayyappan et al., 2011). This practice is cost-efficient as by-products from one farming practice can be used as nutritional supplements for the other, reducing labor and transportation costs for waste disposal and feed costs for the other practice. Fish farming can be integrated into various farming systems, such as paddy cum fish farming, horticulture cum fish farming, mushroom cum fish farming, seri cum fish farming, vermicompost cum fish farming, or livestock-fish based farming

systems such as cattle cum fish farming, vegetable cum fish farming, goat or sheep cum fish farming, poultry cum fish farming, or duck cum fish farming, with fish farming as a significant component (Ayyappan et al., 2011)."

Training is a simple and effective way to transfer knowledge, as people of any age, gender, or educational status can participate in training programs. These programs can help farmers increase their awareness of new agricultural technologies and bridge the gap between production and productivity. Krishi Vigyan Kendras often organizes on-campus and off-campus vocational training programs, which can enhance the trainees' knowledge and skills, and change their perception of recommended, improved farm technologies, potentially increasing self-employment opportunities among rural farmers (Shankara et al., 2014).

Integrated fish farming is a multifaceted agricultural practice that combines aquaculture with other complementary activities, such as agriculture and livestock rearing, to optimize resource utilization and enhance sustainability. This holistic approach to food production holds immense promise for addressing food security challenges and promoting economic growth in various regions around the world. As interest in

Quick Response Code



Access this article online

Website:
www.mahj.org.my

DOI:
10.26480/mahj.01.2024.01.04

integrated fish farming continues to grow, it becomes imperative to assess the effectiveness of vocational training programs designed to equip aspiring fish farmers with the knowledge and skills necessary for success in this dynamic field.

Vocational training programs play a pivotal role in bridging the knowledge gap and empowering individuals to pursue careers in specialized domains. In the context of integrated fish farming, these programs have the potential to not only impart technical know-how but also foster innovation and entrepreneurship. However, the precise impact of such training initiatives on trainees' knowledge acquisition remains a topic of ongoing investigation. This study seeks to contribute to this important discourse by assessing the effectiveness of a vocational training program in integrated fish farming at Krishi Vigyan Kendra, Ganjam-I.

The scientific significance of this research lies in its potential to shed light on the role of vocational training in enhancing knowledge acquisition among individuals aspiring to engage in integrated fish farming. While vocational training programs have been widely implemented in various agricultural sectors, their specific impact on integrated fish farming remains relatively unexplored. This study seeks to fill this gap in the literature by providing empirical evidence of the knowledge gains achieved by trainees upon completing such a program.

The novelty of this research is underscored by its focus on the integrated fish farming domain, a field characterized by its unique combination of aquaculture and other agricultural practices. By evaluating the immediate post-training knowledge levels of participants, this study aims to assess the effectiveness of the program in imparting practical insights into the complexities of integrated fish farming. Moreover, the results of this investigation can inform policy decisions and resource allocation strategies aimed at bolstering vocational training initiatives in support of sustainable agricultural practices. The significance of the study lies in its potential to contribute to various aspects of integrated fish farming, education, and sustainable agriculture:

1.1 Enhancing Food Security

Integrated fish farming represents a promising approach to increasing food production while optimizing resource utilization. By evaluating the effectiveness of vocational training in this area, the study addresses a key component of efforts to enhance food security and promote sustainable agriculture.

1.2 Empowering Aspiring Fish Farmers

Aspiring fish farmers often lack the specialized knowledge and skills required for success in integrated fish farming. This study assesses the impact of vocational training in bridging this knowledge gap, potentially empowering individuals to pursue careers in this field and contribute to their communities' economic well-being.

1.3 Innovation and Entrepreneurship

Integrated fish farming relies on innovative approaches that combine aquaculture with other agricultural activities. Effective vocational training programs can foster innovation and entrepreneurship by equipping trainees with the practical skills needed to develop and manage integrated fish farming enterprises.

1.4 Policy and Resource Allocation

The findings of this study have implications for policymakers and organizations involved in vocational education and sustainable agriculture. Understanding the impact of training programs can inform decisions regarding resource allocation, curriculum development, and program design, ultimately leading to more effective and targeted initiatives.

1.5 Scientific Knowledge Gap

While vocational training programs are common in agriculture, the specific impact of such programs on integrated fish farming is relatively understudied. This research addresses this knowledge gap by providing empirical evidence of the knowledge gains achieved through vocational training in this specialized field.

1.6 Sustainability and Environmental Considerations

Integrated fish farming can contribute to sustainable agriculture by optimizing resource use and reducing environmental impacts. Assessing

the effectiveness of training programs in this context helps support environmentally responsible agricultural practices.

1.7 Economic Development

By equipping individuals with the skills and knowledge needed to succeed in integrated fish farming, vocational training can contribute to economic development, particularly in rural and resource-dependent communities.

1.8 Promoting Best Practices

The study may identify best practices in vocational training for integrated fish farming that can be disseminated and replicated in other regions, fostering the growth of this agricultural sector on a broader scale.

2. MATERIALS AND METHODS

2.1 Location of the study and sampling plan:

Krishi Vigyan Kendra (KVK) or farm science center that operates in India. KVKs are part of the Indian Council of Agricultural Research (ICAR) system and play a vital role in disseminating agricultural knowledge and technology to rural farmers and communities. KVKs have a significant impact on improving agricultural productivity, income generation, and overall rural development in India. They bridge the gap between scientific research and practical application, ultimately benefiting the farming community and contributing to food security and rural livelihoods. To evaluate the knowledge acquired by trainees on integrated fish farming, the study was conducted in three batches during the year 2020-2022 on all 63 individuals who attended the vocational training at Krishi Vigyan Kendra, Ganjam-I under Ouat. The trainees belonged to various backgrounds, including farmers, laborers, unemployed youth, students, and businessmen. They also varied in their socio-demographic profiles, ranging from urban to rural, primary to graduates, landless to landholders, and different age categories, with some aged under 30 and others over 30.

2.2 Research design and data collection

To assess the impact of the training programs, a knowledge test consisting of ten objective-type questions was developed and administered before and after the training. The participants were evaluated quantitatively, with one credit assigned for each correct answer and no credit for incorrect responses. The maximum possible score on the test was ten. The respondents' answers were recorded in hard copy format and subsequently compiled into a digital format for data analysis.

2.3 Analysis of Data

In order to measure the knowledge gained by the trainees on integrated fish farming practices, the difference between their knowledge levels before and after the vocational trainings was calculated. The knowledge gain data was then compiled and analyzed using frequency and percentage, following the standard formula described by (Ansari and Chandargi, 2000).

$$\text{Gain in knowledge} = \frac{\text{Posttrainingtest} - \text{Pretrainingtest}}{\text{Pretrainingtest}} \times 100$$

The knowledge scores were categorized into three levels to evaluate the trainees' level of understanding on integrated fish farming practices: low (0 to 30%), medium (31 to 60%), and high (more than 60%)

3. RESULTS AND DISCUSSION

3.1 Socio-demographic characteristics of trainees

Table 1 presents an overview of the socio-demographic characteristics of the trainees. The trainees were categorized into different age groups, educational qualifications, gender, landholding status, and occupation. Based on age, the trainees were classified into three groups: up to 30 years, 31-40 years, and above 40 years. The majority of the trainees (47.62%) belonged to the 31-40 years age group, followed by up to 30 years (26.98%) and above 40 years (25.40%). All the trainees were males, which is consistent with the findings of (Singh et al., 2013).

It was observed that trainees from different castes participated in the vocational trainings, with 39.68% belonging to the schedule caste, 6.35% from the backward caste, and 53.97% from other castes. In terms of educational qualifications, 50.79% of the trainees had completed senior secondary education, followed by matriculation (26.98%), graduation (12.70%), middle school (6.35%), and primary level (3.18%). In terms of

landholding status, approximately 60% of the participants owned land, while 40% were landless.

In relation to occupation, the majority of the trainees were farmers (52.38%), followed by laborers (20.63%), businessmen (15.87%), unemployed youth (7.94%), and students (3.18%). This finding is in line with Kaur's study (2016) [7], which showed that farmers have a keen interest in integrated fish farming. The study also revealed that the majority of trainees (84.13%) came from rural areas to learn about integrated fish farming. These findings are in accordance with (Singh et al., 2010).

Table 1: Socio-demographic characteristics of trainees (n=63)

Sr. No.	Characteristics of trainees	Frequency	Percentage
1.	Age		
	Up to 30 years	17	26.98
	31-40 years	30	47.62
	Above 40 years	16	25.40
2.	Caste		
	Scheduled Caste	25	39.68
	Backward Caste	04	6.35
	Others	34	53.97
3.	Education		
	Primary	02	3.18
	Middle level	04	6.35
	Matriculate	17	26.98
	Senior Secondary	32	50.79
	Graduate	08	12.70
4.	Occupation		
	Farming	33	52.38
	Business	10	15.87
	Unemployed	05	7.94
	Laborers	13	20.63
	Students	02	3.18
5.	Landholding		
	Landless	25	39.68
	<1 ha	09	14.29
	1-2 ha	12	19.05
	>2 ha	17	26.98
6.	Gender		
	Male	63	100
	Female	0	0
7.	Residence		
	Urban	10	15.87
	Rural	53	84.13

3.2 Previous knowledge assessment

Upon examining Table 2, it is evident that the trainees had a low level of knowledge about integrated fish farming prior to attending the vocational training programs. The majority of trainees, constituting 85.7 percent, fell into the low knowledge category (0-30%), which is in line with the findings of (Belakeri et al., 2017). Furthermore, approximately 14.29 percent of the participants had a medium level of knowledge (31-60%), but none had a high level of knowledge exceeding 60 percent. These results are consistent with the studies (Pandey et al., 2017; Singh and Tanwar, 2018; Zhou, 2020). This indicates that farmers, unemployed youth, businessmen, and even students had inadequate knowledge of integrated fish farming practices before undergoing training.

Table 2: Pre-training knowledge score of trainees

Knowledge Level	No. of trainees (N=63)	Percentage
Low level (0 to 30%)	54	85.71
Medium level (31 to 60%)	9	14.29
High level (more than 60%)	0	0

3.3 Increase in level of knowledge

Table 3 presents the knowledge gain of trainees on integrated fish farming practices before and after their participation in the vocational trainings at Krishi Vigyan Kendra, Ganjam-I. The increase in knowledge was measured by calculating the difference between the pre-training and post-training percentages.

Upon analyzing the data presented in Table 3, it was discovered that prior to attending the trainings at Krishi Vigyan Kendra, Ganjam-I, the trainees had the least knowledge about fish marketing, with a percentage of only 7.93%. Moreover, their pre-training knowledge on pond preparation, fish integration with agriculture and poultry was relatively low at 22.22%. Interestingly, their knowledge on integration of fish with vegetable was slightly higher, at 23.80%. The trainees' knowledge regarding fish cum duck farming and water quality management were also found to be low, at 15.87% and 12.69%, respectively.

After analyzing the pre- and post-training data presented in Table 3, it was observed that the trainees had a significant improvement in their knowledge level. Before the training, the trainees had a 22.22% knowledge level in pond preparation, which increased to 60.31% after the training, which is in agreement with the studies conducted (Barua, 2010; Laxmi et al., 2015; Nwachukwu et al., 2005). In terms of knowledge about fish selection and balanced feeding, the trainees had a 28.57% and 22.22% level of knowledge before the training, respectively. However, after the training, the knowledge level increased to 76.19% and 65.07%, respectively. These findings align with the study conducted (Laxmi et al., 2015). Additionally, the trainees had a 17.46% and 53.96% level of knowledge about fish stocking density before and after the training, respectively, which is consistent with the findings of (Barua, 2010; Nagarajaiah et al., 2005).

Table 3: Gain in knowledge after acquiring training with respect to different operational parameters. n=63

Sr. No.	Parameters	Pre-evaluation (%)	Post-evaluation (%)	Gain in knowledge
1.	Selection of fish species	28.57	76.19	47.62
2.	Preparation/construction of pond	22.22	60.31	38.09
3.	Balance feeding	22.22	65.07	42.85
4.	Stocking density of fish species	17.46	53.96	36.50
5.	Integrated fish cum agriculture	22.22	74.60	52.38
6.	Integrated fish cum Vegetable	23.80	84.12	60.32
7.	Integrated fish cum Poultry farming	22.22	77.77	55.55
8.	Integrated fish cum Duck farming	15.87	61.90	46.03
9.	Water quality management	12.69	52.38	39.69
10.	Fish marketing	7.93	49.20	41.27

Upon further analysis of the data, it becomes clear that the vocational trainings had a significant impact on the knowledge of candidates regarding integrated fish farming practices. The percentage of knowledge gain in integrating fish with agriculture, vegetable, poultry, and duck was 52.38%, 60.32%, 55.55%, and 46.03%, respectively. The lowest percentage of knowledge gain (36.50%) was observed with stocking density of fish species. However, there was a similar gain in knowledge regarding the construction of pond, water quality management, fish

marketing, and balanced feeding, with percentages of 38.09%, 39.69%, 41.27%, and 42.85%, respectively. Notably, the knowledge acquired about fish selection after training was 47.62% higher compared to pre-training knowledge.

Upon analyzing the study's results, it was discovered that trainees experienced a substantial increase in knowledge, ranging from 36.50% for stocking density of fish species to 60.32% for integrated fish cum

vegetable, after completing the Integrated Fish Farming training program. The overall findings revealed a significant improvement in knowledge from the pre-training to post-training evaluation data. These results were consistent with those who also observed an increase in knowledge level after participating in similar training programs (Singh and Tanwar, 2018; Laxmi et al., 2015; Islam and Nath, 2015; Pordhiya et al., 2017; Singh et al., 2010; Baraiya, 2016; Sen, 1973).

3.4 Extent of knowledge

Table 4 depicts that the vocational training programs on integrated fish farming had a significant impact on trainees' knowledge level. The majority of trainees (52.38%) had a high level of knowledge after the training, followed by 38.10% with a medium level of knowledge, and only 9.52% with a low level of knowledge. These results align with the previous findings of (Belakeri et al., 2017).

Table 4: Post-training knowledge score of trainees		
Knowledge Level	No. of trainees (N=63)	Percentage
Low level (0 to 30%)	6	9.52
Medium level (31 to 60%)	24	38.10
High level (more than 60%)	33	52.38

4. CONCLUSION

The aforementioned results indicate that the vocational trainings organized by Krishi Vigyan Kendra, Ganjam-I effectively disseminated modern and sustainable aquacultural practices to the grassroots level. The vocational training programmes have been effective in imparting knowledge about new farming practices. By equipping individuals at the grassroots level with these skills and knowledge, the programmes enable them to adopt new methods that are not only more productive but also environmentally friendly. A notable aspect of these training programmes is their reach among farmers and laborers. These individuals often have direct involvement in fish production but may lack access to the latest farming innovations and sustainable practices. The fact that a significant number of participants in these programmes belong to this demographic is significant. It means that the training is reaching the very people who are directly engaged in the aquaculture sector and can immediately apply the knowledge gained. One of the key outcomes of these vocational training programmes is the potential for self-employment opportunities. As participants acquire new skills and insights into modern farming methods, they are better positioned to establish and manage their aquaculture ventures. The ability to create self-employment opportunities has a direct impact on the participants' livelihoods and economic independence. The knowledge gained through these programmes can help close the gap in aquacultural output and efficiency. By disseminating modern aquaculture techniques, these programmes enabled participants to significantly improve their yields and aquacultural practices. This, in turn, contributed to reducing disparities in aquacultural productivity between different regions and fish farming communities. Finally, the impact of these vocational training programs extends beyond individual participants and local communities. When farmers and laborers enhance their aquacultural practices and increase their productivity, it has a direct positive effect on the nation's economy. Increased aquacultural output means more fish production and potentially reduced reliance on imports from other states, leading to better nutritional security. Additionally, improved practices can stimulate economic growth by creating value-added products and employment opportunities within the aquacultural value chain.

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