



Assessment of Training Effectiveness for Fish Farmers of Tripura

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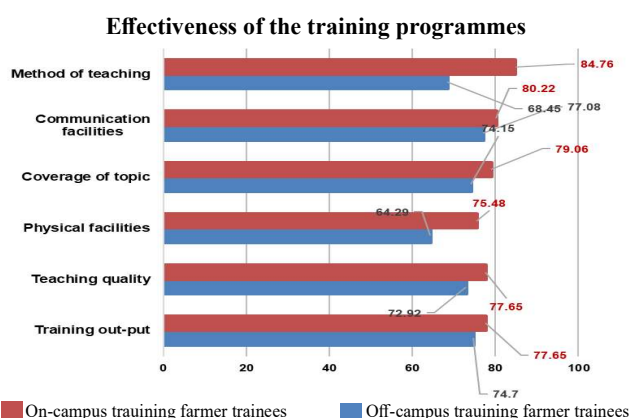
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HIGHLIGHTS

- The overall effectiveness score (OES) for the on-campus training programme for farmers in all selected dimensions was 79.99.
- The overall effectiveness score (OES) for off-campus training programme for farmers, the overall effectiveness score (OES) was 71.93.
- Mann Whitney U test score (2169.00** at $p < 0.01$) indicates that there was a significant difference in the effectiveness score of the training programmes of on-campus and off-campus

GRAPHICAL ABSTRACT



ARTICLE INFO

Editor:

Dr. B.S. Meena

Key words:

Training effectiveness;
Total effectiveness score;
Training evaluation;
North- East Region.

Received : 11.01.2024

Accepted : 22.02.2024

Online published :

01.04.2024

doi: 10.54986/irjee/2024/
apr_jun/10-18

ABSTRACT

Context: Training programmes often involve human resources, time and costs of organizations which need to justify these resource uses by demonstrating quantifiable qualitative and quantitative outcomes. Evaluating a training program in terms of training effectiveness is essential for making necessary improvements, allocating resources wisely, and ensuring that the program aligns with organizational goals and trainees' needs. Training evaluation also provides a structured framework for assessing the efficiency and effectiveness of training programs.

Objective: This study aims to assess the effectiveness of the training programmes attended by fish farmers of Tripura during 2022-23.

Method: A quasi-experimental research design was used in the present study. 188 farmer trainees were selected who participated in training programmes of the College of Fisheries, Tripura using the complete enumeration sampling technique. The training effectiveness was analyzed on the basis of the extent potential ratio (EPR) and total effectiveness score (TES) were estimated.

Result and Discussion: The outcome of the present study found that the majority (59.04%) of the farmer trainees belonged to the young age group, obtained education up to high school (39.36%), and had a medium-sized family. The majority of trainees had pond areas up to 0.40 ha., with 1-5 years of experience in fish farming. The overall effectiveness score for on-campus training programmes was OES 79.55, and for off-campus training programmes was found to be OES 71.93. The result of the "Mann-Whitney U test" statistics indicated that there was a significant difference in the effectiveness score between on-campus training (mean effectiveness rank = 119.23, $n = 146$) and off-campus training (mean effectiveness rank = 85.45, $n = 42$) at 1 per cent level of significance ($p < 0.01$) 2-tailed. A calculated overall effectiveness score was 74, indicating that the on-campus training programmes were more effective. The result of the present study revealed that the farmer trainees who participated in the training programmes organized by the College of Fisheries benefited, their skills, knowledge and attitudes were improved.

Fisheries and aquaculture are important sectors providing employment to millions of people and contributing to the India's livelihood. India is the third largest fish-producing country, contributing 8 per cent to global fish production and ranks second in aquaculture production, contributing 7.56 per cent of global production and about 1.24 per cent to the country's Gross Value Added (GVA) and over 7.28 per cent to the agricultural GVA (PIB, 2023). The fisheries sector in the northeastern region (NER) of India holds an important position in the socio-economic upliftment and the cultural context of the people in the region (Singh *et al.*, 2017). Fish has been closely linked with the life of northeast India since time immemorial, with more than 90 per cent of the people eating fish. North-East (NE) India consists of eight States Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim, with a total geographical area of 2.55 lakh km² which is 8 per cent of the country. However, nearly 80 per cent of farmers in the NE area are marginal (less than 0.40 ha) or small (less than 1.44 ha). In addition, as the population increases, the average area of land holdings decreases over time (De and Singh, 2017). According to the Handbook of Fishery Statistics (2020), the annual fish production in this region is estimated to 5,18,380MT/, which is around 5 per cent of India's total inland fish production, yet this could not fulfil the growing population's food requirement, the supply and demand for fish still fall short by 43000 MT. It was found that a maximum number of farmers perceived the different types of training from agricultural institutes, FPOs, and NGOs and enhancement of Knowledge, Skill and Understanding after attending the training programmes (Vyas *et al.*, 2020; Chandegara *et al.*, 2023). So, training acts as a tool to play a vital role in transferring technology, so the massive demand for training among farmers, farm women and extension workers is not being met qualitatively and quantitatively. Training is related to direct financial costs, time of employees devoted to training, training planning, and time of managers. Many researchers agreed in the 1990s that most investments in training were wasted (Ford and Weissbein (1997). A variety of extension programmes are implemented for creating awareness, educating and motivating the farmers, farmwomen and rural youth to adopt and manage the new agricultural technology in the fields or homes (Singh *et al.*, 2010). However, according to Baldwin *et al.* (2009) successful transfer of learning

to workplace is often limited. Therefore, evaluation of training would help in revising programmes to meet large number of goals and objectives (Mann, 1996). Blume *et al.* (2010) and Tai (2006) noted that effective training can increase the knowledge, skills and abilities (KSA's) of the trainees for organizational benefit however, its effectiveness is based on the willingness of the head of the family (Gupta *et al.*, 2016). Training evaluation ensures that applicants' knowledge may be used in their workplaces or daily tasks. In the simplest of ways, evaluation is the assessment of objectives with outcomes to answer the question of whether training has accomplished its objectives (Topno, 2012). Evaluation the one of important component in training cycle, it also helps to reduce the gap between subjective qualifications (the ability to act and use the competencies to meet the organization's goals) and objective qualifications (the highest level of education completed and requirements imposed on employees) and to increase labour productivity (Urbancova *et al.*, 2021). Tyler is regarded as one of the pioneers in stressing programme evaluation as an integral part of the educational process (Wong *et al.*, 1997). Cronbach (1982) however, opined that evaluation is regarded as an activity that must be engaged to satisfy an external funding agency the government rather than being regarded as an integral part of the educational enterprise. In terms of educational programs as argued by Cronbach (1982), the program evaluation connotes anything ranging from a set of instructional materials and activities that are distributed at a national level, to the educational experiences of a single learner. According to Van Dyk *et al.* (1997), evaluation serves three purposes: it is used to make decisions about individual learners (their needs, the instructional plan and sequence, their grouping and feedback); course improvement (deciding on the most appropriate methods and material, as well as where and how to revise the material); and the system's effectiveness. Furthermore, previous research studies on various training institutions have focused on the effect of the training program on the extension methods employed, follow-up, information obtained by farmers, individual growth as a result of training and organization, and so on. However, very less attempts have been made to evaluate the effectiveness of the fisheries training programmes. Hence, there is a need to evaluate the effectiveness of training programmes organized by the College of Fisheries (Karim *et al.*, 2012).

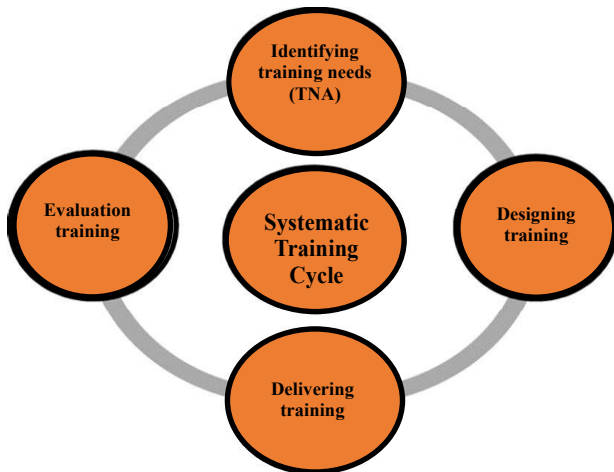


Fig. 1 Systematic Training Cycle: the basic cycle
(source- Cole, 2004)

The degree to which training achieves the desired objectives or immediately anticipates outcomes that were assumed before the training is referred to as "training effectiveness" (Kalemci, 2005). The basic element of evaluating training effectiveness is to set the desired learning goal or competence. These goals are then evaluated by evaluation methods (Tennant *et al.*, 2002). It is a crucial aspect of any organization's talent development strategy, as it determines whether the investment in training has been worthwhile and whether trainees have acquired the necessary skills and knowledge to perform their work effectively. The effectiveness of training is a critical factor in determining the return on investment in human resource development (HRD). Effectiveness was determined by assessing the transfer skills from training to the job (Yaw, 2005). To determine the impact of a management development program on organizational performance and to evaluate the influence of management relations on union grievance ling rates (Bostain, 2000). The effectiveness of communication training programs is not only dependent on program characteristics but may be affected by a range of other variables as well, on the basis of a review of the literature, by Francke *et al.* (1995). The paper aims to assess the effectiveness of the training programmes. Based on the empirical literature, the questionnaire was created. The study involved a convenience sampling method for choosing the participants. To fulfil the present objective following methodology were applied.

METHODOLOGY

Locale of research: The present study was conducted in northeast region of India (Latitude: 25.5736° N

Longitude: 93.2473° E), consisting eight States with 2, 62,379 km² geographical area, of which 43 per cent is situated at the elevation of 300m, 30 per cent in the elevation range of 300-1200m and 27 per cent in the elevation of above 1200m above MSL (Chakravarty *et al.*, 2012). The farmers from different states of north-eastern India who had participated in training programmes conducted by the College of Fisheries Lembucherra, Agartala. during 2022-2023 were selected for study.

Research design: The quasi-experimental research design was adopted for the present study; it is an empirical interventional study used to estimate the causal impact of an intervention on a target population without random assignment. Experimental designs that are not randomized are quasi-experimental (Campbell and Stanley, 1966).

Sampling design: Complete enumeration sampling (CES) method was followed in the present study. The farmers from different states of north-eastern India who had participated in training programmes conducted by College of Fisheries were selected for study which 146 fish farmers were selected from the on-campus training programme and 42 fish farmers were selected from off-campus training programmes which were conducted at Krishi Vigyan Kendra (KVK) and village panchayat in Sepahijala, Agartala during 2022-2023.

Measurement: The collected data were scored, compiled, tabulated and subjected to various appropriate statistical tools to draw significant results and reasonable conclusions. To determine the effectiveness of the training programme, the responses were obtained from respondents on five dimensions of the training programme (i.e., Training out-put, teaching quality, physical facilities, coverage of topic and communication facilities) through a set of statements on a three-point scale i.e., agree, undecided and disagree with assigned scores were 2, 1 and 0 respectively. The method followed by Kulkarni and Nikhade (1996) was taken as a basis for estimating the effectiveness of the training programme. Detailed procedure is given as : For identifying the individual effectiveness of the training aspect, the following formula was applied:

$$TE = \frac{D1}{P1} + \frac{D2}{P2} + \frac{D3}{P3} + \dots + \frac{Dn}{Pn} \times 100$$

Where, TE = Training effectiveness,

D₁, D₂, D₃,.....D_n refers to the total score obtained by all the respondents on a particular dimension of

items $P_1, P_2, P_3, \dots, P_n$ refers to the potential scores obtainable on each dimension included in the study. Further to calculate the overall effect the following

The formula will be used:

$$OPE = \frac{TEI_1 + TEI_2 + TEI_3 + \dots + TEI_n}{Z}$$

OPE= Where summation $TEI_1 + TEI_2 + \dots + TEI_n$ refers to the individual effectiveness for all the items 1 to Z included in the programme.

The Mann-Whitney U test was applied to test whether significant difference in the effectiveness between on-campus and off-campus training programmes. Spearman’s correlation coefficient was applied to assess the significant relationship between socio-economic profile and the effectiveness of training programmes.

RESULTS

Socio-economic profile: The demographic profile of the trainees including age, caste, gender, education, income, occupation, area of pond they have etc. are presented in the Table.

Table 1 present the socioeconomic profile of trainees. The study found that the majority of farmer trainees (59.04%) were in the young age group, possibly due to young individuals seeking employment opportunities in aquaculture. Bello (2000) opined that age influences a person's acceptance of innovation and risk-taking. Argade *et al.* (2023) reported a similar finding that the majority of the fish farmer trainees

(70.40%) were in the young age group. Most trainees were female (60.11%), Similar result was reported by Nyamwamu *et al.* (2014), A large number of farmers belonging to the Schedule tribe (44.68%), and had education up to high school (39.36%). These findings are matched with the result reported by Chauhan *et al.*, (2023). Education is vital for farmers to understand improved agricultural practices, follow guidance from extension organizations, and comprehend technical recommendations that require numeracy and literacy (Abdullahi, 2010). The majority had medium-sized families (57.98%) and pond areas up to 0.40 ha (64.89%). Similar findings were reported by Upadhyay *et al.* (2012). The results revealed that the majority of farmers trainees had small water areas for fish culture and training is helpful for them to increase the production of fish per unit water area. According to Ali *et al.* (1995), the size of the family has a significant impact on the family's income and expenditures. Additionally, 64.36 per cent had 1-5 years of experience in the fisheries sector. Lawal (2021) reported that individuals with less fish farming expertise are more likely to acquire and accept new fish farming skills and techniques instead of continuing with the original ways, they are familiar with. Aquaculture was the primary occupation for 62.77 per cent, while 37.23 per cent considered it a secondary occupation. Around 81.91 per cent had medium annual incomes (₹72138-₹165383), and 77.66 per cent showed a medium level of innovativeness, likely due to limited exposure to modern farming techniques. Trainees had medium levels of market orientation (67.02%), medium levels of scientific orientation (70.21%) and medium economic orientation (63.23%). Amanda *et al.* (2021) anticipate that economic orientation encouraged, the need to increase farming efficiency in terms of cost-benefit ratio. Additionally, 58.51 per cent of farmer trainees had medium mass-media contact, while 61.70 per cent of farmer trainees had medium extension levels. According to Singh *et al.* (2023), apart from producing more farm publications in local languages, efforts should also be made the use ICT tools and different social media platforms for information sharing and exchange.

Effectiveness of training programmes: The degree to which training achieves the desired objectives or immediately anticipates outcomes that were assumed before the training is referred to as “training effectiveness” (Kalemci, 2005).

Table 1. Socio-economic profile of trainees

Socio-economic profile	Mean	S.D.	Range
Age	1.6	0.79	1-3
Gender	1.6	0.49	1-2
Caste	2.97	1.12	1-4
Education	3.11	1.25	1-5
Family Size	1.81	0.67	1-3
Area of pond	0.83	0.33	0.3-2
Primary Occupation	1.6	0.91	1-4
Secondary Occupation	1.82	0.77	1-4
Experience in fish farming	1.68	1.1	1-5
Annual Income	118760.64	46622.86	45000-500000
Innovativeness	11.4	1.76	5-15
Market Orientation	11.74	1.86	7-15
Scientific orientation	9.1	1.44	5-12
Economic Orientation	12.64	1.55	9-15
Mass Media Contact	12.9	3.87	7-21
Extension Contact	9.4	2.45	5-15

Table 2. Scores obtained extent potential ratios and total effectiveness score for each dimension of farmer trainees

Degree of perception dimension	Off-campus farmer trainees			On-campus farmer trainees		
	Effectiveness score(n=42)			Effectiveness score(n=146)		
	TS	EPR	TES	TS	EPR	TES
<i>Training out-put</i>						
The training helped to learn new technologies	67	0.80	79.76	67	0.825	82.53
Training increased the knowledge of Fish Production	63	0.75	75.00	244	0.836	83.56
Training improved self-confidence	61	0.73	72.62	224	0.767	76.71
Training was need-based and field-oriented	60	0.71	71.43	227	0.777	77.74
Average	62.75	0.75	74.70	226.75	0.777	77.65
<i>Teaching quality</i>						
Staff is adequate to demonstrate the new technologies	63.00	0.75	75.00	217	0.743	74.32
Staff taught farming technology in a simple manner	63.00	0.75	75.00	236	0.808	80.82
Staff is sufficient to teach the farming technologies	60.00	0.71	71.43	221	0.757	75.68
Staff mingled freely with the trainees	59.00	0.70	70.24	233	0.798	79.79
Average	61.25	0.73	72.92	226.75	0.777	77.65
<i>Physical facilities</i>						
Lecture hall	54	0.64	64.29	200	0.684	68.49
Lodging facilities	55	0.65	65.48	230	0.787	78.77
Boarding facilities	52	0.62	61.90	228	0.780	78.08
Transport facilities	55	0.65	65.48	222	0.760	76.03
Library facilities	54	0.64	64.29	222	0.760	76.03
Average	54	0.64	64.29	220.4	0.754	75.48
<i>Coverage of topic</i>						
Water quality parameter testing	62	0.74	73.81	234	0.801	80.14
Seed treatment	57	0.68	67.86	228	0.781	78.08
Recommendation of varieties	68	0.81	80.95	233	0.798	79.79
Application of fertilizers	61	0.73	72.62	234	0.801	80.14
Aquatic weed and predatory fish control	58	0.69	69.05	231	0.791	79.11
Fish preservation	59	0.70	70.24	228	0.781	78.08
Integrated farming	71	0.85	84.52	228	0.780	78.08
Average	62.29	0.74	74.15	230.86	0.790	79.06
<i>Communication facilities</i>						
Audio –Visual aids	60	0.71	71.43	234	0.801	80.14
Language	68	0.81	80.95	239	0.818	81.85
Visibility of Slides	63	0.75	75.00	233	0.799	79.79
Transparencies & charts	68	0.81	80.95	231	0.791	79.11
Average	64.75	0.77	77.08	234.25	0.802	80.22
<i>Method of teaching</i>						
Lecture+ Discussion	61	0.726	72.61	245	0.839	83.90
Lecture + Demonstration	57	0.678	67.85	248	0.849	84.93
Field trip + lecture	57	0.678	67.85	244	0.835	83.56
Discussion + Field trip	55	0.654	65.47	253	0.866	86.64
Average	57.5	0.684	68.45	247.5	0.847	84.76
OES	60.42	0.71	71.93	232.29	0.796	79.55

(TS= Total Score, EPR= Effective Potential Ratio, TES= Total Effectiveness Score, OES= overall effectiveness score)

The results presented in Table 2 indicate that out of the six dimensions taken for the study of the training effectiveness of both on-campus and off-campus training programmes for fish farmers. In the case of the on-campus training programme, the training effectiveness score for the method of teaching was found to be the highest (TES 84.76). In the case of the off-campus training programme, the training effectiveness score was highest for communication facilities (TES 77.08). The training effectiveness score for training output for on-campus training programmes ranged from TES 76.71 to TES 83.56. Similar results were also reported by Senthikumar *et al.* (2016). The training programme provided knowledge about new technology to the farmer (TES 82.53) so after attending the training programme, the farmers felt that the training programme was helpful to increase in fish production (TES 83.56). Sennuga, *et al.* (2020) emphasized that better-trained farmers are known to make greater use of information, skills, advice and training, and are more diligent and proactive in adjusting to agricultural changes and adopting new and improved technologies. A farmer's trainees further reported that the training programme improved their self-confidence (TES 76.71) and most of the trainees perceived that training was need-based and skill-oriented (TES 77.74). In the context of off-campus training programs, training effectiveness scores ranged from TES 71.43 to TES 79.76. Hence more effort is needed to increase the training effectiveness of off-campus training. The training effectiveness score (TES) was 71.43 for need-based and skill-oriented, and for self-confidence TES was 72.62 which have direct influence on training aspect (Upadhyay *et al.*, (2021). As regards teaching quality, obtained training effectiveness scores were between 74.32 to 80.82 for the on-campus training programme, which showed that the training programme with respect to quality of teaching was more effective and useful in understanding the improved fish culture technique. In the case of the off-campus training programme the training effectiveness scores ranged from 70.24 to 75.00, it could be inferred that off off-campus training programme was slightly less effective in terms of teaching qualities. Sennuga and Oyewole (2020) stated that effective training provides a person with the ability to recognize opportunities and become endowed with knowledge, self-esteem and the skills to act on them. For the on-campus training programme, the training

effectiveness score for physical facilities ranged from 68.49 to 78.08. Most of the trainees reported that all physical facilities, except the lecture hall quality (TES 68.49), were very effective and suitable for the trainees. Whereas in the off-campus training programme, the total effectiveness score under physical facilities ranged from 61.90 to 65.48. The lecture hall is one of the key components of teaching-learning so it needs to be improved. With respect to the coverage of topics, the majority of trainees reported that after attending the training programme their skill regarding testing the water quality parameter was improved (TES 80.14), In the training programme they gained knowledge about integrated fish farming practices for diversifying their income source (TES 78.08). In the context of the off-campus training programme, the total effectiveness score ranged from 70.24 to 84.52. The majority of trainees reported that the topic related to integrated farming was well covered in the training programme (TES 84.52) and they got information related to the profitability of fish species. A majority of the farmers found the material in the e-bulletins to be beneficial, since it was specifically customized by KVK for their area (Buruah *et al.*, 2023). The majority (49.32%) of the trainees suggested that lectures, discussions, and demonstrations should be used in training, it makes teaching-learning more concrete and utilization of the maximum number of sense organs. The majority of respondents recommended that training institutions provide an introduction to all the agricultural equipment suited for the northeastern area of India supported by Singh *et al.* (2023). The overall effectiveness score (OES) for the on-campus training programme for farmers in all selected dimensions was 79.99. whereas in the case of the off-campus training programme for farmers, the overall effectiveness score (OES) was 71.93. Although the calculated effectiveness score for the on-campus training programme from all registered dimensions was above 74, the on-campus fisheries training programme was found to be very effective in all terms as per Tyagi and Tyagi, (2014). Whereas the overall effectiveness score for off campus training programme for farmers was near to the effectiveness score of 74, the off-campus training programme for farmers was found to be effective, Effective use of audio-visual aids, including videos, and increased the teaching facilities field visit and demonstration might further increase the effectiveness of the training. Mann Whitney U test was applied to compare the difference

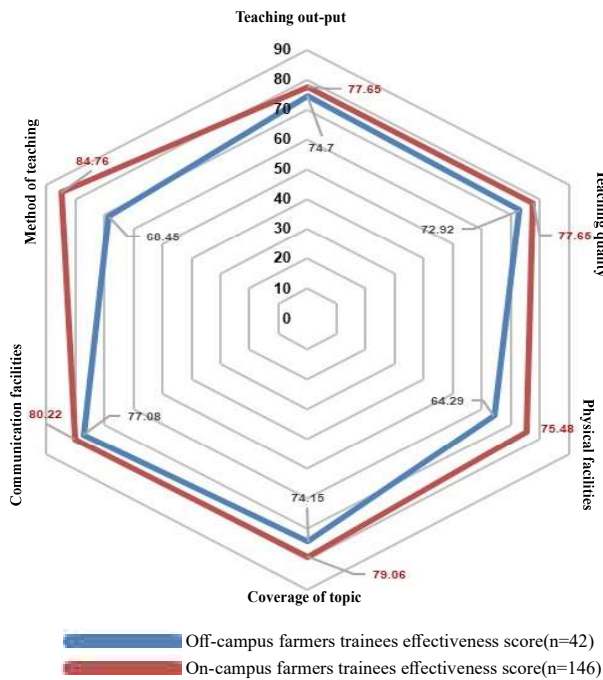


Fig. 3 Effectiveness of the training programmes

in effectiveness score of the training between the off-campus training vs. the on-campus training and the obtained Mann Whitney U test score (2169.00** at $p < 0.01$) indicates that there was a significant difference in the effectiveness score of the training programmes of on-campus and off-campus.

Correlation between socio-economic profile and training effectiveness: It can be observed from Table 3 that there is a significant relationship between socioeconomic variables such as education status, farming experience,

occupational status, market orientation, mass media and the effectiveness of the training programme. In the context of educational status, there is a negative and significant relationship between educational status and the effectiveness of training programmes ($r = -.328^{**}$). The probable reason might be that the majority of the farmer's trainees were less educated. They have less exposure to the subject matter and have fewer mass media contacts. Trainees with low educational status might approach the training programme with more motivation to improve their skills, leading to a higher level of engagement and commitment, which in turn enhances the programmes' effectiveness. In the case of farming experience, there is a positive and significant relationship with the effectiveness of the training programme ($r = .145^*$). There is a negative and significant relationship between occupational status and the effectiveness of the training programme ($r = -.257^{**}$). From this, it is evident that the low occupational status of trainees leads to an increase in the effectiveness of the training programme. In the case of market orientation, there is a positive and significant relationship with the effectiveness of the training programme ($r = .188^{**}$). This might be due to the majority of farmer trainees having a medium level of market orientation and tend to benefit more from the training, they are more receptive to learning and adapting to the market change. Extension contacts also showing the positive and significant relationship with the training effectiveness. It is also supported by (Sagma *et al.*, 2022).

CONCLUSION

Based on the above findings, it can be concluded that training in different areas was provided to farmers of north-eastern India under the College of Fisheries which resulted in a gain in knowledge, and skills of farmers and their overall confidence was improved after attending the training programmes. In the context of the effectiveness of the training programmes except for the off-campus training programme, an on-campus training programme for fish farmers was found to be highly effective in all terms perceived by the trainees, including training output, physical facilities, teaching quality, teaching method, etc. To further improve the effectiveness of training programmes, the majority of the trainees suggested that adequate duration for training should be provided, more focus should be given on the practical portion, training should be given

Table 3. Correlation coefficient of profile characteristics of trainees with the effectiveness of the training programme

Profile characteristics	(r)	Sig. (2-tailed)
Age	0.090	0.220
Education	-.328*	0.000
Experience in fish farming	0.145*	0.047
Pond area	-0.048	0.509
Family size	0.073	0.321
Annual income	-0.004	0.952
Occupational status	-.257**	0.000
Innovativeness	0.116	0.114
Market orientation	0.188**	0.010
Scientific orientation	0.125	0.089
Economic orientation	0.106	0.147
Mass media contact	-.366**	0.000
Extension contact	0.193**	0.071

* Correlation is significant at 0.05 level (2-tailed)

**Correlation is significant at 0.01 level (2-tailed)

to trainees based on their training needs assessment, and more trainers should be provided for off-campus training programs. All these suggestions should be implemented to further improve the effectiveness of the training programmes.

Funding: There was no funding support for conducting this research.

Declaration of competing interest: Authors have no competing interests.

Data availability: Data would be made available on request

Authors' contribution: Author's Contribution: The first and eighth authors collated and analysing the data, second, third, fourth, fifth, sixth and seventh authors conceptualized, operationalized the data, analyzed the data.

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