



Knowledge and skill development of Bihar farmers on inland fisheries management: A terminal evaluation

APARNA ROY, B. K. DAS, GANESH CHANDRA, ARCHAN KANTI DAS AND R. K. RAMAN
ICAR-Central Inland Fisheries Research Institute, Barrackpore, Kolkata, India
e-mail: aparnandrister@gmail.com

ABSTRACT

The state of Bihar in India has a huge potential in fisheries and the research institutes of Indian Council for Agricultural Research (ICAR) are involved in building capacity of the fish farmers of the state. Since 2012-13 to 2014-15 about 1279 fish farmers from 21 districts of Bihar State were trained under the Department of Fisheries/Agricultural Technology Management Agency schemes by ICAR-Central Inland Fisheries Research Institute on inland fisheries management. An ex-post facto study was undertaken to measure the effectiveness of these training programmes. Data were collected from 400 trainees from six different districts of Bihar using a semi-structured interview schedule. The Training Effectiveness Index (TEI) was developed and the results of the study indicated that the logistic regression analysis with socio-economic variables like main occupation, land holding, membership in organisations had positive and significant effect on training effectiveness. The overall effectiveness of training was found to be 87.86% which was recorded under the high effectiveness category. The results also revealed that 44.8% of the trainees were young and they also had positive effect on training effectiveness. About 53% of the farmers perceived that the training situation provided to them was highly satisfactory. The farmers also perceived that these trainings helped them to increase their knowledge and skill, enhance entrepreneurial ability and also motivated them to initiate new enterprises.

Keywords: Bihar, Inland Fisheries, Knowledge, Management, Skill, Training effectiveness

Introduction

Development of a nation is the sum total of physical, natural and human resource development and among all these human resource is the root, which helps to bring desired impact in the country's development. Abundant physical or natural resources may lie unutilised or get wasted if human resource is not skilled or developed for its effective utilisation. As per World Bank report (World Bank, 1990) human resource development is a key component to reduce poverty and it helps to improve socio-economic development. To develop human resource, knowledge and skill is very much essential and that can be through training; as training is a systematic effort to increase knowledge, improve skill, inculcate appropriate attitudes and develop desired attributes. Fisheries sector has an important role in overall development of the state of Bihar, India. The state is endowed with a variety of natural water resources *viz.*, rivers and associated water bodies like floodplain wetlands (oxbow lakes, meanders, seasonal floodplains), reservoirs, ponds and tanks. The state is endowed with 2800 km stretch of rivers; 2,00,000 ha of *chaurs* and floodplain wetlands; 9,000 ha of oxbow lakes or *mauns*; 25,000 ha of reservoirs and 90,000 ha of ponds and tanks. The maximum utilisation of these

water resources can fetch prosperity for the state and ensure food and nutritional security. Appropriate inland fisheries management can bring out new avenues for self-employment and entrepreneurial opportunities for sufficient and sustainable wealth generation for rural populace of the state. Since 2008, Department of Fisheries, Government of Bihar has introduced several schemes for skill development of fish farmers, among them the most important scheme is capacity building and training of the fish farmers on recent advances in inland fisheries management to be conducted in institutes outside Bihar. ICAR-Central Inland Fisheries Research Institute (ICAR-CIFRI) is a premier research organisation situated in Barrackpore, West Bengal and is prominent in Asia in the field of inland fisheries research, extension and training and mandated to create awareness, provide training and consultancy in inland open-waters. Since 2012-13 to 2014-15, about 1279 fish farmers from 21 districts of Bihar State were trained under the Department of Fisheries/Agricultural Technology Management Agency schemes by ICAR-CIFRI on the theme of Inland Fisheries Management *viz.*, flood plain wetland management, enclosure culture, fish disease management, utilisation of derelict waters, soil and water chemistry and feeding management. Training is a process which results in changes

of attitudes through development of knowledge and skill in accordance with specific objectives. Evaluation of the impact of training is also necessary which can be done through systematic collection of data or information for and about a training activity which can then be used for guiding decision making and for assessing relevance and effectiveness of various training components (Raab, 1987). In the present study, an attempt was made to use terminal evaluation to determine the effectiveness of the trainings imparted to fish farmers of Bihar during 2012-13 to 2014-15 by ICAR-CIFRI on inland fisheries management for securing livelihoods and generating employment opportunities for the rural populace of Bihar.

Materials and methods

Terminal evaluation is concerned with learners' performance and its primary objective was to determine the degree to which the intended objectives and goals have been fulfilled. Two general methods were used for terminal evaluation, measurements of change in KSAOs and measurement of trainee perceptions about training activity through questionnaire, rating scale, checklists and other tools (Mishra, 1990). A total of 400 trainees were randomly selected and they were interviewed with semi-structured interview schedule and Training Effectiveness Index (TEI) was calculated for terminal evaluation. Data were collected during 2012-13 to 2014-15. 'Four point continuum scale' was used to measure the perception of the trainees on different aspects of training. The TEI was calculated using the formula of Singh and Singh (2014) as:

$$TEI = \frac{TS \text{ obtained by respondents}}{\text{Maximum possible scores}} \times 100$$

where, TS = Training score

The relation of socio-economic parameters with the training effectiveness was ascertained through Logistic Regression Analysis (LRA). The dependent and independent variables and their measurements are given in Table 1.

Results and discussion

Socio-economic profile of the farmers

The profile of farmers in the present study highlights their salient characteristics as these characteristics were assumed to influence their perception regarding

Table 1. Variables and measurements

Variables	Measurement
Independent variables	
Age	Direct questioning
Education	Direct questioning
Occupation	Direct questioning
Family size and family type	Direct questioning
Land/pond holding	Direct questioning
Family income	Direct questioning
Social participation (Membership in any organisation)	Schedule developed
Dependent variable	
Effectiveness of training	Schedule developed

effectiveness of the training. The variables under investigation were analysed critically and primary descriptions are presented.

The study revealed that majority of the fish farmers (44.8%) belonged to young age group ranging from 18-30 years; 28.96% belonged to age group of 31-40 years and only 16% of the farmers were more than 50 years of age. As almost 45% of the trainees were young, enhancement of skill and knowledge during the training was expected (Table 2).

Table 2. Distribution of the respondents according to age

Age composition (yr)	Respondents
18-30	179 (44.8%)
31-40	116 (28.96%)
41-50	61 (15.17%)
>51	44 (11.11%)

Among the trainees it was found that 35.41% were graduates and 9.65% were having post-graduate degree and 2.75% were functionally literate (Table 3). Higher educational status was noticed among the young age group trainees. Functional literacy was prevalent among the trainees above 50 years of age. Background, educational qualifications and literacy skills are highly related. But sometimes, from a theoretical perspective, due to presence of third variables, this relationship may vary (Massing and Schneider, 2017).

Majority of the respondents (72%) among the trainees were engaged in agriculture and it was their main occupation. Only 4% of the respondents were found to be landless labourers. About 24% of the trainees were involved in fisheries and it was their main business (Fig. 1). Trainees' attributes and attitudes may influence the

Table 3. Distribution of respondents based on educational status

Educational status	Functionally literate	Primary level	Secondary level	Graduate	Post-graduate
Bihar farmers	11(2.75%)	60 (15.17%)	149 (37.24%)	141 (35.17%)	39 (9.65%)

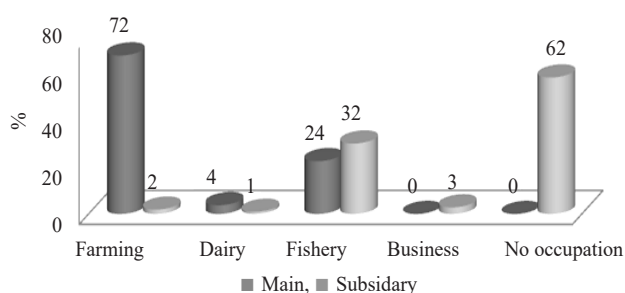


Fig. 1. Occupational distribution of the respondents

effectiveness of training (Noe, 1986). So, the occupational diversification among trainees may have influence on training effectiveness.

Only 5% of the respondents were in service with organisations. Business or independent profession/others (poultry and goatary) was being carried out by 42% of the total respondents; whereas 26% of the respondents carried out dairying as their subsidiary occupation. Hence, it could be concluded that majority of the farmers were engaged in agriculture.

About 48% of the farmers did not have any involvement in social organisations. Only 19% of the sampled farmers were members of cooperative societies and 13% of them were members of farmers' clubs, whereas 8% were members of fish production group (Fig. 2).

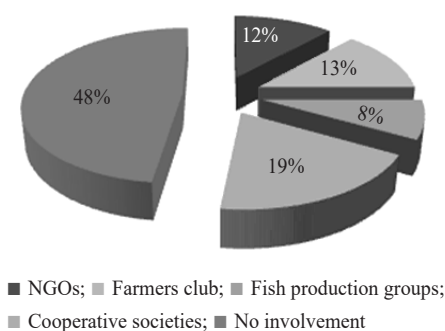


Fig. 2. Farmer's involvement in organisations

Effectiveness of the training programmes

Farmers' training is an intensive learning activity for a group of selected farmers, assisted by competent trainers to understand and practice the skills required in the adoption of technology at a place where appropriate facilities exist and at a time and duration considered suitable by farmers (Okwu and Ejembi, 2005). Effectiveness of the training programme is an essential indicator of terminal evaluation. Terminal evaluation helps to assess the usefulness of training by the implementing organisation as well as to the donors. In the present study, it was measured on a four point continuum ranging from high to very low effectiveness. Among the respondents, 48% reported that

the training was highly effective, 27% of the trainees reported that effectiveness was at a medium level and 12% of the beneficiary farmers stated the training programmes as very less effective (Table 4). Meta-analysis of seventy training programmes by Scott (2004) revealed that, well designed creativity training programs typically induce gains in performance and cognitive skills. The overall TEI was calculated based on individual score and it was found to be 71.3%, which implies that trainings conducted were successful in terms of imparting knowledge, skill and changes in attitude and attribute of the trainees and were rated as medium to highly effective.

Table 4. Distribution of respondents based on effectiveness of training programmes

Category for effectiveness	No. of farmers (%)
Very low (10-15)	12
Low (15-20)	13
Medium (20-25)	27
High (25-30)	48

Perception of beneficiary farmers on different aspects of training programme

Most of the farmers (46%) perceived that the course content on which training provided to them were highly relevant. Almost 54% of the farmers perceived that designing of the course material is very effective as theory as well as practical and field exposure visits were also included in the training curriculum. About 67% of the trained farmers perceived that faculty of the training programmes are highly effective as they are very interactive and use audiovisual aids in local language. Beneficiary farmers (92%) were satisfied about the physical facilities available in the institute for the training. However, 6% of the farmers perceived that the practical facilities for the training were not effective, whereas 59% of the farmers perceived as highly effective. Overall 83% of the trainees expressed very high level of satisfaction from the trainings in terms of overall training facilities, course curriculum, faculty and exposure visits. This finding is in line with the study on farmers' perception towards effectiveness of trainings organised by Krishi Vigyan Kendras (KVKs) at Uttarakhand which revealed that majority of the KVK beneficiaries (50%) had favourable perceptions towards training programmes (Ranjan, 2017). A study by Ahmad *et al.* (2012) revealed that majority of respondents (63.42%) reported that training programme was fully based on their needs and was effective for them.

The results (Table 5) also depict an effective learning situation (Fig. 3) as all essential elements for promoting learning *i.e.*, learners, teachers, subject matter, teaching

Table 5. Distribution (%) of beneficiary farmers based on perception on different aspects of training programme

Perceptual factor dimension	Very high	High	Medium	Low
Relevance of course contents	46	30	18	6
Designing of the course and teaching material	54	21	21	4
Faculty	67	33	-	-
Classroom facility	92	8	-	-
Practical session/facility	12	59	23	6
Field exposure	20	42	26	12
Overall satisfaction from training	83	11	6	

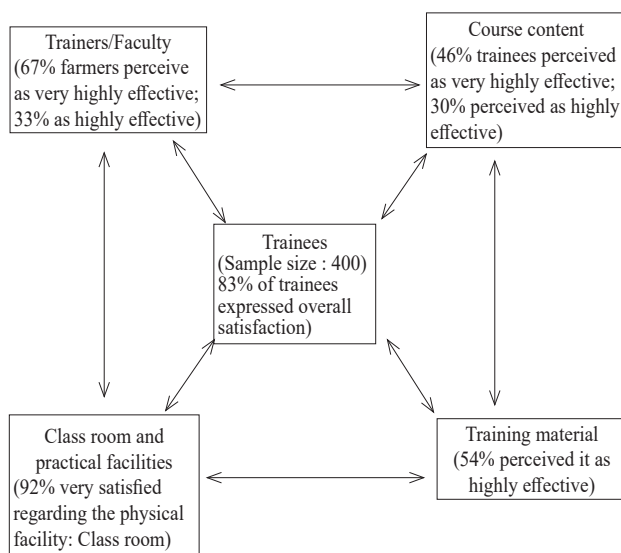


Fig. 3. Effective learning/training situation

materials and physical facilities (Leagans, 1961) are present in a dynamic relationship with one another. Appropriate learning situation gives quality learning environment and favourable situation to learn. Learning is an important function of our cognitive system which brings desirable and relatively permanent change in behaviour. The learners perceived that 67% faculty/trainers are very highly effective and the course content is also perceived as very highly relevant by 46% of the trainers or learners. The trainers were also highly satisfied with class room facility (92%) and practical facilities. The course material

Table 6. Training benefits as perceived by the beneficiaries

Training benefits	High	Moderate	Low
Increase in knowledge	47%	39%	14%
Development of skills	16%	59%	25%
Enhancement of entrepreneurial ability	36%	43%	21%

or teaching material developed for the trainees was also perceived as highly effective by 54% of the trainees.

Training benefits as perceived by the beneficiaries

The study revealed that (Table 6) training on inland fisheries management helps the beneficiaries to increase their knowledge (46% reported high, 39% moderate and 14% low) on various issues of inland fisheries management like wetland management; enclosure culture; disease management and conservation aspects. Skill is very important as it determines the ability to execute plans. Fifty-nine percentage of training beneficiaries believed that they have gained moderate improvement in their skills like fish feed preparation, water quality analysis, disease identification and record keeping. About 36% of the trainees reported that the trainings effectively contributed to enhance their entrepreneurial ability in the field of inland fisheries like feed mill establishment and integrated wetland development. These inferences are in agreement with the findings of the study conducted by Singh and Singh (2014) at Patna and Muzaffarpur districts of Bihar State where 58.3% farmers perceived that they were highly benefited in terms of increase in knowledge followed by gain in skills (48.3%) and 15% farmers were willing to start new enterprise as a result of training.

Logistic regression analysis showed that the socio-economic variables like main occupation *i.e.*, agriculture, age (18-30) of the farmers, land and pond holdings of the farmers and membership in organisations (NGOs, Cooperative societies and Groups) have positive and significant relationship with training effectiveness (Table 7).

The findings of the study suggested that the trainings provided to the farmers from Bihar were imperative and have brought about positive impact leading to increase in knowledge level of the farmers. One third of the farmers

Table 7. Estimates using logistic regression analysis

Parameter	Estimate	Standard error	Wald Chi-Square	$p > \chi^2$
Main occupation (Agriculture)	1.7449	0.5308	10.8058	0.0010
Young age (18-30 yr)	0.4189	0.2371	3.1208	0.0503
Land /Pond holding	0.1140	0.0622	3.3583	0.0609
Membership in organisations	0.1487	0.0802	3.4388	0.0637

felt that training has enhanced their entrepreneurial ability. The study has identified the weak links in the training programme such as inadequate field visits and limitations in practical facilities. There is scope for improvement through increase in practical facilities and more field exposure visits to the trainee farmers during future training programmes. More information is also needed to assess the ex-post-facto impact of training programmes in terms of adoption of different practices of inland fisheries management and their entrepreneurial capability in handling real farming situation.

Acknowledgements

Authors are indebted to Mr. Atanu Das, Technical personnel of ICAR-CIFRI, Barrackpore for assistance in collection of data.

References

- Ahmad, N., Singh, S.P. and Parihar, P. 2012. Farmers assessment of KVK training programme. *Economic Affairs*, 57(2): 165-168.
- Leagans, J. P. 1961. Characteristics of teaching and learning in extension education, 15. *Extension Education in Community Development*, Directorate of Extension, Govt. of India, New Delhi.
- Massing, N. and Schneider, S. L. 2017. Degrees of competency: the relationship between educational qualifications and adult skills across countries. *Large scale Assessments in Education*, 5(1): 6.
- Misra, D. C. 1990. *New directions in extension training: a conceptual framework*. Directorate of Extension, Govt. of India. New Delhi, 238 pp.
- Noe, R. A. 1986. Trainees' attributes and attitudes: Neglected influences on training effectiveness. *Acad. Manage. Rev.*, 11(4): 736-749.
- Okwu, J. O. and Ejembi, A. S. 2005. Essentials of a successful farmer training programme in Agricultural Extension in Nigeria. *Proceedings of the 10th Annual National Conference, AESON*, 14-17 June, 2005, Nigeria, p. 1-5.
- Raab, R. T., Swanson, B. E., Wentling, T. L. and Clark, C. D. 1987. *A trainer's guide to evaluation*. FAO, Rome., p. 20-25.
- Ranjan, R., Ansari, M. A., Verma, A. P., Shekhar, S. and Rashit, S. 2017. Farmers' perception towards effectiveness of Krishi Vigyan Kendras (KVKs): A study in Uttarakhand, India. *Int. J. Curr. Microbiol. App. Sci.*, 6(3): 878-890.
- Scott, G., Leritz, L. E. and Mumford, M. D. 2004. The effectiveness of creativity training: A quantitative review. *Creativity Res. J.*, 16(4): 361-388.
- Singh, D. K. and Singh, P. 2014. Effectiveness of training programmes under Agricultural Technology Management Agency in Bihar. *Ind. Res. J. Ext. Educ.*, 14(1): 93-95.
- World Bank 1990. *World Development Report 1990*. Oxford University Press, New York.