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

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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 chaurus 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:

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

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               | Schedule developed            |
| Effectiveness of training        | Schedule developed            |

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%)   |
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 goatery) 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).

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      |     |

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 percent 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

|--|------------------------------------------------|---|---|---|---|
|Parameter                      | Estimate | Standard error | Wald Chi-Square | $p \approx \chi^2$ |
|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    | 0.1847   | 0.0852         | 3.4388          | 0.0637         |

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 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 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 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 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 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

Training situation

1. Effective learning/training situation

2. Trainers/Faculty (67% farmers perceive as very highly effective; 33% as highly effective)

3. Course content (46% trainees perceived as very highly effective; 30% perceived as highly effective)

4. Trainers (Sample size : 400) 83% of trainees expressed overall satisfaction)

5. Course content

6. Faculty (67% farmers perceive as very highly effective; 33% as highly effective)

7. Field exposure

8. Relevance of course contents

9. Designing of the course and teaching material

10. Classroom facility

11. Practical session/facility

12. Field exposure

13. Overall satisfaction from training

14. Course content

15. Faculty

16. Classroom facility

17. Practical session/facility

18. Field exposure

19. Overall satisfaction from training

20. Course content

21. Faculty

22. Classroom facility

23. Practical session/facility

24. Field exposure

25. Overall satisfaction from training
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.

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