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# Impact of ToT Programmes on Knowledge, Attitude and Skill Level of Trainees

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## ABSTRACT

Capacity building and skill development of officials who work with fishermen at grassroots level is of utmost importance for efficient inland fishery management. The present study aims at finding out the impact of training of trainers (ToT) conducted by ICAR-Central Inland Fisheries Research Institute in terms of knowledge, attitude and skill (KAS) development. A total of 105 trainees of five training programmes in several areas of inland fisheries management were interviewed using structured interview schedule and telephonic interview. Knowledge test and attitude scale were developed for the purpose of the study. Trainees mostly fell in the medium category (51.19%) of knowledge before training and in the high category (45.24%) after the training programmes. Overall level of attitude was found to be skewed towards neutral before the training programmes while after the training programmes it was found to be skewed towards favourable. Statistically significant gain in knowledge was noticed for all the training programmes, while in case of attitude significant change was found in case of two training programmes. Skill acquirement was measured based on trainees' perception. Most of the trainees stated that they had acquired skill either "to satisfactory extent" or "to some extent". The study also found significantly positive correlations between the three domains under investigation. The results of the study would help to design efficient training programmes in future and would pave the way for conducting further research in training impact assessment on job performance of trainees.

**Keywords:** Attitude scale, Impact, KAS, Knowledge test, ToT

## INTRODUCTION

Despite the spike in economy, India still witnesses cases of abject poverty, hunger and malnutrition among a large section of its population. Rural India which comprises two third of the nation is even more vulnerable to these stress factors. On the face of the challenges posed by poverty and unemployment rural livelihood diversification assumes special importance. Livelihood diversification opens up multiple avenues for income generation of rural poor and thus, increases their resilience towards natural and anthropogenic hazards (Pal *et al.*, 2017). Here comes the importance of fishery sector. Exploring allied sectors of agriculture like dairy and fishery is claimed to be economically rewarding for rural youth who can earn sufficient by livelihood diversification (Som *et al.*, 2018). India has shown continuous and sustained increments in fish production since independence. The total fish production during 2017-18 is estimated to be 12.60 million metric tonnes, of which nearly 65 per cent is from inland sector (NFDB, 2020).

Considering the importance of this sector, the Government of India has launched the second Blue Revolution or the Neel Kranti Mission in the year 2016 with aim of sustainable development of fishery sector along with livelihood security of the fishermen (Mohanty *et al.*, 2018). Therefore, building human resources in and around this sector is imperative. 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 (Roy *et al.*, 2018). In order to empower the fishermen communities it is of utmost importance to build skill and capacity of the personnel who are in direct touch with the fishermen. According to Roger's "Trickle-down effect" (1962) technologies and innovations trickle down from one level of users to the next level. Therefore, in order to empower the people at the grassroots level it is primary requirement to train the trainers first. A common assumption is that training of trainers (ToT) is a strong predictor of sustainability

because of its potential for up-skilling the workforce rapidly, cheaply and exponentially by developing local educators (Mormina and Pinder, 2018). Furthermore, training and capacity building of personnel are required to equip them with new skills and knowledge so that they can serve their organizations more efficiently. In a rapidly changing and dynamic work environment, it is crucial for organizations as well as for employees to acquire new skills which are required for successful job performance (Aguinis and Kraiger, 2009; Kraiger, 2014). Training provides an opportunity to develop such skills (Salas *et al.*, 2012). It helps an organization to have a competitive edge over other organizations by reaping the benefit of the gained knowledge and skill of the employees (Tarik, 2018). Besides, it helps to uplift employees' productivity, career progression and job satisfaction over long time (Bowes, 2008).

On this backdrop, the Central Inland Fisheries Research Institute of Indian Council of Agricultural Research has been arranging a number of training and capacity building programmes since a long time. Besides conducting research on sustainable management of inland open water resources, productivity enhancement in inland open waters and aquatic ecosystems health management the Institute profusely works in the area of human resource management. It imparts training not only to farmers but also to the officials who work at ground level with the fishing communities since they are the carriers of knowledge and information. The Institute has trained more than 300 officers working in the area of inland fisheries in last five years and the Training of Trainers found to be most effective 80.66% (Training Effectiveness score of Ornamental fisheries) Som *et al.* (2019). The present study aims to assess impact of these trainers' training programmes conducted by ICAR-CIFRI. Five training programmes on four important areas of inland fishery management, namely, enclosure culture, reservoir fisheries, ornamental fisheries, and fish health management were tested for their efficacy in terms of building better knowledge, attitude and skill among the trainees.

## MATERIALS AND METHODS

In the present study, data were collected using structured interview schedule from a total of 105 participants of five training programmes. For measuring knowledge and attitude level of participants, knowledge test and attitude

scales were developed which were administered to the trainees before and after conduction of the training programmes. Skill acquirement was measured in a 5 point continuum rating scale based on the perception of the trainees.

## Measurement of Variables

**Knowledge test:** A knowledge test was developed with the help of item collection and item analysis to assess the knowledge level of officials before and after the training programme. For item collection, important aspects regarding the respective training programmes were listed in consultation with experts working in the domain and review of literature. Altogether 50 questions were selected. For Item analysis, difficulty indices and discrimination indices were calculated with respective sets of 30 respondents who were not part of the study. The difficulty index for an item was worked out as the percentage of respondents giving right answer to an item. The items for which the percentage ranged from 30 to 80 were considered for the selection in the final knowledge test. The discrimination index was calculated using  $E^{1/3}$  method by Mehta (1958). In order to work out the discrimination index, for each question, the total score of the 30 respondents for 50 questions were ranked. The scores obtained were arranged in descending order of total scores and the respondents were divided into six equal groups – G1, G2, G3, G4, G5, and G6 with 5 respondents in each group. The following formula was used to calculate the discrimination index of each item.

$$E^{1/3} = \frac{(S1+S2) - (S5+S6)}{N/3}$$

Where,  $E^{1/3}$  = Discrimination index, S1, S2, S5, and S6 are the frequencies for correct answers in the group G1, G2, G5, and G6, respectively. N is total number of respondents in the sample selected for item analysis. In the present study, the items with DI value more than 0.20 were considered for final selection for inclusion in the knowledge test. After discarding the items by difficulty index and discrimination index finally, 30 items were retained in each of the final knowledge test. The reliability coefficients of the tests were calculated using Spearman-Brown formula (Guilford and Fruchter, 1978). The coefficients were above 0.75 for all five tests designed for five training programmes.

$$r_{tt} = \frac{2r_{hh}}{1 + r_{hh}}$$

Where,  $r_{tt}$  = reliability coefficient of the test and  $r_{hh}$  = the correlation between two halves of the test. The tests were at last validated by the concerned experts in relevant fields.

**Attitude scale:** The initial set of statements aiming to measure attitude towards respective themes of training programmes were presented to thirty experts who were asked to express the relevancy of the statement in a five-point continuum rating scale. T-test for item analysis (Edwards, 1957) was performed to work out the relevancy scores. For this purpose, all the thirty scores for a statement are recorded in a descending order. The top 25 per cent and bottom 25 per cent of responses are grouped into “high group” and “low group”, respectively and then the t-score is calculated with the help of the following formula:

$$t = \frac{\bar{x}_H - \bar{x}_L}{\sqrt{\frac{\sum(x_H - \bar{x}_H)^2 + \sum(x_L - \bar{x}_L)^2}{n(n-1)}}$$

Where,  $x_H$  = Mean score on a given statement for the high group

$x_L$  = Mean score on the same statement for the low group

$n$  = Number of subjects in the upper and low groups

$x_H$  = Score of an individual in high group

$x_L$  = Score of an individual in low group

The indicators with t score of more than 1.75 were selected in the final scale.

## RESULTS AND DISCUSSION

The details of the five training programmes are presented in Table 1. All the training programmes have taken place at headquarter of CIFRI at Barrackpore in West Bengal except ToT on Reservoir Fishery Management, Bangalore which took place at the Bangalore regional centre of the institute in Karnataka. The participants were Line Department Officers of various State Governments, Assistant Professors, Scientists, entrepreneurs, research scholars, technical officers, fishery inspectors, and managers of private companies.

Knowledge level of the trainees was tested using the knowledge test developed for the study. Another study by Shankar *et al.* (2012) measured the impact of a training module on pharmaceutical promotion on knowledge, attitude and skills of medical students of a Nepalese medical school using a retrospective-pre questionnaire. All scores were found to have increased significantly at the end of the module in the study. In the present study, based on their knowledge level the trainees were divided into three categories, i.e., high, medium and low. The categorization was done following mean  $\pm$  SD method. Most of the trainees fell in the medium category regarding their knowledge level before the training programme. After the training programmes most of the trainees fell

**Table 1: Details of Training Programmes**

Name of training programme	Place	Date	Number of trainees
Training of trainers on “Inland Ornamental Fisheries Management for Income Generation”	ICAR-CIFRI, Guwahati Centre, Assam	December 17 to 21, 2018	21
ToT on Reservoir Fishery Management	ICAR-CIFRI, Bangalore Centre, Karnataka	June 11 to 15 2019	17
Training of Trainers (ToT) on “Reservoir Fishery management for employment generation”	ICAR-CIFRI, Barrackpore, West Bengal	November 23 to 27, 2019	20
Training of Trainers (ToT) programme on “FishHealth Management of Inland Cultured Fishes for Doubling Farmer’s Incomes”	ICAR-CIFRI, Barrackpore, West Bengal	December 02 to 06, 2019	25
NFDB Sponsored Training of Trainers (ToT) on “Enclosure Culture (Cage and Pen) towards Livelihood and Nutritional Security	ICAR-CIFRI, Barrackpore, West Bengal	January 14 to 18, 2020	22
<b>Total</b>			<b>105</b>

Table 2: Knowledge Level of Trainees before and after training programmes

ToT Programme	Pre			Post		
	Low	Medium	High	Low	Medium	High
ToT on Inland Ornamental Fisheries Management (n=21)	20.46	66.67	12.87	10.34	32.52	57.14
ToT on Reservoir Fishery management (n=20)	35	45	20	25	15	60
ToT on Fish Health Management (n=25)	48	40	12	24	36	60
ToT on Enclosure Culture (n=22)	36.36	27.27	36.36	18.18	18.18	63.64
ToT on Reservoir Fishery Management, Bangalore (n=17)	11.76	70.59	17.65	5.88	52.94	41.18

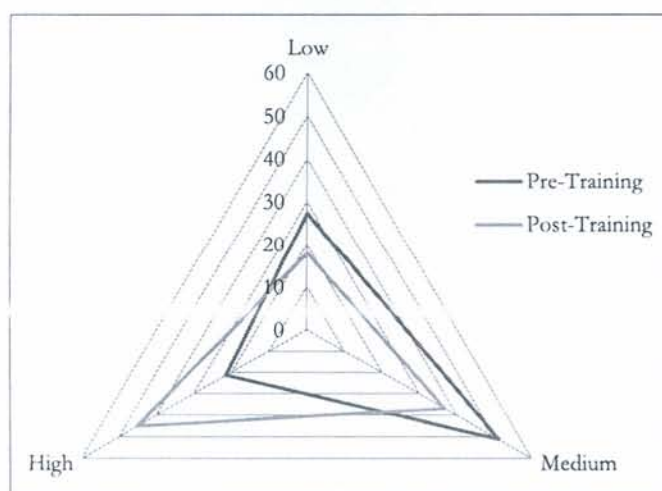


Figure 1: Overall Knowledge level of trainees before and after training

in the high knowledge category except for ToT on Reservoir Fishery Management in Bangalore (Table 2). Analysis of knowledge level of all the trainees together also confirmed similar scenario. Trainees mostly fell in the medium category (51.19%) of knowledge before training and in the high category (45.24%) after the training programmes.

Attitude was measured using a Likert scale developed for the study. Another study on impact of teaching

module on medical students used a pre-validated questionnaire with three domains addressing acquisition of knowledge, generic skills and attitudes and responses were collected on a five-point Likert scale. In the present study, the trainees were divided into three categories regarding their attitude level following mean  $\pm$  SD method. Before conduction of the training programmes, most of the trainees fell in the neutral attitude category. After the training programmes, most of them fell in the favourable attitude category in case of all the training programmes (Table 3). Figure 2 reflects the overall change in attitude of all the trainees together. Overall level of attitude was found to be skewed towards neutral before the training programmes while after the training programmes it was found to be skewed towards favourable.

The average pre and post training knowledge and attitude scores of the trainees in each of the training programmes are presented in Figure 3 and 4. Highest gain in knowledge was noticed for ToT on Inland Ornamental fisheries management (47.32%) followed by ToT on fish health management (42%). The differences between knowledge test scores before and after training were found to be statistically significant using Wilcoxon Signed Rank test for all the five training programmes.

Table 3: Attitude level of trainees before and after training programmes

	Pre			Post		
	Non-favourable	Neutral	Favourable	Non-favourable	Neutral	Favourable
ToT on Inland Ornamental Fisheries Management (n=21)	16.77	57	26.23	13.64	36.36	50
ToT on Reservoir Fishery management (n=20)	20	50	30	10	40	50
ToT on Fish Health Management (n=25)	12	60	28	4	56	40
ToT on Enclosure Culture (n=22)	9.09	72.73	18.18	9.09	40.91	50.00
ToT on Reservoir Fishery Management, Bangalore (n=17)	5.88	47.06	47.06	5.88	29.41	64.71

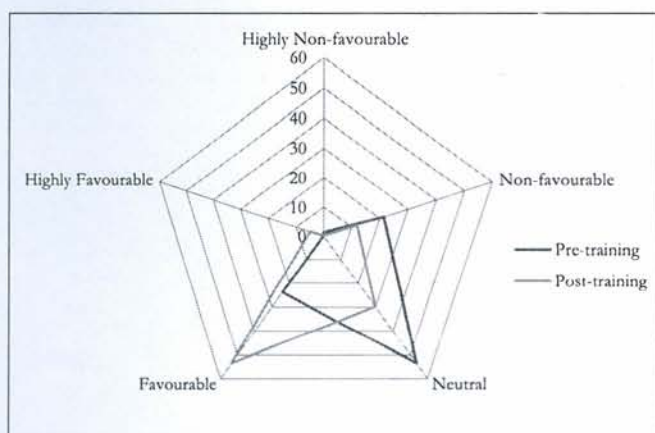


Figure 2: Overall attitude level of trainees before and after training

However, in case of attitude scores, significant differences could be noticed only in case of ToT on Inland Ornamental Fisheries Management and ToT on Enclosure Culture (Table 4).

Skill acquirement was measured based on trainees' perception. A study by Farnandez *et al.* (2018) aimed to measure satisfaction, gain in knowledge, attitude and skill based on perception of trainees after a 2-day course in scientific writing in Spain. In the present study around 38 per cent and 32 per cent trainees under ToT on inland ornamental fisheries management and enclosure culture respectively stated that they had acquired skill to satisfactory extent. Around 35 per cent, 40 per cent, and

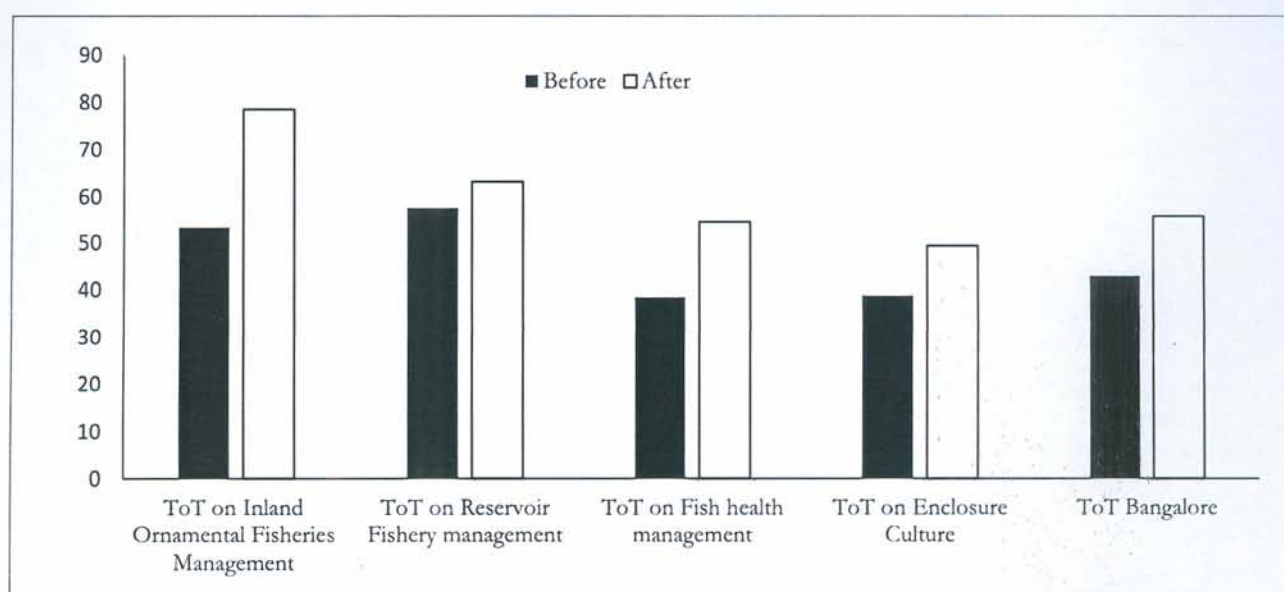


Figure 3: Change in Average knowledge score

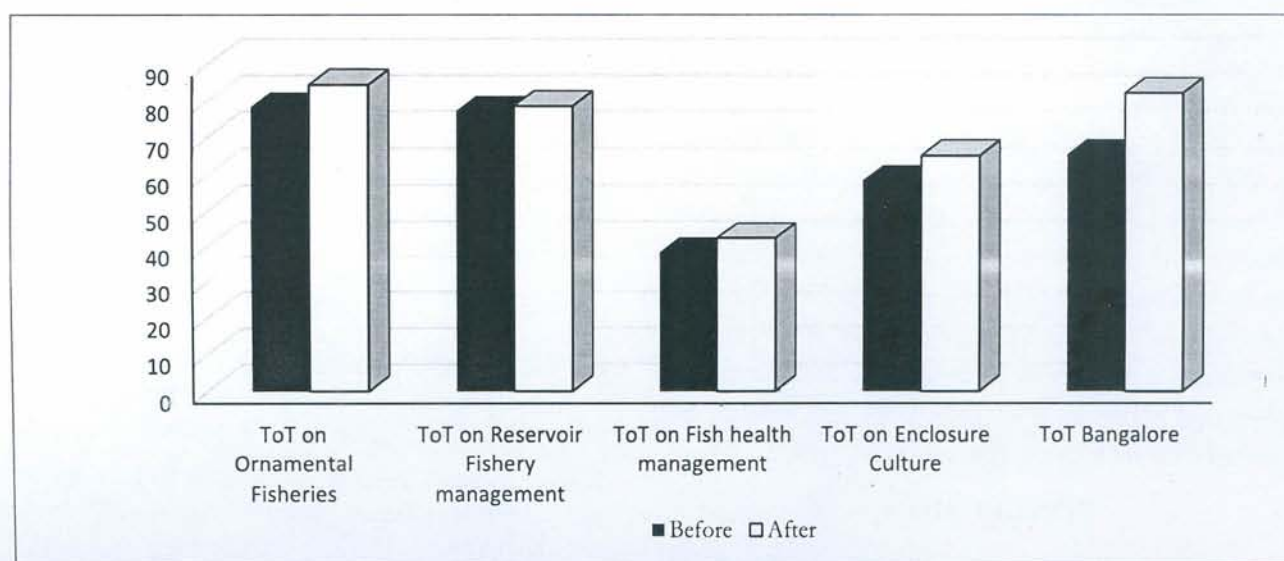


Figure 4: Change in average attitude score

Table 4: Statistical significance of Change in knowledge and attitude

	Knowledge		Attitude	
	Z score	P value	Z score	P value
ToT on Inland Ornamental Fisheries Management (n=21)	-4.018	0.000	0.522	0.000
ToT on Reservoir Fishery management (n=19)	-2.730	0.006	-0.337	0.736
ToT on Fish Health Management (n=20)	-4.063	0.000	-1.756	0.079
ToT on Enclosure Culture (n=21)	-3.174	0.002	-3.140	0.002
ToT on Reservoir Fishery Management, Bangalore	-2.942	0.003	-0.641	0.522
Overall	-6.434	0.000	-2.578	0.01

Table 5: Perceived Skill Acquisition by the trainees

Training programmes	To a great extent	To satisfactory extent	To some extent	To little extent	Not at all
ToT on Inland Ornamental Fisheries Management (n=21)	23.81	38.09	23.81	14.29	0
ToT on Reservoir Fishery management (n=20)	10	20	35	30	10
ToT on Fish Health Management (n=25)	12	32	40	16	0
ToT on Enclosure Culture (n=22)	18.18	31.82	27.27	18.18	4.55
ToT on Reservoir Fishery Management, Bangalore (n=17)	11.76	17.65	47.06	17.65	5.88

47 per cent participants of ToT on Reservoir Fishery management, ToT on fish health management, and ToT on Reservoir Fishery Management, Bangalore respectively expressed that they had acquired skill to some extent after completing the respective programmes.

Further, significant positive associations were found between the gain in knowledge and attitude scores ( $r=0.475$ ,  $p<0.0001$ ), knowledge and perceived skill gain ( $r=0.585$ ,  $p<0.0001$ ) and also attitude and perceived skill gain ( $r=0.641$ ,  $p<0.0001$ ) using Pearson correlation coefficient at 5 per cent level of significance. This indicates that those who gained higher knowledge also perceived higher gain in skill. In another study, positive correlations between scores in knowledge and attitude was found in a course on problem-based learning which improved the students' acquisition of knowledge, generic skills and attitudes (Hande *et al.*, 2015). It can be implied that higher level of knowledge and attitude get translated into better skill acquisition.

### CONCLUSION

The study intended to assess the impact of trainers' training programmes conducted at ICAR-CIFRI based on gain in knowledge, attitude and skill of trainees. There was clearly a shift in knowledge level of the trainees under all five training programmes under the study.

Statistically significant differences between knowledge test scores were found before and after the training programme. In case of attitude, significant difference could be noticed only in two training programmes. However, analysis of the collective data for all the training programmes together revealed that there was overall gain in knowledge and attitude which was statistically significant. Most of the trainees perceived that they gained skill "to satisfactory extent" or "to some extent". The results of the study gave understanding about the efficacy of trainers' training programmes in inland fishery sector. It will be helpful to devise such training programmes in future and to conduct further research on translation of gained knowledge and skill in actual job performance of the trainees.

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