

## Analysis of training effectiveness of marine ornamental fish culture training programmes

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In India, fisheries sector serves as an important source of employment and income generation. In a fishing household, the male member, who goes to the sea and engages himself in the actual fishing process is recognised well but role of the female member who does a lot of work after the fish is landed is often not highlighted. Today's average Indian fisherman family often finds it difficult to earn a livelihood throughout the year. Therefore, the potential of the unemployed fisherwomen needs to be tapped, by equipping them with skills to generate additional income for the household. One of such options is to start a small-scale marine ornamental fish production unit. However, for starting such enterprise they require hands-on training in marine ornamental fish production.

In recent years the marine ornamental fish trade is growing rapidly in national and international markets, for which fish are mainly collected from the coral reef habitats. This indiscriminate and often destructive collection of fishes leads to irreparable damage to the coral reef ecosystem. The establishment of a few small-scale ornamental hatcheries will pave the way for hatchery produced ornamental fish trade. The ICAR- Central Marine Fisheries Research Institute (CMFRI) has been pioneering the development of seed production technologies and commercial level production for more than a dozen species of clownfishes and damselfishes, which are in good demand in the marine ornamental fish trade. Marine ornamental fish production is a low volume, high value enterprise and hence highly lucrative. Keeping this in view, training programmes on 'Seed production

of selected marine ornamental fishes to fishers in Gulf of Mannar region' was organized under Gulf of Mannar Biosphere Reserve Trust (GOMBRT) funded project at the Mandapam Regional Centre of ICAR-CMFRI for 14 groups in four batches during 2014-16 period. The technologies were mostly disseminated to fisherwomen groups, so that they could develop as small-scale entrepreneurs for production of marine ornamental fishes. Hands-on training was given in broodstock development, breeding, larval



Learning by seeing



Learning by doing

and juvenile rearing of clown fishes, grow-out techniques, livefeed culture, enrichment of live feeds, water quality and disease management. Allied topics like biodiversity of marine ornamental fishes in the Gulf of Mannar region, setting up of a small-scale hatchery for ornamental fishes and its economic analysis and familiarization with Government schemes for starting a hatchery were also covered in the training. Field visit to small scale marine ornamental fish units at Mandapam was arranged. Trainees also interacted with the buyers of marine ornamental fishes. The training was given by the scientists/technicians who were involved in the development of marine ornamental fish seed production technology. Evaluating the usefulness of the training programme in terms of Training Effectiveness is an important aspect. This provides information for decisions concerning future training programmes and is highly useful in fine-tuning the training programmes (Meena and Yadav, 2003, *Indian J. Ext. Educ.*, 49 (1 & 2): 99-102). Hence, the training effectiveness of marine ornamental fish culture training programmes organized at the Mandapam Regional Centre of ICAR-CMFRI were assessed.

### Methodology

The training effectiveness was studied based on Kirkpatrick four-level Training Evaluation Model (Kirkpatrick and Kirkpatrick, 1994, *Evaluating Training Programs: The Four Levels*, Berrett-Koehler Publishers). The four levels are:

**Level 1: Reaction** - Measures how trainees reacted to the training.

**Level 2: Learning** - Measures the increase in knowledge as a result of the training.

**Level 3: Behaviour** - Evaluates how far trainees have changed their behaviour, based on the training they received and how trainees apply the information into practical use.

**Level 4: Results** - Analyses the final results of the training, namely, the outcomes of the training.

**Level 1:** Feedback was received from trainees (N=162) both in an evaluation schedule and written response conducted for each trainee at the end of the programmes. The indicators used by Koshti, 2008 (*Evaluation capacity building in rural resource management: A manual*, IARI, New Delhi, India. p.107-127) to study the effectiveness of training was modified and suitably developed for the present study. The indicators are:

1. *Relevance and utility of course content (Theory and Practical)* : Responses were taken on 11 topics on five point continuum namely, highly relevant and most useful, quite relevant and quite useful, relevant and useful, somewhat relevant and somewhat useful, not relevant and not useful by assigning numerical score of 5,4,3,2 and 1 respectively.
2. *Training organization* : Responses were taken as 9 statements on five point continuum namely, strongly agree, agree, no opinion, disagree and strongly disagree by assigning numerical score of 5,4,3,2 and 1 respectively.
3. *Impact on knowledge and skill* : Responses were taken on 11 topics on five point continuum as no change, little change, some improvement, fair improvement and great improvement by assigning numerical score of 1, 2, 3, 4 and 5 respectively.
4. *Overall usefulness of information* : It was measured on five point continuum such as poor, fair, good, very good and excellent and was given score as 1, 2, 3, 4 and 5 respectively.
5. *Fulfillment of expectations* : It was measured on five point continuum such as extremely met, fairly met, satisfactorily met, met to some extent and not met and was given score as 5, 4, 3, 2 and 1 respectively.
6. *Opinion about meeting room and facilities* : It was measured on five point continuum such as poor, fair, good, very good and excellent and was given score as 1, 2, 3, 4, and 5 respectively.

Training Effectiveness Index (TEI) was worked out taking into account all the above mentioned indicators by using the formula given below:.

$$\text{TEI} = \frac{\text{Obtained scores on all dimensions of training effectiveness}}{\text{Maximum obtainable score on all dimension of training effectiveness}}$$

Percentage analysis and Garret ranking was done to process the data and to arrive at meaningful conclusions.

Level 2: A knowledge test with a set of 15 questions was conducted before and at the end of training to ascertain their change in knowledge due to the training.

Level 3 and 4: Periodic follow-up was undertaken by observation method. Through frequent interaction with the trainees, assessment of how many trained people could apply the skills learnt on ornamental fish seed production practically was made. The immediate benefits gained by adopting the technique were documented while the long term benefits (results) were also predicted.

## Results and Discussion

### Level 1: Reaction

Training Effectiveness Index indicated the overall training effectiveness as perceived by the trainees was 83%. Half of the trainees indicated that the marine ornamental fish culture training programme was highly effective (>80% TEI )(Table 1).

**Table 1. Distribution of marine ornamental fish culture trainees based on Training Effectiveness Index**

Training Effectiveness Index	Frequency	Percentage
61 to 70%	23	14
71 to 80%	58	36
81 to 90%	49	30
91 to 100%	32	20

Among the eight indicators, trainees rated the overall usefulness of information and training organization as excellent. The trainees expressed that the relevance and utility of course for practical and theory was 'Highly Relevant' and 'Most Useful' to 'Quite Relevant' and 'Quite Useful'. At the end of the training, trainees expressed that there was a fair improvement in knowledge and skills on marine ornamental fish culture and their expectations were fairly met. The results indicated that they perceived the training given to them as effective (Table 2).

**Table 2. Indicator-wise training evaluation**

Indicator	Mean score	Rank
Relevance and utility of course content (Theory)	4.18	V
Relevance and utility of course content (Practical)	4.41	III
Training organization	4.46	II
Impact on knowledge	4.05	VI
Impact on Skill	4.31	IV
Overall usefulness of information	4.60	I
Fulfillment of expectations	3.90	VIII
Opinion about meeting room and facilities	4.0	VII

Reactions about the training revealed that the training has increased the awareness, knowledge and skill for most of the trainees on marine ornamental fish culture and ultimately changed their attitude towards small-scale ornamental hatchery production (Table 3)

**Table 3. Reactions about organization of training**

Reactions	Number of 'Yes' responses	%
Increased the awareness about ornamental fish culture	154	95
Provided the theoretical information about ornamental fish culture along with practical experience in hatchery	146	90
Provided opportunity for		

skill learning about ornamental fish culture	122	75
Acquired adequate knowledge about various aspects of ornamental fish culture	146	90
Changed the attitude towards ornamental fish culture	154	95

Before the training programme most of the trainees expressed they had no idea to start a small-scale ornamental hatchery, whereas after the training more than half of the trainees expressed that they are intended to start small scale marine ornamental hatchery unit in the near future (Table 4).

**Table 4. Extent of use of practices learnt**

Reactions	Number of 'Yes' responses	%
Start a small scale hatchery immediately	57	35
Intend to start small scale hatchery in the future	97	60
No plan to start	08	05

Regarding suggestions for improving the training programme it was found that majority of the trainees ranked 'Need for more practical session' first (Table 5). Some of the trainees suggested increasing the training duration by 10 days and more individual practical sessions incorporated in the programme.

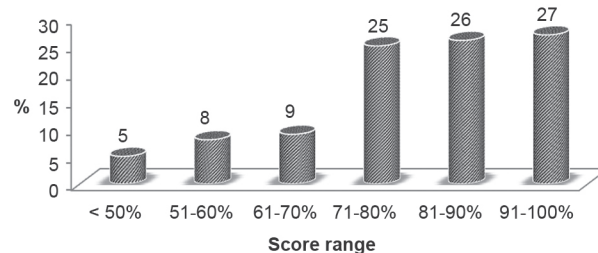
**Table 5. Suggestions of trainees for improving the training programme**

Suggestion	Score	Rank
More practical session	75	I
To do practical individually	60	II
Field level training	43	III
Increasing the training duration by 10 days	27	IV

### Level 2: Learning

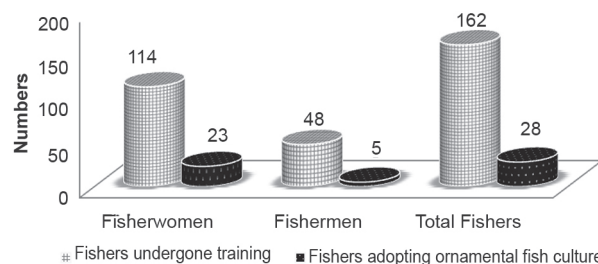
While majority of trainees obtained only 10-20% score in the knowledge test conducted before the training, more than three-fourth of the trainees

obtained above 70 % score in the test conducted after the training (Fig. 1).



**Fig. 1. Distribution of trainees based on their score in knowledge test**

### Level 3: Behaviour



**Fig. 2. Genderwise profile of trainee**

Out of 162 fishers, twenty eight have initiated the small-scale ornamental fish culture unit in their respective places. Among these, 23 members from Thangachimadam village received 50 % subsidy (₹50,000) under The National Fisheries Development Board (NFDB) scheme to start ornamental fish production offered by the State Fisheries



**Fisherwomen group in Thangachimdam undertaking ornamental fish culture**





Ornamental fish culture unit at Mandapam



Packing of ornamental fish seed

Department, Ramanathapuram. Remaining five members from Mandapam have initiated the marine ornamental fish culture with their own investment. Evidently 20 % of the trained fishers were able to practically apply the learnt knowledge and skill on marine ornamental fish seed production.

The development of small-scale private entrepreneurship on hatchery production of marine ornamental fishes at Mandapam is detailed. Fishermen Self-Help Groups (SHG) established a small scale hatchery in 100 square feet area at Mandapam. Percula, sebae and fire clownfish brooders were handed over to the group on 24<sup>th</sup> March 2016. In addition, about 400 numbers of hatchery produced half-inch sized juveniles of percula clown, tomato clown and skunk clownfishes were supplied by the Mandapam Regional Centre of ICAR-CMFRI during first week of May 2016. The list of ornamental fish traders for marketing the produce and entire technical guidance on rearing of the juveniles, health management, water quality management and packing techniques for transportation had already been given by the scientific and technical staff of ICAR-CMFRI, Mandapam. After two months of rearing the clownfish juveniles to a size of 1.0 and 1.5 inch were sold for ₹ 75 and ₹100 per fish respectively to

a fish trader at Bengaluru. The operating cost for two months of rearing was ₹17,000 with gross revenue of ₹ 30,000. The estimated capital productivity was 0.57. Owing to the good economic benefits, they have expanded the hatchery to 350 sq.ft area and are continuing with the marine ornamental fish production.

#### Level 4: Results

Marine fisheries sector in Palk Bay and Gulf of Mannar region is witnessing over exploitation of trawling grounds, declining catches and consequent reduction in profit for fishermen. In such a scenario, the fishers group have well understood that the marine ornamental fish seed production will be one of the best alternate livelihood options for them. One of the anticipated outcomes from the training is the economic empowerment of women and enhanced decision making ability. In the long run, marine ornamental fish seed production will pave the way for a sustainable hatchery produced, ornamental fish trade. The findings of the study suggest that though it takes longer time for establishment of large scale units, we can progress to a scenario where it is possible to substantially reduce the quantity of wild collected marine ornamentals and replace it with a hatchery produced marine ornamental fish trade.