Delivery Competence and Penetration of Extension Services among Fish Farmers of Assam

Parag Saikia*, **M. Krishnan***, **P.S. Ananthan***,
Sheela Immanuel* **and Dinesh Hazarika****

ABSTRACT

Extension primarily deals with human resource development (HRD) and the transfer of technology and knowledge from research centres to farmers. Improving human resource development (HRD) within rural community is essential for agriculture and community development. Extension workers are professionals in the extension system responsible for developing individuals in the community. This study was carried out to investigate the competency of fisheries extension officers and the extent of penetration of Department of Fisheries initiatives in improving the awareness and knowledge of the fish farmers in the selected districts of Assam. The data were collected from 180 farmers with the help of structured and pre-tested interview schedule involving 15 statements developed for this purpose. From the results, based on the responses, it can be seen that the officials scored highly on technical knowledge skills (84 per cent) and managerial skills (81 per cent). They also scored well on training skills (68 per cent), communication skills (66 per cent) and social mobilisation skills (69 per cent). It was also found that majority of the fish farmers (59.44 per cent) had medium level of knowledge in respect of scientific fish culture practices.

Keywords : Non-parametric methods, Fish culture.

JEL classification: Q16, Q22, C14

I

INTRODUCTION

The objective of establishing an extension mechanism is to propagate and popularise information and education to people in all walks of life. The mission of extension is to extend education to people. The emphasis in extension education is always on helping people to help themselves. The extension workers' role in developing countries has been on transferring agricultural technologies to clients in order to increase productivity. Extension therefore is a human process as well in which technical information are used to help rural people achieve their potential (Boone, 1990). The lead role of extension professionals is to diffuse information using appropriate teaching strategies, procedures and techniques. Radhakrishna *et al.* (1994) emphasised that the leadership role of extension workers has become an increasingly critical element in the successful performance of extension programmes. Transfer of technology and development of clients' capacity and potential has been

identified as the two key factors in ensuring effectiveness of any extension service (Bennett, 1989; 1993). The transfer of technology aims to communicate effectively the result of research to clients and development of clients' capacity and potential through educational activities aimed to nurture self motivated clients who can act voluntarily in their society and are able to make rational decisions and solve their problems. The effectiveness of extension services is also highly dependent on the ability of extension workers who are competent. As a whole, extension process is dependent on them to transfer information from extension organisations to the clients. Realising this situation, therefore, it is very critical to know the leadership competencies of extension workers and how these competencies influence their performance. Furthermore, in the context of agricultural extension; most international studies generally focus on evaluation of extension system and methodology rather than the personnel. For example, economic evaluation of the performance of T&V extension system (Bindlish and Evenson, 1993), economic impact of extension system of agricultural extension (Brikhaeuser *et al*., 1991) and measuring performance indicators of paid-extension system (Dinar and Keynan, 1998) reflect this focus. Pawar (2010) found that Department of Fisheries (DoF) officials of three districts of Maharashtra scored highly on technical knowledge skills (72.67 per cent) and managerial skills (73.10 per cent) but scored low on training skills (53.67 per cent), communication skills (55.20 per cent) and social mobilisation skills (53.80 per cent).

The present study is an attempt to investigate the job performance competencies of Fisheries Extension Officers (FEO) in terms of competency in relation to the technical knowledge skills, training skills, communication skills, social mobilisation skills and management skills and also the extent of penetration of Department of Fisheries initiatives in improving the awareness and knowledge of fish farmers of Assam.

II

MATERIALS AND METHODS

This investigation was carried out from October-December 2011 in the three districts of Assam. Three districts, namely, Nagaon, Sonitpur and Golaghat were purposively selected for the study. The selection of three districts were made based on the prior consultation with the officials of the Department of Fisheries (DoF), Assam on the basis of fish production data (2010-11) available with the DoF, Assam. A structured and pre-tested interview schedule was used to collect data from the respondents by personal interview method. The development competency index of the DoF Fishery Extension Officers (FEOs) (30 numbers) were worked out on five different parameters which included technical knowledge and training skills (15 indicative parameters), communication skills, social mobilisation, management skills (10 indicative parameters) were rated out. For evaluating the DoF staff the index

developed by Jeevitha (2009) and Pawar (2010) were used. The average scores obtained by DoF staff in each district were calculated for each component as well as for capturing the overall development competency index which was based on 60 identified statements of 5 parameters and used for comparative analysis. Kruskal-Wallis non-parametric test was done to test the significance of the DoF competencies of the three districts. Training need index (Majhi, 2001) was used to measure and compare the extent of training needs expressed by the respondents.

$$\text{Training need index} = \frac{\text{Essentially needed x 2 + needed x 1}}{\text{Total respondents}}$$

The awareness and knowledge about scientific fish culture practice of 180 farmers were empirically measured by using scales and scoring procedures developed earlier. The data were collected with the help of structured and pre tested interview schedule involving 15 statements developed for this purpose from the respondents through personal interview. The scoring pattern was '1' for the correct answer, '0.5' for the partially correct or near correct answer and '0' for the wrong answer. Box plot and Stem-and-Leaf Plot technique were used for measurement of awareness and knowledge of the respondent farmers.

III

RESULTS AND DISCUSSION

Besides socio-economic parameters, qualifications, experience and exposure to training programmes also play an important role in delivery competence as well as penetration of extension services (Table 1). Out of the sample of 30 DoF staff, 17 had professional qualifications, 43 per cent had more than 20 years' experience and 47 per cent had at 1-2 years training in various areas of fisheries science, technology and extension.

IV

COMPETENCY INDEX OF FIELD FUNCTIONARIES OF DOF

The development competency index of the DoF officials (30 numbers) were worked out on five different parameters which included technical knowledge and training skills (15 indicative parameters), communication skills, social mobilisation and management skills (10 indicative parameters) were rated out. Based on the responses it can be seen that the DoF officials scored highly on technical knowledge (84 per cent) and managerial skills (81 per cent).

TABLE 1. SOCIO-ECONOMIC AND PERSONAL PROFILE OF THE STAFF OF DOF

Sr. No. (1)	Socio-economic and personal variable (2)	Nagaon $n_1=12$ (3)	Sonitpur $n_2=12$ (4)	Golghat $n_3=6$ (5)	Total $N=30$ (6)
I	Designation				
	(a) Fishery extension officer	9 (75.0)	10 (83.3)	3 (50.0)	22 (73.3)
	(b) District fisheries extension consultant	3 (25.0)	2 (16.7)	3 (50.0)	8 (26.7)
	Age				
	(a) Young age (less than 40 years)	4 (33.3)	2 (16.7)	3 (50.0)	3 (30.0)
	(b) Middle aged (41- 60 years)	8 (66.7)	10 (83.3)	3 (50.0)	21 (70.0)
II	Educational Qualification (Zoology Graduate)				
	(a) Graduate	4 (33.3)	7 (58.3)	2 (33.0)	13 (43.3)
III	Professional degree				
	(a) D.F.Sc	1 (8.3)	1 (8.3)	0 (0.00)	2 (6.7)
	(b) B.F.Sc	7 (58.3)	4 (33.3)	2 (33.0)	13 (43.3)
	(c) M.F.Sc	0	0	1 (16.7)	1 (3.3)
	(d) Post Graduation in extension education	0	0	1 (16.7)	1 (3.3)
IV	Annual family income				
	(a) 2 to 4 lakhs	7 (58.3)	5 (41.7)	4 (66.7)	16 (53.3)
	(b) Above 4 lakhs	5 (41.7)	7 (58.3)	2 (33.3)	14 (46.7)
V	No. of years of job/ professional experience				
	(a) Below 5 years	0	0	2 (33.3)	2 (6.7)
	(b) 5-10 years	4 (33.3)	2 (16.7)	1 (16.7)	7 (23.3)
	(c) 10-15 years	3 (25.0)	2 (16.7)	0	5 (16.7)
	(d) 15-20 years	0	3 (25.0)	0	3 (10.0)
	(e) Above 20 years	5 (41.7)	5 (41.7)	3 (50.0)	13 (43.3)
VI	No. of training courses attended last 5 years				
	(a) No course attended	0	4 (33.3)	0	4 (13)
	(b) 1 to 2	5 (41.7)	7 (58.3)	2 (33.3)	14 (46.7)
	(c) 3 to 4	4 (33.3)	1 (8.3)	4 (66.6)	9 (30)
	(d) Above 4	3 (25.0)	0	0	3 (10)

Figures in parentheses indicate percentages.

They also scored well on training skills (68 per cent), communication skills (66 per cent) and social mobilisation skills (69 per cent). Therefore the DoF officials were quite competent in their job responsibilities.

The relative performance of the DoF officials in terms of technical knowledge was in favour of Golaghat district where 95 per cent of the DoF staff scored high on this parameter in comparison to the value of indices in Nagaon and Sonitpur districts. It could be seen from the table that based on the average training skills among the three districts, DoF staff of Golaghat was highest at 76 per cent and lowest among the staff of Nagaon district at 63 per cent. It is observed from Table 2, that DoF staff of Golaghat district have better communication skills, i.e., 71 per cent as compared to the other two districts. As far as managerial skill is concerned, 90 per cent of the DoF staff in Golaghat districts scored high in comparison to their colleagues in Sonitpur and Nagaon districts. The overall competency of the DoF staff is quite high in technical knowledge skills (84 per cent). This looks good from the technical point of view, but communication skills at 66 per cent are low among all the five parameters. So it is a prime consideration for the DoF to use the human resources of the department more effectively at the field level maintaining the above five parameters by giving additional in service training in the area of lower competencies.

TABLE 2. DEVELOPMENT COMPETENCY INDEX OF DOF

Sr. No. (1)	Development competency index variable (2)	Nagaon $n_1=12$ (3)	Sonitpur $n_2=12$ (4)	Golghat $n_3=6$ (5)	Total average N=30 (6)
(a)	Technical knowledge (out of 15)	12.12 (80.80)	11.58 (77.20)	14.33 (95.53)	12.67 (84.46)
(b)	Training skill (out of 15)	9.41 (62.73)	10.0 (66.66)	11.41 (76.06)	10.27 (68.46)
(c)	Communication skill (out of 10)	6.08 (60.80)	6.54 (65.40)	7.16 (71.6)	6.59 (65.90)
(d)	Social mobilisation skill (out of 10)	6.37 (63.7)	6.75 (67.50)	7.58 (75.80)	6.9 (69.00)
(e)	Managerial skill (out of 10)	7.70 (77.00)	7.66 (76.60)	9 (90.00)	8.12 (81.20)
	Average (out of 60)	41.68 (69.46)	42.53 (70.88)	49.48 (82.46)	44.56 (74.26)

Figures in parentheses indicate percentages.

Kruskal-Wallis non-parametric test was done to test the significance of the DoF competencies of the three districts. Chi-square value was 9.284 and significant (Table 3).

TABLE 3. DEVELOPMENT COMPETENCIES OF DOF STAFF IN ASSAM

Kruskal-Wallis test				
Group	N	Mean rank	Chi-square	Significance
(1)	(2)	(3)	(4)	(5)
Nagaon	12	13.50	9.284	.010
Sonitpur	12	12.62		
Golaghat	6	25.25		
Grouping Variable: districts group				

The competencies of the DoF staff do not have any significant correlation with the age, educational qualification, experience and number of training undergone in the last five years. It should be noted that irrespective of experience, age, educational qualifications and training all the DoF staff have a good competency in fisheries extension among them. The experience of handling a number of attractive schemes, effective and regular implementation and continuity of operations related to fisheries development has contributed immensely to the smooth and informed involvement and hence enhanced competencies of the DoF officials. This is a good indication of the dedication and competency of the DoF staff of Assam.

V

PERCEIVED TRAINING NEEDS OF THE RESPONDENT DOF STAFF

The DoF staff of Assam had opportunities of exposure to various technical training programmes. Nevertheless, few training programmes were felt to be more required by them compared to others. In order to assess the training needs of the respondent DoF staff, the training needs index values were estimated. The training need indices showed that fish and prawn culture practices followed by fish and prawn health management were the two most desired areas of technical training.

This was followed by the desire for training programmes in fish and prawn seed production, development of farm plans, integrated farming, ornamental fish breeding techniques and fish/prawn packaging and transportation. Pearl culture techniques were not desired as a training programmes, since fresh water pearl oyster culture was not in practice in the region (Table 4).

As far as perceived extension related training needs are concerned (Table 5), based on the training need index value, procurement of loans from different agencies emerged as the primary extension related training need of the DoF staff. The other extension related training needs programmes were, in the order of importance, expressed by the DoF staff were fisheries rules and regulation (1.76), human resource management (1.6), communication skills/presentation skills and public speaking (1.56), organising and managing training programmes (1.5), community mobilisation techniques and co-management techniques (1.46) , aquaculture policies (1.43) , and preparing and handling of AV aids (1.33).

TABLE 4. TRAINING NEED INDEX OF DOF STAFF ACCORDING TO THEIR PERCEIVED AREAS OF
TECHNICAL TRAINING NEEDS

Sr. No. (1)	Areas of perceived technical training needs (2)	Mostly need (MN) (3)	Need (N) (4)	No need (5)	Total score= 2XMN + N (6)	Training need index= total score/total respondents (7)
(a)	Development of farm plan	24 (80.0)	6 (20.0)	0	54	1.80
(b)	Integrated farming	23 (76.7)	7 (23.3)	0	53	1.76
(c)	Fish/prawn health management	29 (96.7)	1 (3.3)	0	59	1.96
(d)	Fish/prawn seed production	25 (83.3)	5 (16.7)	0	55	1.83
(e)	Fish/prawn culture practices	30 (100)	0	0	60	2.00
(f)	Fish/prawn packaging and transportation	12 (40.0)	11 (36.7)	7 (23.3)	35	1.16
(g)	Pearl culture techniques	5 (16.7)	10 (33.3)	15 (50.0)	20	0.66
(h)	Ornamental fish breeding techniques	18 (60.0)	12 (40.0)	0	48	1.60

TABLE 5. TRAINING NEED INDEX OF DOF STAFF ACCORDING TO THEIR PERCEIVED AREAS OF
EXTENSION RELATED TRAINING NEEDS

Sr. No. (1)	Areas of perceived extension related training needs (2)	Mostly need (MN) (3)	Need (N) (4)	No need (5)	Total score= 2XMN + N (6)	Training need index= total score/total respondents (7)
(a)	Community mobilisation techniques	14 (46.7)	16 (53.3)	0	44	1.46
(b)	Co-management practices	14 (46.7)	16 (53.3)	0	44	1.46
(c)	Organising and managing training programmes	15 (50.0)	15 (50.0)	0	45	1.50
(d)	Communication skill/ presentation skill/ Public speaking	17 (56.7)	13 (43.3)	0	47	1.56
(e)	Preparing and handling of AV aids	10 (33.3)	20 (66.7)	0	40	1.33
(f)	Human resource management	18 (60.0)	12 (40.0)	0	48	1.60
(g)	Sourcing loans from different agencies	24 (80.0)	6 (20.0)	0	54	1.80
(h)	Fisheries rules and regulations	24 (80.0)	5 (16.7)	1 (3.3)	53	1.76
(i)	Aquaculture policies	16 (53.3)	11 (36.7)	3 (10.0)	43	1.43

VI

AWARENESS AND KNOWLEDGE LEVEL OF FISH FARMERS REGARDING
SCIENTIFIC FISH CULTURE PRACTICES

The findings presented in Figure 1 revealed that out of 180 fish farmers, majority, i.e., 107 (59.44 per cent) of the fish farmers had medium level of knowledge whereas 40 (22.22 per cent) had low level of knowledge, followed by 33 (18.33 per cent) with high level of knowledge in categorical scale of 0-5, 5-10, and 10-15. The above findings are in line with those of Meeran (1983), Mahendra Kumar (1996), Awasthi *et al.* (2000), who also reported that majority of the fish farmers were having medium level of knowledge related to fishculture practices. It is known fact that education is the basic requirement which widens the knowledge of an individual to expose him to various media and information sources.

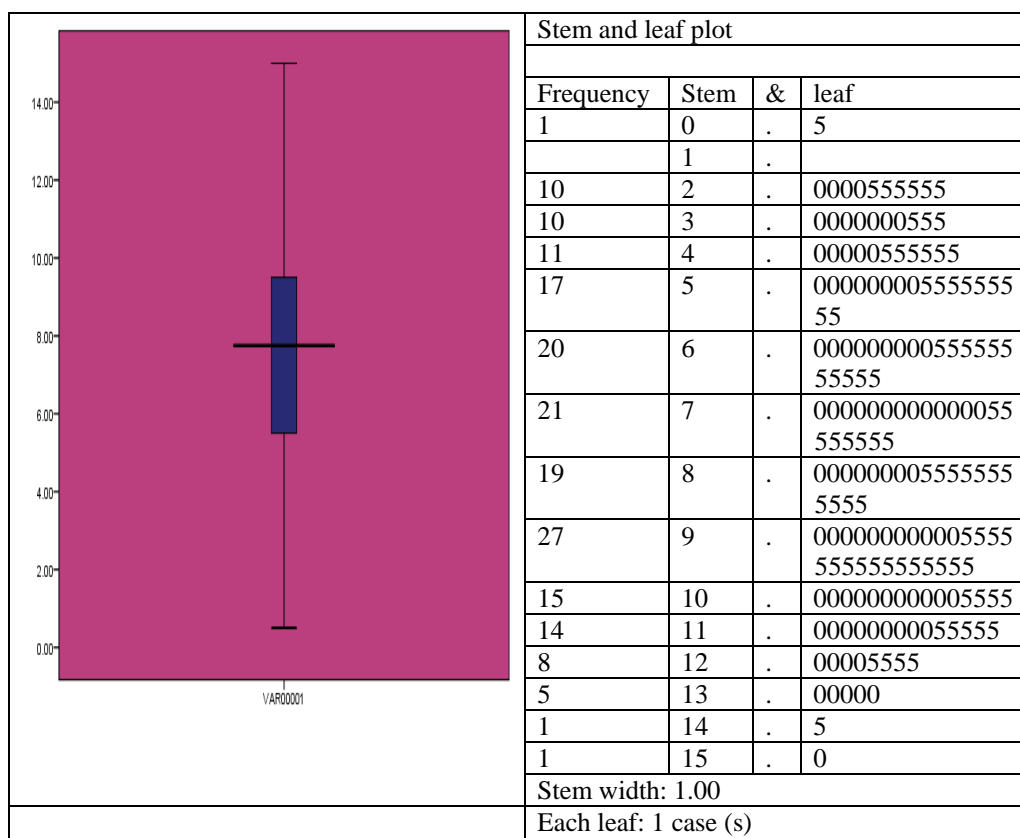| Stem and leaf plot			
Frequency	Stem	&	leaf
1	0	.	5
	1	.	
10	2	.	0000555555
10	3	.	0000000555
11	4	.	00000555555
17	5	.	00000000555555555
20	6	.	00000000055555555555
21	7	.	000000000000055555555
19	8	.	0000000055555555555
27	9	.	000000000005555555555555555
15	10	.	000000000005555
14	11	.	00000000055555
8	12	.	00005555
5	13	.	00000
1	14	.	5
1	15	.	0
Stem width: 1.00			
Each leaf: 1 case (s)			

Figure 1. Knowledge and Awareness of Scientific Fish Culture Practices
Among the Farmers

A clear distinction may be observed in the level of the scores of the development competency indices of the DOF officials and the scores of the awareness index of the farmers. The high development competency values and the relative differences in the levels of awareness of the farmers may be attributed in the latent relationships that exist between socio-economic variables and the levels of awareness (Goswami and Samajdar, 2011). Nevertheless there is enough scope for improvement in bridging the gap in the levels of awareness and competencies of the DoF officers.

It can be interpreted from competency index of FEOs (Table 2) that there is a scope to raise these respondents from medium knowledge category to high score category. Keeping in view the need to improve the fishermen's socio-economic condition, both the policy makers and extension functionaries should make adequate use of various teaching methods effectively like demonstrations, field days, on-farm testings, exhibitions, film shows, educational tours, campaigns, farm clinics, seminars, workshops and information communication technologies like radio, TV, different audio visual aids and internet, etc. for raising the level of knowledge on different aspects of scientific fish culture together with marketing and cultural practices. The marginal gaps in technology dissemination could be resulting from the unfilled posts in the department and also the increasing ratio of (new) fish farmers to the existing DoF officials which needs to be eliminated to remove these marginal gaps in technology dissemination (Saikia, 2012).

VII

CONCLUSIONS

On the whole it may be concluded that the DoF officials were quite competent in technical knowledge skill and managerial skill for their job responsibility but in the extension activities their proficiency increases with training skills, communication skills and social mobilisation skills side by side, for which they need some form of refresher or in-service training. The majority of the respondent fish farmers (59.44 per cent) of the study area were having medium level of awareness and knowledge on scientific fish culture. Hence, it is suggested that technology dissemination system must focus on these variables by organising awareness campaigns, field days, demonstrations, exhibitions, *Kisan Gosti*, *Kisan Mela* etc. enabling farmers to accrue latest knowledge on scientific fish culture practices. In order to plug the existing marginal gaps in the information dissemination process and improve the process of reorienting the fishery extension system and to provide technical and input support to the farmers to enhance knowledge, the authorities should arrange to formulate and monitor visit schedule of extension officials along with an introduction of a system of evaluation at the apex level.

REFERENCES

Awasthi, H.K., P.R. Singh, and R.N. Sharma (2000), Knowledge and Attitude of Dairy Farmers Towards Improved Diary Practices, *Maharashtra Journal of Extension Education*, Vol.19, pp.290-292.

Bennett, C.F. (1989), "Improving Coordination of Extension and Research", in A. Blackburn (Ed.) (1989), *Foundations and Changing Practices in Extension*, University of Guelph, Canada, pp.118-128.

Bennett, C.F. (1993), "Interdependence Models", *Journal of Extension*, Vol.31, pp.8-10. http://www.joe.org/joe/1993summer/a8.php.

Bindlish, V. and R. Evenson (1993), *Evaluation of the Performance of T&V Extension in Kenya*, Technical Report No.208, The World Bank, Washington, D.C., U.S.A.

Boone, E.J. (1990), "Crossing Lines", *Journal of Extension*, Vol.28, No.3, www.joe.org.journalofextension.

Brikhaeuser, D., R.E. Evenson, and G. Feder (1991), "The Economic Impact of Agriculture Extension: A Review," *Economic Development and Cultural Change*, Vol.39, No.3, pp.607-650.

Dinar, A. and G. Keynan (1998), *The Cost and Performance of Paid Agricultural Extension Services: The Case of Agricultural Technology Transfer in Nicaragua*, Policy Research Working Paper No.1931, The World Bank, Washington, D.C., U.S.A.

Goswami, B. and T. Samajdar (2011), "Knowledge of Fish Growers about Fish Culture Practices", *Indian Research Journal of Extension Education,* Vol.11, No.2, pp.25-30.

Jeevitha, C. (2009), "Study of Extension Service Delivery System in Fisheries Sector of Tamil Nadu", M.F.Sc. Dissertation (Fisheries Extension), Central Institute of Fisheries Education, Mumbai, (unpublished).

Mahendra Kumar K. (1996), "Communication Behaviour of Fish Farmers in Tamil Nadu", Ph.D.Thesis, Central Institute of Fisheries Education, Mumbai, (unpublished).

Majhi, S.K., (2001), "Training Needs Assessments of Fishery Extension Officers", Unpublished M.F.Sc. Dissertation (Freshwater Aquaculture) CIFA, Central Institute of Fisheries Education, Mumbai.

Meeran, N.M. (1983), "A Study on the Adoption Behaviour of Fish Farmers", Agricultural College and Research Institute, Tamil Nadu Agricultural University, Madurai, M.Sc. (Ag). Thesis, (unpublished).

Pawar, M.S. (2010), "A Study on Fisheries Extension Service Delivery System in Maharashtra", M.F.Sc Dissertation (Fisheries Extension), Central Institute of Fisheries Education, Mumbai, (unpublished).

Radhakrishna, R., P. Edgar and C. Baggett (1994), "Time Management and Performance", *Journal of Extension*, Vol.29, No 2, www.joe.org/joe/1994.

Saikia, Parag (2012), *An Assessment of Fisheries Extension Strategies and Delivery Systems in Assam*, Fisheries Economics, Extension and Statistics Division, Central Institute of Fisheries Education, Mumbai, M.F.Sc (Fisheries Extension) Thesis, unpublished, pp.173.