

## Human Resource Planning for an Effective Fishery Extension

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### ABSTRACT

*Fisheries and aquaculture are significant components of coastal agrarian milieu contributing significantly for the livelihood, nutritional and economic development. Human resource development is a continuous process and prerequisite for an effective extension service. A case study was undertaken among the 45 randomly chosen fishery extension officers of the Department of Fisheries, Tamil Nadu state to assess their perceptions on the human resource management in their organization, its human resource demand and supply and to suggest a human resource management strategy. The division of labour in the fisheries extension organization indicated that 60%, 30% and 5% of the existing extension manpower respectively involved in implementation of welfare schemes, fish seed production and culture, and research and extension services. Fishery resources and fisher folk population were identified as the criteria for human resource planning using Delphi technique and accordingly 5000 ha of inland capture area, 1000 ha of inland culture ponds/tanks and 20 marine fishing villages were the units of human resource planning. The human resource demand and supply were worked out respectively through focused group discussion and markov analysis. The study revealed that 40% additional human resource is required for an effective fishery extension service in the state with a vibrant capacity enhancement mechanism. Adequate human resource supply in the form of qualified fishery graduates is available within the state for recruitment. Structural and functional reorientations in the department of fisheries, suitable human resource management strategy, budget and policy support are essential to revamp the fisheries extension service of the fisheries department.*

**Key words:** Human Resource Demand; Inland fisheries; Marine fisheries; Human Resource Management Strategy;

**F**isheries being a renewable resource contribute significantly for the nutritional and economic euphoria of a Nation. India is a major maritime state and an important aquaculture country in the world. Being a home for more than 10 per cent of the global fish biodiversity, it ranks third in the world in total fish production with an annual fish production of about 6.4 million metric tonnes. Constituting over 1 per cent of the GDP, fishery sector contributes to 5.3 per cent of the agriculture Gross Domestic Product. There has been a paradigm shift in the production scenario from that of marine to inland fisheries and further to aquaculture that is increasingly becoming important with an annual growth rate of over 6 per cent. Producing about 4.4 per cent of world's fish, India trades to the extent of 2.4 per cent in the global fish market, with the annual export earnings from fish and shellfish being over Rs.6,000 crore. Fisheries, apart from contributing to nutritional security component of the food basket of the country, is providing live-

lihood and employment to millions of people (Ayyappan, 2006). India with its fishery resources and congenial climatic conditions can increase its annual fish production from the present 6.2 million tonnes to 8.4 million tonnes through reduction of yield gaps, species and space diversification. Organised and dedicated extension machinery could make it happen by imbibing progressive changes in the attitude, knowledge and skills of the primary producers. Farm extension service plays a crucial role as 'facilitator' of the farm information system where-in farm innovation is generated, transformed, transferred, consolidated, received and feedback is generated in such a manner that these processes function synergistically to underpin the knowledge utilization by farm producers (Roling, 1998). Fisheries extension research and services play an increasingly important role in aquaculture development (Tu and Giang, 2002) by means of technical assistance, public outreach, training and education in aquaculture (Ellis,

1998) and an important link between research result and the end users of research findings (*Omoyeni, and Yisa, 2005*). The rapid adoption of farm innovations is directly dependent on the effectiveness of extension services in the field.

Aquaculture extension services did not get parity with the growth of aquaculture sector and as a result, the system functions under a limited environment. It is essential to strengthen the extension paraphernalia in the States and Union Territories, to educate aqua farmers in Better Management Practices (BMP) to provide on the spot guidance and their social capital development (*Yadava, 2003*). Substantial investment in training, demonstration and infrastructure development is necessary to improve efficiency of extension service (*Molnar and Duncan, 1989; NACA /FAO.2000*).

Fisheries Division in the Department of Animal Husbandry, Dairying and Fisheries, under the Union Ministry of Agriculture is the nodal agency responsible for planning, monitoring and funding of several centrally sponsored development schemes related to fisheries and aquaculture in all of the Indian states. Though fisheries/aquaculture extension programmes are planned at both national and State levels, but executed at field level exclusively by the respective State Fisheries Departments. The prime agency responsible for delivery of technical messages is the Department of Fisheries (DoF) through its state, regional and district level machinery. The main focus of the DoF is providing fish fingerlings and some financial support to Fish Farmer Development Agencies (FFDAs and BFDAs), the main extension service arms. The research centres of DoF and State Veterinary and Fisheries Universities play a very limited role in extension service. The DoF extension system has been pre-occupied with implementation of welfare schemes of central and state governments having input and subsidy delivery. Hence, its mandated extension service function is in jeopardy. Further, the DoFs are ill equipped in terms of manpower, budget, infrastructure and skills required to address the sustainable development problems (*Alagarsamy, 1995; NACA /FAO.2000*).

*Human Resource planning and management for extension* : Human Resource Development (HRD) is an indispensable part of extension science. There is a great need for a new kind of fisheries extension officer, whose training focuses on management and two-way

communication rather than on development and one-way instruction (*Johannes, 1997*). Large scale investment in training, demonstration and infrastructure development is necessary to support aquaculture effectively (*Molnar and Duncan, 1989*). Attention to human resource development will be important for aquaculture development as the sector continues to experience considerable changes and growth. Hence, manpower planning and training of personnel for all the fisheries developmental activities is important (*Meenakumari, 2002*). Human resource planning forecasts the future personnel needs of extension organizations. With the rapid changes in technology, needs of farmers, market situation, and competitive environment, planning for human resources has become an important, challenging task for extension. Human resource planning involves plans for future needs of personnel, their required skills, recruitment of employees and development of personnel (*Miller, Burack, & Albrecht, 1980*). However, the manpower information available with the DoF is about numbers and date of retirement which is insufficient for human resource planning and management. Hence a better system should be introduced and institutionalized (*BOBP, 2000*).

Considering the diversities of Indian fisheries sector, manpower planning of fisheries extension needs a lot of care in exacting both the quantitative as well as qualitative aspects of manpower planning. While assessing the quantitative requirement of fisheries extension personnel at different levels, the quality and organizational aspects are also given due consideration (*Singh et al.1997*). Because organizational climate perception of the fisheries extension personnel was found to have positive influence on job performance and job satisfaction of fisheries extension personnel (*Sontakki and Sundaraswamy, 1999*). *NACA/FAO (1996)* reported that 93 per cent of Asian countries considered HRD as a major problem facing aquaculture and 71 per cent of them noted that lack of skilled personnel was a major impediment to further development.

Training and HRD section with the DOF is vital to train and continuously upgrade staff capacity to undertake the objectives of the DOF, (*Roy, 1997*). The absence of a motivated extension set up and manpower with proper aptitude in the country has been the

responsibility for the underutilization of the existing fish culture technologies (*CMFRI, 1980*). Paucity of precise information about manpower requirements of fisheries extension constrained human resource planning for fisheries (*Singh et al., 1997*). At present there is no established system for making information on the capacity strengthening of the extension staff to the decision makers. Major part of the training reports meets the requirements of budget monitoring and there is no qualitative information quite essential for effective decision-making. Aspects such as need, adequacy, feedback and suggestions for improvements did not form part of these reports. This might be due to inadequate understanding of HR planning and the HRD itself. In this context the present case study was undertaken to assess perception of the fisheries extension officials on the human resource management in the DoF, its human resource demand and supply and to suggest a human resource management strategy to revamp the DoF as an effective extension organization.

## METHODOLOGY

This investigation was carried out in Tamil Nadu (TN) state purposively due to proximity, personnel, budget and time available with the researcher. There are about 12 coastal districts which contribute significantly for the fisheries and aquaculture production of the state. Forty five extension officials constitute the sample of the study and were selected randomly. Personal attributes of extension personnel *viz.*, age, education, experience and training attended, training need, place of work/residence and information were studied using appropriate procedure developed for the study. The criteria for human resource assessment were arrived at employing Delphi technique using managerial judgment. The human resource demand and supply was worked out through focused group discussions with fisheries extension personnel and markov analysis aided by facilitation and consensus. Markov Analysis (MA) was used to examine the movement of personnel into, within, and out of the organization (*Herbert et al. 1977; Lindner, 2001*). The secondary data on existing fishery resources, internal manpower and external available manpower of the year 2005-06 were collected from the DoF. A comprehensive questionnaire was developed in consultation with literature and subject matter specialists for data collection. Personal interview and personal observation were the tools for data

collection. The questionnaire was pre-tested for its reliability and content validity with the sample drawn from non-sample area.

## RESULTS AND DISCUSSION

*Demographic profile of Fishery Extension Personnel of Tamil Nadu* : The demographic profile of the respondents is indicated in the Table 1 showed that three fourth (77%) of the respondents were more than 40 years old. It showed that recruitments were not made on a regular basis as per the requirements. The data on the educational qualification showed that one third of the respondents (32%) had diploma in fisheries technology. About one fourth (23%) of them were professional fisheries graduates and among them 14 per cent were post-graduates. Unlike in agriculture and veterinary departments where professional B.Sc (Agri.) and B.VSc graduates were alone eligible for recruitment, in fisheries about three fourth of the employees were general biology graduates or diploma holders. About 55% of the respondents had more than 20 years of rich experience in the department. Places of work and residence were same for fifty per cent of the respondents. About 55 per cent of the respondents had attended training courses exclusively on extension subjects like use of audio visual aids, leadership development, extension methodologies etc. Majority of the respondents (68%) expressed interest to participate training courses on extension subjects. Since majority of the fisheries development officials belonged to zoology background their exposure to the extension education concepts was negligible, hence they were interested to undergo training on extension subject. This could also be one of the reasons for the inadequate extension efforts of the DoF. Majority of the respondents felt that the aqua farmers approached DoF for technical guidance. The respondents reported that DoF (staff training institute and research wing) was their only source for knowledge and skill upgradation. This indicated the non-existence of linkage between the research and extension organizations for technology dissemination, field feedback and capacity building.

*Human Resource Management in the DoF, Tamil Nadu* : Fisheries' being the State subject, the State has the responsibility for the sustainable fisheries development and welfare of the fisher folk. A review of the work wise division of labour in DoF showed that majority of the staff (60%) in the DoF were involved in

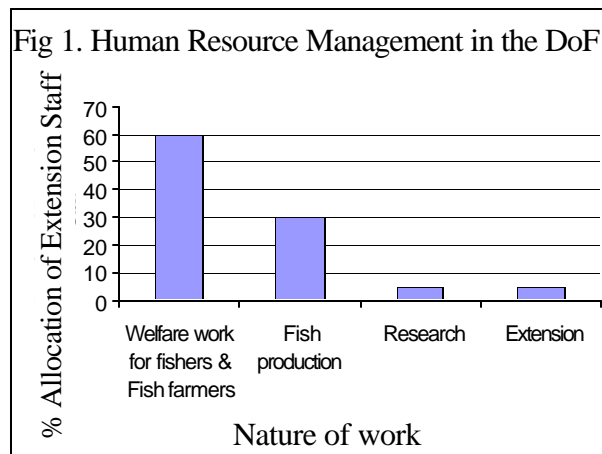
Table - 1. Demographic Profile of Fishery Extension Officers (N=45)

S.No.	Parameter	%*
1.	Age	
	Below 40 years	23.00
	Above 40 years	77.00
2.	Educational Qualification	
	M.F.Sc.	14.00
	M.Sc. +	14.00
	M.Sc.	18.00
	B.F.Sc.	9.00
	B.Sc. +	5.00
	B.Sc	9.00
3.	DFT	32.00
	Experience	
	Below 10 yrs	27.00
	10-20 yrs	18.00
	Above 20 yrs	55.00
4.	Place of work and stay	
	Same	50.00
	Different	50.00
5.	Training Undergone on Extension per se	
	YES	45.00
	NO	55.00
6.	Training Need on Extension per se	
	Needed	68.00
	Not needed	32.00
7.	Farmers Approach DOF for service	
	YES	68.00
	NO	32.00
8.	Information Source*	
	DoF	100.00
	Research Institutes	5.00
	Mass Media	14.00

\* Multiple responses

carrying out welfare schemes sponsored by the State and central governments. About 30 per cent were given the job of fish seed production and culture in reservoirs, tanks and DoF farms. Hardly about 5 per cent each were working for fisheries on farm research and extension services respectively (Fig-1). While the research and technology development was looked after by the research institutions and fisheries colleges, the DoF is expected to undertake the responsibility of extension and act as the interface between technology development and technology adoption. However, the information available showed that the manpower in DoF was mostly utilized for the welfare of fishers alone. The

DoF had a Staff Training Institute (STI) at its State capital (Chennai) which offered induction and in-service trainings to their field extension personnel. However, the frequency of in-service training available to extension personnel was also very low. The facility available with the STI was also inadequate far from a dynamic training institution. The faculty at this training institute was drawn from the DoF itself who were prone to transfer and they have not been equipped fully either in training methodology or in extension subject.



*Human Resource Appraisal in the DoF, Tamil Nadu:* The perception of the fishery extension officials on the human resource management in the DoF revealed that majority (77%) of the respondents expressed that they were spending 50 per cent of their time on extension activities. Around 70 per cent of them informed that administrative and welfare works consumed 50 per cent of their time at present and they could spare hardly 25 per cent of their working time for extension work. However, they (63%) felt that they should and wished to spend 50-75 per cent of their time on extension work and 25 per cent on administration and welfare and remaining 25 per cent of their time on research. However, more than half (55%) of them expressed that they preferred to spend 50 per cent of their time on research by conducting trials to validate the technologies at field level for refinement and communicate the short comings if any back to the research (Table 2).

Ninety per cent of the respondents felt that the existing manpower of extension officers was insufficient to reach the existing clientele and hence they (59%) felt that DoF needed a lot more new extension officers to strengthen the fisheries extension. However,

one third (36%) of the respondents felt that some additional man power with existing strength would be sufficient to man the extension work. Most of them (95%) felt that the existing manpower of extension workers at field level was not sufficient to reach the existing clientele and hence they (59%) felt that DoF needed lot more new extension workers to carry out the extension programmes at field level. However, 40 per cent of the respondents felt that some additional manpower with existing strength would be sufficient to handle the extension work. From the findings it is understood that additional manpower of extension workers and officials was required to make the DoF presence felt in the sector. Further, extension workers are to be free from administrative work.

About half of the respondents (55%) expressed that the existing strength of administrative staff was inadequate. Hence, half of them (50%) expected that

some additional requirement is needed to have sufficient ministerial staff to relieve the extension personnel to concentrate on extension work. Majority of the respondents (68% and 59%) felt that existing FEOs were respectively from fisheries and general science background. However, 18 per cent of them felt that people from other disciplines were also working as FEOs. However, most of the respondents (95%) felt that fisheries department should recruit only fisheries and aquaculture graduates as fishery extension officials or workers. About 60 per cent of them opined that marine biology and zoology subjects were also to be considered as the education qualification for FEOs.

Majority (64%) of the respondents expressed that need based opportunity was given for capacity building as per their requirements. However, 50 per cent of the respondents expected that an ideal DoF should provide opportunity for capacity building at least once in 1-2

Table 2. Perception of FEOs on the Human Resource in the DoF values as percentage of respondents (N=45)

	Existing		Perception Attributes	Expected		
	Research	Extension		Extension	Research	Administration/welfare
1. Administration / welfare	68.18	77.27	<i>% of Time Spent on Key Performance Areas (For eg.: 50%, 25% &amp; 25%)</i>	63.64	54.55	27.27
2. Not Sufficient	Manageable	Sufficient	<i>Sufficiency of Manpower</i> <i>A. Extension Officers</i>	Need lot more manpower 59.09	Some additional requirement 36.36	Additional manpower not required 4.55
3. Not Sufficient	Manageable	Sufficient	<i>B. Extension Workers</i>	Need lot more manpower 59.09	Some additional not required 40.91	Additional manpower not required 0.00
4. Not Sufficient	Manageable	Sufficient	<i>C. Administrative staff</i>  27.27	Need lot more manpower 50.00	Some additional requirement 22.73	Additional manpower not required
5. Others	General Science	Fisheries Science	<i>Educational Qualifications required for FEOs</i>	Fisheries & Aquaculture 95.45	Marine Biology/ Zoology 59.09	Others  4.55
6. Once in 1- 2 years	Once in few months	Need based	<i>Opportunity for capacity building as per your requirements</i>	Need based 45.45	Once in few months 4.55	Once in 1- 2 years 50.00
7. Negative 36.36	Routine 63.64	Positive 0.00	<i>Career Prospects of FEOs (Motivation, Performance Appraisal &amp; counseling)</i>	Positive 59.09	Routine 40.91	Negative 0.00

years to update the knowledge and skill of the extension officer or worker. About 45 per cent felt that need based opportunity should be given for capacity building. Majority of the respondents (64%) felt that the DoF followed routine promotional policies and one third (36%) of them felt that career prospects were negative in the department. Majority (59%) of them expected that a positive employee friendly career prospects should be evolved in the DoF. They felt that career prospects in the form of incentives, promotions and performance appraisal was gloomy in the DoF and expressed that the department should have a positive employee friendly career prospects to motivate the officials. Promotions should not be linked to the vacancies. A career path with minimum three promotions once in 8-10 years needs to be evolved. Participatory performance appraisal procedures need to be developed to motivate and guide the extension workers and officials.

*Human Resource Demand (HRD) in the DoF, Tamil Nadu* : Adopting Delphi technique the fisheries extension experts, scientists and fisheries extension officials' by consensus decided that the fishery resources and marine fishermen villages as the criteria for assessing the human resource demand for the DoF.

Accordingly, HR demand of extension personnel was worked out through facilitated discussions and consensus among the respondents. It was unanimously decided that for Inland capture fisheries for every 5000 ha of resource one Fishery Extension Officer is required for extension service. In Inland culture fisheries, for every 1000 ha of culture ponds/tanks one Fishery Extension Officer (FEO) is required to carryout the extension services. The fishery extension officer is expected to visit his each client or a client group once in a week compulsorily. He should be given a work chart indicating his nature of works and schedule of extension activities. In case of marine side for every 20 marine villages one Fishery Extension Officer is required to carry out the extension and welfare work. As far as coastal aquaculture is concerned for every 1000 ha of culture area one Fishery Extension Officer is required. Each FEO will have two Assistant Fisheries Extension Officers (AFEOS) and two Administrative Staff and one Office Assistant. Each Inland district is headed by an Assistant Director of Fisheries (ADF) and every coastal district has two ADFs (for inland and marine) and headed by a Deputy Director of Fisheries (DDF) (Table 3).

In addition to this each district will have a Fisheries

Table 3. Proposed Fisheries Office at District level

Fisheries Office (Inland district) DDF / ADF FO (SMS) FEO Assistant Extension Officer Support staff Admn. staff	Fisheries Office (Coastal district) DDF	
	ADF (Aquaculture) FO (SMS) FEO Assistant Extension Officer Support staff Admn. staff	ADF (Marine) FO (SMS) FEO Assistant Extension Officer Support staff Admn. staff

Officer (Subject Matter Specialist) (FOSMS) he/she is to look after the work of on farm research, demonstration and trials with the Research Institutions. He/She will be trained once in six months and he will train the FEO and AFEOS once a month. It was decided that B.FSc should be qualification for FEOs and Degree in marine Biology/ Aquaculture/ DFT would be qualification for Assistant Fishery extension officers. Based on the suggestions, the human resource demand of fishery extension personnel was worked out and presented in the Table 4. It was felt that to manage the existing resources DoF need 40 per cent of additional manpower and out of it 25 per cent should be working

staff involving fishery field assistants and fishermen. The working staff demand has to be worked out as per the existing formula. The DoF, TN should revamp its Staff Training College (STC) with laboratory, qualified staff and infrastructure to function as State level training institute for capacity building of fishery extension officers and workers. The STC should offer courses for internal as well as external youths on fisheries and extension related subjects. The ADF and DDF respectively are the head of fisheries department in the inland and coastal districts and supervise the extension services implemented by the FEO and FOSMS. The FEO is the nodal official implementing the extension

Table 4. Fishery resources potential and manpower planning  
(Area in hectares) (Excluding Fishermen+Watchmen+Admn. Staff)

S. No	Name of the District	Resources									Required Manpower in No.s			
		a	bi	bii	ci	cii	d	e	f	g	h	i	j	k
1	Chennai	NIL	NIL	NIL	NIL	NIL	NIL	NIL	240	44	NIL	1	2+1	5
2	Tiruvallur	-	NIL	7813	749	8032	215	2662	9236	58	1	2	6+1	13
3	Kancheepuram	3263	NIL	6393	-	6572	285	-	5424	44	1	2	4+1	9
4	Vellore	565	NIL	5937	364	20808	-	NIL	NIL	NIL	NIL	1	2+1	5
5	Villupuram	-	22000	NIL	NIL	NIL	NIL	-	2703	19	1	1	25+2	52
6	Tiruvannamalai	9740	NIL	NIL	NIL	NIL	NIL	-	NIL	NIL	-	-	-	-
7	Dharmapuri	2467	NIL	512	402	1052	NIL	-	NIL	NIL	NIL	1	2+1	5
8	Cuddalore	NIL	NIL	5986	312	12568	1000	-	8100	49	1	1	7+1	15
9	Erode	8030	NIL	95	136	509	NIL	NIL	NIL	NIL	NIL	1	2+1	5
10	Nilgiris	NIL	NIL	NIL	-	5	NIL	NIL	NIL	NIL	-	-	-	-
11	Nagapattinam	NIL	NIL	NIL	287	NIL	637	6300	16014	51	1	2	6+1	13
12	Thnjavur	NIL	NIL	112	-	4019	833	-	9106	27	NIL	1	4+1	9
13	Thiruvarur	NIL	NIL	112	-	4183	3430	-	6280	13	NIL	1	3+1	7
14	Trichy	NIL	NIL	421	261	502	NIL	NIL	NIL	NIL	NIL	1	3+1	7
15	Karur	138	NIL	408	-	486	NIL	NIL	NIL	NIL	-	-	-	-
16	Perambalur	-	NIL	408	-	532	NIL	NIL	NIL	NIL	-	-	-	-
17	Coimbatore	2991	NIL	91	NIL	1788	NIL	NIL	NIL	NIL	0	1	1+1	3
18	Namakkal	-	NIL	NIL	NIL	1073	NIL	NIL	NIL	NIL	1	1	3+1	7
19	Salem	15540	NIL	30	NIL	1074	NIL	NIL	NIL	NIL	-	-	-	-
20	Dindigul	886	NIL	4760	265	464	NIL	NIL	NIL	NIL	NIL	1	1+1	3
21	Pudukottai	NIL	NIL	5457	280	7237	NIL	247	NIL	32	NIL	1	2+1	5
22	Madurai	NIL	NIL	549	NIL	555	NIL	NIL	NIL	NIL	1	1	10+2	21
23	Theni	2876	-	10431	570	455	NIL	NIL	NIL	NIL	-	-	-	-
24	Ramanad	-	NIL	NIL	-	13741	160	1385	900	184	1	1	10+2	21
25	Sivagangai	946	NIL	259	184	32062	125	NIL	NIL	NIL	-	-	-	-
26	Virudhunagar	-	NIL	260	-	30536	215	NIL	NIL	NIL	-	-	-	-
27	Thirunelveli	1114	NIL	7892	875	1405	100	157	NIL	7	NIL	1	2+1	5
28	Thoothukudi	657	NIL	1908	NIL	1587	NIL	1408	400	21	1	1	2+1	5
29	Kanyakumari	2842	NIL	470	701	6855	NIL	18	300	42	NIL	1	3+1	7
	Total	52055	32000	60304	5386	158100	7000	14880	56000	591	9	24	124	222

Note:

- a. Reservoir  
b. Major Irrigation & Long Seasonal Tanks  
bi. Intensive Inland Fish Culture  
bii. Others  
c Short Seasonal Tanks & Ponds  
ci. FFDA Tanks  
cii. Others  
d Derelict Water  
e. Brackish-water Aquaculture Developed  
f. Estuaries & Back-waters  
g. Marine Fishing villages  
h. DDF  
i. ADF  
j. FEO+FO (SMS)  
k. AEO.For extension + 1 for (SMS)

Criteria:

- Inland Capture :( FEO/ 5000 ha);  
Inland Culture: FEO/1000ha.
- Marine: FEO (20 fishing Villages);  
Coastal Aquaculture: FEO/ 1000 ha
- Each FEO will have 2 Fisheries Assistants  
and 2 Admn. Staff and 1 Office Assistant.
- Each Inland district is headed by an ADF and  
every coastal district has two ADFs and headed by a DDF
- Each ADF office will have a FEO, 2 AFEO,  
2 FA, 4 Admn.Staff and 2 OAs.
- The DD will head the office of the coastal district  
where both the ADF (Aqua.) and ADF (Marine) offices located.
- Capture for a reservoir of 1000 ha: 1+2+2+4 = 9 persons  
are required. For seed farm of 1 ha required 6 fishermen +1 watchman.

activities of the DoF. The FOE should have annual work plan prepared through participatory methods with primary producers. The AFEO is the grass root level extension agent who stays and works with the farmers and fishers. *Human Resource Supply (HRS)* : HRS indicates the availability of qualified personnel in adequate number. HRS may be from internal or external depending on the kind and magnitude of manpower required. Markov Analysis (MA) was used to examine the movement of personnel into, within, and out of the organization (*Herbert et al.1977; Lindner, 2001*). Accordingly the internal manpower available with the DoF was worked out cadre wise and given in Table 5. The cadre strength assigned, vacancies, promotions and rate of annual turnover were analysed to obtain the internal supply. Similarly the external manpower available in a year from the fisheries educational institutions were obtained and given in the Table 6. From the above, it is concluded that the man power availability was at short with the DoF. However, sufficient qualified manpower is available externally with in the State, which can be recruited on merit basis as and when required.

Table 5. Human Resource Supply (*Internal*) Markov Chain Analysis

	FEO (SI, RA&IF)	ADF	DDF	JDF	OS	Adm
Total strength	52+ 25 +89	37	2	6	4	764
Vacancy	32+10+35	15	8	0	7	110
Rate of annual turnover @10%	5+10	3	0	0	0	75
Available Manpower	74	19	2	6	4	579
% of promotion	As and when vacancy arises					

(Source : DoF, Tamil Nadu )

OS=Other Skilled,

Adm=Administrative,

Table 6. Yearly Human Resource Supply (*External*)

S. No.	Category	No.
1.	Fisheries Graduates	35
2	Marine Biology & Aquaculture	30
3	Diploma in Fisheries Technology	15
4	Post graduates in Fisheries & Aquaculture	20
	Total	100

(Source: Personal communication)

*Human Resource Management Strategy:* A human resource management strategy should maximize the effectiveness of both the employees and their organization. The HRM strategy suggested for the DoF, Tamil Nadu is as follows. The planners in the DoF may,

- (i) Undertake a detailed job analysis of its various key performance areas and mandated responsibilities.
- (ii) Decide the required qualifications and mode of recruiting the right kind of people for different positions.
- (iii) Re-organize the department as per the mandate structurally and functionally.
- (iv) Development of an effective performance appraisal system for reviewing the performance of employees at different levels.
- (v) Provide capacity enhancement training to the employees as per the necessity
- (vi) Rejuvenate the training facility as centre of continued learning with latest infrastructure, communications and qualified trainers
- (vii) Policy intervention to make extension function as the primary role of the DoF
- (viii) Creation of a Human Resource Cell for an effective HRM in the Department of Fisheries.
- (ix) The department should ensure that adequate investment (budget) is allocated for extension programmes.

**CONCLUSION**

It is concluded that the DoF, Tamil Nadu needs proper HR planning and management mechanism and strategy. The department requires additional human resources to improve its effectiveness and efficiency. Adequate human resource is available with in the State which can be appropriately recruited and trained for the purpose. A review and fine tuning of the existing organizational policies, practices and procedures of the DoF is necessary to establish a congenial organizational climate. A suitable career plan may be devised and implemented for the employees at various levels. Required qualified human resource at intermediate and field level with infrastructure and enough budgetary resources would improve the extensions service performance of the department of fisheries.



## REFERENCES

1. Alagarswami.K. (1995). Strategies for sustainable shrimp farming and transfer of technology, Proc. of the N. Workshop on Transfer of technology for sustainable shrimp farming, CIBA, Chennai, 29-42 p.
2. Ayyappan.S. (2006). Preface to the Handbook of Fisheries and Aquaculture, Indian Council of Agricultural Research, New Delhi, India
3. Bay of Bengal Programme (BOBP) (2000). Monitoring and Evaluation and Management information systems of Department of Fisheries, Govt. of Tamil Nadu, India, *BOBP/MM/04*, 62 p.
4. CMFRI (1980). Seminar on Fisheries Extension, Marine Fisheries Information Service Technical Extension Series no.27, 20 pp.
5. Ellis, SC. (1998). Aquaculture extension and training in the U.S. Affiliated Pacific: An island perspective, *Aquaculture '98*, Book of Abstracts. p. 158.
6. Herbert G. Heneman, III, Marcus G. Sandver (1977). Markov Analysis in Human Resource Administration: Applications and Limitations, *The Academy of Management Review*, 2 (4) : 535-542
7. Johannes, RE. (1997). Traditional management options and approaches for reef systems in small island nations. In Nickerson, DJ and Maniku, MH (eds.) Proceedings of the Workshop on Integrated Reef Resources Management in the Maldives. Male, Maldives. 16-20 March, 1996. BOBP/REP/76, pp. 275-293.
8. Lindner, J.R. (2001). Competency Assessment and Human Resource Management Performance of County Extension Chairs, *J. Southern Agril. Edu.Res.*, 51 (1): 1333 – 346
9. Meenakumari, B. (2002). Problems and prospects of Indian fisheries. In: Proceedings of the National Seminar on Marine and Coastal Ecosystems: Coral and Mangrove Problems and Management Strategies, Edward, J.K.P., Murugan, A. and Patterson, J. (eds.). Tuticorin India Suganthi Devadason Marine Research Institute, 2002 vol. 2, pp. 85-91.
10. Miller, E. L., Burack, E. H., & Albrecht, M. H. (1980). Management of human resources. Englewood Cliffs, NJ: Prentice-Hall.
11. Molnar.JJ and B.L.Duncan (1989). Monitoring and evaluation of Aquaculture Projects. In: Impacts of Small Scale Fishery projects: Aspects of Monitoring and Evaluation, University of Rhode Island, USA
12. NACA /FAO (2000). Aquaculture Development Beyond 2000: The Bangkok declaration and Strategy, Rome.
13. NACA/FAO (1996). Report of the survey and workshop on 'Aquaculture development, Research priorities and capabilities in Asia'. Bangkok.
14. Omoyeni, BA and Yisa, JJ. (2005). Enhancement of fish production in Borno State with Extension services: In Araoye, PA (ed.,) Proceedings of the Annual Conference of the Fisheries Society of Nigeria (FISON). pp. 658-662. 2005.
15. Roling.N.G.(1998). Extension Science – Information Systems in Agricultural Development, Cambridge, Cambridge University Press.
16. Roy, R. (1997). Strengthening of the fishery extension service of the Department of Fisheries, Bangladesh. In: Khan, B.A., Ahmed, L., Ali, L., Nishat, A., Karim, M., Hossain, A.M.M., Mazid, M.A., Abbasi, S.A., Chowdhury, S.N. (ed). Report of the National Workshop on Fisheries Resources Development and Management in Bangladesh, 29 October - 1 November, 1995, Dhaka, Bangladesh. pp. 297-302. (BOBP/REP/74)
17. Singh.R, Sontakki, B.S, Thakur,N.K, Biradar,R.S and Sontakki,Bsrho (eds.) (1997). Fisheries Education in India, Proceedings of the National Seminar on Fisheries Education Organised at CIFE, Mumbai, 23-24th May,1996, Central Institute of Fisheries Education, Versova, Mumbai, India, , pp 254-262.
18. Sontakki, B.S and B.Sundaraswamy (1999). Organizational Climate perception and its influence on job performance and job satisfaction of fisheries extension personnel, in Joseph, MM et al. (Eds) The fourth Indian Fisheries Forum, Proceedings, 24 - 28 November, 1996, Kochi, Kerala, 489-490 pp.
19. Tu, N.V., Giang, T.T. (2002). Improving the Efficiency of Aquaculture Extension Activity in the Southeastern Provinces of Southern Vietnam. In: Edwards, P., Demaine , H., Little, D.C. (Eds.), Rural aquaculture, 285-300. Wallingford, UK: CABI Publication.
20. Yadava.Y.S. (2003). In Fish For All National Launch, Kolkata, 18-19, December, 2003.