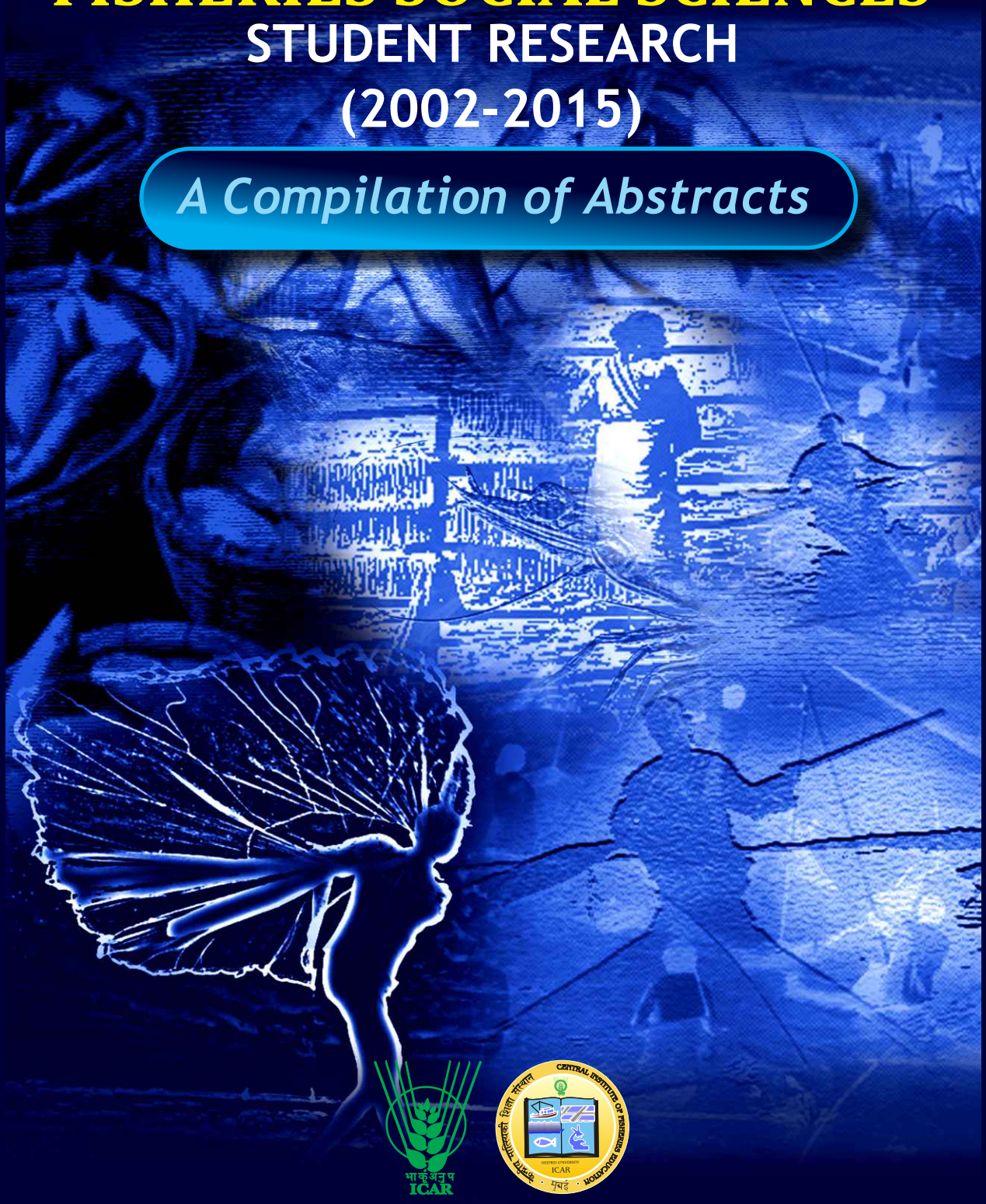
NABARD

FISHERIES SOCIAL SCIENCES

STUDENT RESEARCH (2002-2015)

A Compilation of Abstracts



Fisheries Economics, Extension and Statistics Division

ICAR-Central Institute of Fisheries Education

Mumbai 400061

India

Fisheries Social Sciences

Student Research

(2002-2015)

A Compilation of Abstracts

Fisheries Economics, Extension and Statistics Division
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Foreword

The ICAR-Central Institute of Fisheries Education has been in the forefront of delivering premier education at post graduate and doctoral levels in Fisheries science for more than 5 decades. This university under the Indian Council of Agricultural Research is offering post graduate and doctoral programmes in 11 disciplines including fisheries economics and fisheries extension. Social sciences play a very important and crucial role in enabling technology transfer, impact assessment and ground-truthing. The human resource developed by this university in the subject area of fisheries economics and fisheries extension have been successful in obtaining placements in government, universities, public sector undertakings, research organizations and non-governmental agencies.

In an effort to train the students in fisheries social sciences, the CIFE takes care of inculcating the spirit of research and extension. In this direction suitable topics which are contemporary in nature are initiated by the faculty in the Fisheries Economics, Extension and Statistics Division of this institute. This compilation of abstracts of research work done by Fisheries Social Science students bears testimony to this effort. The quality of research and training in fisheries social sciences in this University has improved leaps and bounds over the last few years. Students of the Fisheries Economics, Extension and Statistics Division have made a mark not only within India but also abroad. They have been participating in various national and international conferences and have won accolades for this university.

I sincerely appreciate the efforts of the FEES division to bring out this compilation of abstracts of students research. This compilation gives a bird's eye view of the process and progress of fisheries social sciences research over time. I congratulate the division for bringing out this volume which will serve as a ready reckoner of areas of research attempted in fisheries social sciences in this university.

Mumbai
2nd December, 2015

Gopal Krishna
Director

Foreword

The Division of Fisheries Economics, Extension and Statistics traces its roots to the department of Fisheries Economics created in1961, the year Central Institute of fisheries Education (CIFE) Mumbai, was established. It was then one of the three pioneering divisions of CIFE. The Division underwent nomenclature changes in the course of time and was renamed as the division of Fisheries Economics, Extension and Statistics(FEES) in 2007. The division is mandated to conduct Master's and Doctoral programmes in fisheries economics and fisheries extension. It is also mandated to develop, organize and conduct professional development, entrepreneurial development and skill development programmes in fisheries and aquaculture. The division also conducts applied research in fisheries economics, extension and statistics. In addition, it offers advisory services to other divisions of the Institute in planning/designing experiments/surveys, analysis and interpretation of data. The division provides support to institutional consultancies and participates in sponsored projects and programmes with other institutions, agencies and industry.

The division has won several awards including best division award, best teacher award, best extension staff, ICAR award for collaborative research and best innovation award. The FEES division has made concerted efforts to project the Institute/University by engaging in lab to land transfer of technology, consultancy projects as well as providing expert teaching faculty to other universities and institutions on an ad-hoc basis. The division has been in the forefront in identifying problem areas in the field and bringing it to the notice of the institute so that suitable projects could be developed to address these on-site issues. The human resources generated by the FEES division in terms of post graduate and doctoral students have proved to be an asset in places where they have been recruited. This only reflected the rigor and seriousness of the academic programmes of this division.

I sincerely congratulate the FEES Division for having brought out this compilation of abstracts of Master's and Doctoral thesis undertaken in this division. I am sure; this volume will go a long way as a handbook for immediate referencing in fisheries social sciences.

Mumbai
2nd December, 2015

R.S. Biradar
Former Head of Division, FEES &
Joint Director, CIFE

Preface

The role of fisheries social sciences in the development of the fisheries and aquaculture sector has been proactive, reactive and supportive. Social sciences have a dual responsibility, they are the eyes and ears of any research organization in the sense they are the source of information on which the structure of biological sciences research is based on. Social sciences are also the tools for transfer of technology from the lab to the land, for providing ex-ante and ex-post evaluation of technologies generated at the institute level.

The students of this division in the subject areas of fisheries economics and fisheries extension are given appropriate topics for their dissertation work that reflect the contemporary requirements of the fisheries and aquaculture sector at the field level. In line with the broader interest of the nation, students of fisheries social sciences are given a broad understanding of the various sub-sectoral research issues and development programmes which will help them to gain a broad understanding of the requirements of the sector when they take up higher responsibilities at work.

This compilation of abstracts of post graduate and doctoral students of this division will enable scientists working in other sectors of agriculture and animal husbandry, a quick understanding of the issues related to the fisheries and aquaculture sectors. The FEES division thank the Director for giving us this opportunity to bring out this volume.

Mumbai
2nd December, 2015

M.Krishnan
HoD, FEES

Abstracts of Student Research

i. Production Economics Theme

P1

Thesis Title : An Economic Analysis of Fish Production and Demand in Tripura

Student : Mr. Biswajit Debnath (PhD - FBM 2005-11)

Major Advisor : Dr. Biradar R.S.

Tripura witnessed an impressive growth in fish production during last decade where fish culture is recognized as vital activity for economic development several plans to meet the requirement of fish and to achieve self-sufficiency in State fish production. The present study aims to workout strategic option that harmonizes production and consumption. Trend analysis indicated that the State is expected to produce 63,616 mt fish, and avail 24,513 mt of Inter-state Fish (ISF) by 2015. Stochastic frontier production function and technical efficiency of fish production estimates yielded positive coefficients for major factors of production. It showed significantly higher mean technical efficiency (0.86) for adopted villages than that for non-adopted villages (0.77). But production efficiencies for both categories of villages were realized to be lesser than the potential by following scientific recommendations. It indicated the possibilities to increase fish production by use of appropriate quantity of major inputs. While examining the consumer preference, constraints analysis of different selected Choice Fish Groups (CFGs) showed that in fish consumption 'high price' was the major constraints in general. Conjoint analysis of consumption attributes also showed 'price' carried 34.08% (for rural Tripura) and 29.72% (for urban Tripura) relative importance among five selected attributes (Price, Taste, Availability, Freshness and Source). 'Freshness of fish was found to be the important consumption attribute for ISF. Utility profile was found to be highest for Small Weed Fish (total utility = 31.06) in rural and for Local Carps (total utility = 35.08) in urban Tripura among five selected CFCs. Demand estimation using multiple using budgeting framework of household showed significant and positive income elastics of demand for Local Carps (0.525), Local Non-carps (0.464) and Small Weed Fish (0.384). But income elasticity for Inter-state Carps (0.066) was less and significant among all selected CFGs. Demand for this fish under the baseline scenario (considering base year 2004) is likely to grow at an annual rate of 3.38% for the state. The State demand for fish by 2015 has been projected as 80,153 mt of which nearly 50% (40,624 mt) will be Local Carps. The present study indicated the importance of local non-carps and adoption of scientific fish culture in increasing fish production of the State. The study also brought out clearly high price and price and lack of freshness of inter-state fish as the major constraints on consumption of fish.

P2

Thesis Title : An Economic Analysis of Production and Marketing of Pangasius in India

Student : Mr. Pankaj H Mugaonkar (PhD - FBM 2010-14)

Major Advisor : Dr. Nalini Ranjan Kumar

Recently India witnessed a boom in *Pangasius* production and simultaneously low prices of *Pangasius* in domestic market. To look critically in to the problem, the study was undertaken in Andhra Pradesh with aims to workout economics of *Pangasius* production, analyse supply chains, to understand consumer behaviour and identify the constraints in production and marketing of *Pangasius* to suggest suitable policy measures. The study was conducted at three level namely farm (Krishna and West Godavari district), market (West Bengal and Maharashtra) and consumer (Pune, Maharashtra, West Bengal and Andhra Pradesh). Production of *Pangasius* across all farms was 36.3 ton/ha which varied from 36.0 ton/ha on large farms to 36.6 ton/ha on small farms. Net income across all farms was Rs.4.37 lakh per ha which varied from Rs.3.97 lakh on large farms to Rs.5.88 lakh per ha on small farms. This reflects that with increase in farm size the net income decreases. Production function analysis had shown that size of fish farm, feed, seed, days of culture and experience of fish farmer in Pangasius culture were significantly contributing in fish production. Stocking of seed need to be increased which was constrained by unavailability of sufficient seed on time in market. Standardization in feeding practices and ameliorated combinations of two types of feed at right phases will optimise the cost and production. High uncertainty in prices of Pangasius didn't allow the farmers to extend the culture period. Increase in experience of Pangasius culture will help in harvesting the higher yield. The small farmers and large farmers have shown the returns to scale 1.04 and 1.14 respectively inferring constant and increasing returns to scale. The estimates of efficiency ratio 'r' for resources employed in Pangasius production were 5.83, 2.85, and 0.33 respectively for fish farm area, seed and feed in case of overall farmers. Safeguarding against uncertainty in prices of Pangasius and financial limitations were the reasons for under-utilization of farms area. Financial limitations found more stringent in case of small farmers than large farmers this led to underutilization of several resources. Pangasius farmers disposed of about 99 percent fish to the distant market wholesalers. Among distant market, major quantity of Pangasius was sold to Howrah market (73.29%) followed by Dadar (16.4%), Assam (4.5%), Haryana (3.6%) and Bihar (1.9%). Low income, middle income and high income group consumers found spending 11.63 percent, 5.36 percent and 2.14 percent respectively on *Pangasius* of the amount spent on the fish.Taste was the main attribute among all consumers for selecting Pangasius for consumption, followed by 'boneless' characteristic of the fish. On the whole, consumers claimed health hazards (80.17%) as the major constraint in Pangasius consumption. Maximum likelihood estimates in Pangasius buying suggests increase in age is more likely to fall in the category of "no buy". Increase in income and family size more likely to fall in the category of "no buy". Income, family size and awareness about seafood labeling has positive effect on reading seafood labels. It was found that 95 per cent of the consumers have not come across any mis-labelled seafood and 75 per cent of the consumers demand to have common seafood certification for all seafood. Lack of timely availability of seed, high price of feed, bacterial diseases, unavailability of labour, were the major constraints for farmers. Capacity building of farmers, Improving availability of quality seed, easy access to cheap institutional credit, low cost alternative of feed, establishment of processing plants, promoting Pangasius consumption domestically and internationally, awareness regarding seafood label and importance of specification on the label, will go a long way in improving the economics of Pangasius production in the country.

P3

Thesis Title : Economic Analysis of Tuna Fisheries in Lakshadweep

Student : Mr. Vinay, A. (MFSc - FEC 2013-15)

Major Advisor : Dr. Ramasubramanian, V.

Economic analysis of Tuna fishery is very important as the estimated potential of oceanic tuna from Lakshadweep waters is about 1.5 lakh tonnes, albeit untapped. In this study, current status and performance, cost and returns analysis, Total Factor Productivity (TFP) growth and constraints analysis of tuna fishery in Lakshadweep have been covered for four major islands viz., Minicoy, Androth, Agatti and Kavaratti. The compound growth rate for tuna landings during 2002-13 was estimated as 5.04%. ARIMA modelling suggested gradual increase in tuna catch in the coming years. Economic analysis of pole and line fisheries of selected islands of Lakshadweep showed differential levels of profitability in different islands when computed in terms of B-C Ratio. Maximum profitability in pole and line fishery was observed in Agatti (1.55) followed by Kavaratti (1.38) and Minicoy Island (1.27 in 1/2 sharing system and 1.26 in 1/3 sharing system). Island of Androth has troll line fisheries predominantly–1/2 sharing system had a B-C ratio of 1.23 whereas the less common 2/3:1/3 system had a B-C ratio of 1.55. Pole and line fisheries has an economic edge over troll line, but lack of sufficient bait fish in Androth island has made space for the latter. Pole and line catch contributes around 90% of the total tuna landings in Lakshadweep; from this, 10% is sold as fresh within the island and remaining 90% is converted into masmin. The use of progressive inputs may induce an upward shift in the production function to the extent that a technological change is incorporated in them which can be captured by TFP. TFP showed a positive growth of 1.44% in Lakshadweep during 2000-14 suggesting that tuna pole and line fishing is sustainable. Positive TFP has been achieved mainly because of technology development like installation of fish aggregating devices. Delineating constraints faced by the respondents that hamper the productivity and computing their Rank Based Quotient (RBQ) aided in framing suggestions for possible policy interventions. RBQ suggested escalating fuel cost and lack of cold storage facilities as major constraints. To sum up, even though tuna fisheries in Lakshadweep is fast catching up and developing, still concerted efforts are needed to mitigate the constraints that are unique to island fisheries.

P4

Thesis Title : Can Sustainable Fishing Techniques Maximize Economic Benefits? The Case of Kombuthurai Fishing Village in Thoothukudi, Tamil Nadu

Student : Ms. Anuja A. (MFSc – FEC 2013-15)

Major Advisor : Mr. Vinod Kumar Yadav

Fisheries is a source of employment, income, nutrition and recreation in the world. The continuing depletion of the world's marine fisheries resources is a key indicator of a critical decline in ocean health and a global issue of increasing concern. Global recorded marine fish production was 82.6 million tonnes (mt) in 2011 and 79.7 mt in 2012 (FAO, 2014). India's marine fish landings declined 5 percent in 2014 to 3.59 mt against 3.78 mt in 2013.Tamil Nadu produced 6.88 lakh tonnes (lt) of marine fish in 2013 followed by 6.65 lt in the year 2014. Thoothukudi share of marine fish production to Tamil Nadu remained steady at 12.52% during 2010-2013 (TNFD, 2014). Thoothukudi is one of the leading maritime districts in marine fish production in Tamil Nadu and 24 marine fishing villages are involved in fishing activities. Out of 24 fishing villages, Kombuthurai fishing village concentrates exclusively on hook and line fishing. In order to make an assessment of sustainable fishing technique of hook and line fishing that maximizes economic returns of the fishers of Kombuthurai fishing village. Kombuthurai has been described as a fishing village in Thoothukudi district, Tamil Nadu which has gained immense importance by practicing sustainable fishing practices. In Kombuthurai village during 2009-2013, CPUE has varied from 0.20 tonnes to the maximum of 0.25 tonnes during this period of time. By using GLM and GLMs analysis the influence of various variables on CPUE across year as well as on each respective year were consistent. It can be found that the CPUE and seasonality of fishing bear a significant relationship between one another. By using binary logistic regression the independent variable such as latitude, longitude, depth, and distance emerged significant in the model, but year, season and hooks were not significant. MSY was estimated for the year 2009-2013 by using surplus production models. This model explains 99% of the variation in the yield. The marketing channels of fishes in Kombuthurai yield certain pointers in terms of sustainable fishing. Hook and line fishing of Kombuthurai fishers has as much to do with the fact that it is quality that matters which supports sustainability with no loss of earnings. The SWOT analysis of Kombuthurai fishing village showed that the main strength of their village is sustainable fishing practices.

P5

Thesis Title : Economic Analysis and Market Share Discrimination in Marine Fish Production, Odisha

Student : Ms. Jyotirmayee Das (MFSc - FEC 2012-14)

Major Advisor : Dr. Krishnan, M.

Odisha is a coastal state located in the east coast of India with a total area of 155.707 sq. kms. The 480 kms coast line of Odisha, Balasore district is ranked first for highest marine fish production. The district consists of 2.7 lakhs fisher who belongs to 47,162 families and 415 fishing villages. The district has 15 landing centers with a total marine fish production of 27234.25 MT (2012-13). Ganjam is the least populous district among of all the maritime districts of Odisha with an area of 8206.0 Sq. Km. in order to estimate the socioeconomic profile and impact of mechanization on the income of estimate the socioeconomic profile and impact of mechanization of the income of fishers percentage analysis, project evaluation techniques including NVP, IRR, Payback period and Net Benefit Investment ration were used. For determining the factors affecting fisher's net share in the market, discrimination analysis was performed. Rank Base Quotient was used for constraint analysis. From the study it is found that marginal productivity of resources for different craft and gear combination fishing days and fishing experience are significant in most of the landing centers in Balasore district. As far as Ganjam district is concerned, fishing days, investment and fishing experience are significant for N–S–N landing centre and fishing experience alone was significant for B-R-G landing centre. The internal rate of return for all combinations of craft and gear were positive and high. Market discrimination among fishers receiving higher market price and lower market price was more prominent in case of Balasore district as compared to Ganjam district. As far as production and marketing constraints were concerned in both the district irrespective of the craft – gear combination, wear and tear of gear and unavailability of catch emerged as the single most important constraints with 100 percent response. There should be careful monitoring of catch effort statistics and suitable sustainable policy need to be developed and executed which will ensure the sustainability of marine fisheries of Odisha.

P6

Thesis Title : Production and Marketing of Cultured Shrimp in Surat District of Gujarat

Student : Mr. Hapse Vijay Shivaji (MFSc - FEC 2011-13)

Major Advisor : Dr. Swadesh Prakash

India is second largest producer of fish producing 8.29 million tonnes (2011-12). Gujarat production has touched to a level of 6800 tons from 2248 ha of water spread area and turnover of 200crore plus (in year 2010). The study was carried out in Olpad block of Surat district. In block Olpad nine villages doing the shrimp farming activity. Covering 66 private shrimp farms and 32 leased-out government shrimp farms, economics of private shrimp farms and leased out shrimp farms have been worked out for small, medium and large shrimp farms was worked out Rs. 1,60,209 Rs. 2,35,076 and Rs. 4, 41,133 respectively. And the net income was after the deduction of interest on capital cost, for small shrimp farms Rs. 52,516. While medium shrimp farms Rs. 79,384 and the large shrimp farms was Rs. 1, 30,765. This yields that the input output ratio 1:1.52 for small, 1:1.32 for medium farms and for large farms 1:1.28 respectively. The estimated production function for 3 type of farming situation in Surat district of Gujarat were based on the three type of farming situation i.e. private farms (n=66), government leased out farms (n=32) and pooled data (n=98). The function had given good fit to the data going by the R^2. The overall fit to the acceptable and hence the fictional form described the response of dependable variable (gross income) to the changes in independent variable by 97%, 98% and 93% respectively in the 3 farming situation as listed above Olpad taluk of Surat district. The marketing cost, marketing margin and efficiency indicate in channel II is better than the channel I and channel III. The growth strategy trends do suggest a need for revised policy approach. The need of the hour is to advocate a balance growth strategy, which would take care of the sustainability without sacrificing equity and economy.

P7

Thesis Title : An Economic Analysis of Reservoir Fisheries in Western Vidarbha Region of Maharashtra

Student : Mr. Abhijeet Naohate (MFSc - FEC 2011-13)

Major Advisor : Dr. Nalini Ranjan Kumar

Reservoirs are water bodies created by dams built of rubble, earth, stone and masonry work across seasonal streams. Primary purpose of these reservoirs is to provide water for drinking purpose and for irrigation agricultural crops. Reservoir fishery is not only an important source of income and livelihood generation but also a source of nutritional security. However, the economic benefit of reservoir fishery has not been exploited fully due to a number of reasons. There are few studies related to identification of constraints potential of fishery in reservoirs. However, there is hardly any systematic study analysis the economics, marketing and constraint associated with fish production form reservoir fisheries in Vidarbha region of Maharashtra. Therefore the present study was undertaken in western Vidarbha region of Maharashtra to estimate costs and returns from reservoir fisheries and to identify constraints in production and marketing of reservoir fishes. The outcome of this study will help the decision makers to take appropriate decisions for utilizing these resources efficiently for fish production. Adan, Kate purna and Arunavathi reservoir from western Vidarbha region were chosen for the study. Secondary data for the study was collected from respective offices of government and cooperatives. The study revealed that the reservoir fishery is a profitable venture with all over cost of production of Rs. 31.46/ kg and returns of Rs.7585/ha making the net returns to be Rs. 3600.66/ ha.The factor which affected the fish catch were identified as fishing experience and trip duration which accounted for 77% variation in fish catch. Rainfall in the area as proxy of water level in reservoirs, boat days and stocking of reservoir with fish seed were the factors affecting fish production from reservoirs. Marketing channel II where fishers sold their catch to retailers through co-operatives was found to be the most efficient channel with marketing efficiency of 0.72 and fishers received maximum share in consumer rupee through channel I where the opted for self-marketing of the catch. The major constraint in fish production from reservoirs was low price for fish catch to fishers by co-operative (79.90) followed by non-allowance for self-marketing (78.68) and fishing by other state fishermen. Being a profitable activity, reservoir fishery could be a great source of income generation to the fishers and produce fish could also provide nutritional security to the people in the vicinity.

P8

Thesis Title : An Economic Analysis Floodplain (CHAUR) Fisheries in Samastipur district of Bihar

Student : Mr. Raushan Kumar (MFSc – FEC 2011-13)

Major Advisor : Dr. Nalini Ranjan Kumar

Chaurs are tectonic depression in land mass which gets filled up with water during monsoon season either through flood water of rivers or excessive rains and gradually dried with passes of time. The seasonal nature of it makes the property regime unique as agriculture under individual ownership and fisheries under multi- ownership. Most of the *chaurs* are underutilized and not being managed for ownership. Most of the *Chaurs*are under-utilizedand not being managed for fishery due to lack of awareness about potential and profitability of the resource. Therefore, economics of *Chaur* fishery was studied in Samastipur district of Bihar to estimate the income and employment generation in the resource. The findings of the study may help in motivating farmers for utilization of these resources. Marketing of produce obtained and management of *Chaurs*has also been investigated to provide suggestions for best utilization of these resources. For the study primary data was collected form sample farmers/ fishers through survey. Sample farmers/ fishers were selected following multi-stage stratified random sampling technique. It was found that paddy (38.08%) was the most popular agricultural crop in *chaurs* followed by wheat (28.33) whereas tobacco was the most profitable (Rs. 177698.81/ha) crop cultivated. The overall cropping intensity in *chaur* was 161 %. The culture fishery was the most profitable(Rs. 294378.06/ha) venture in the *chaur* followed by agriculture (Rs. 87186.82/ ha). The label absorption/ha in culture fishery (1077.29 man days/ha) was substantially higher than agriculture (95.36 man days/ha) and capture fisheries (28.77 man days/ha). the marketing channel-I was the most efficient with market efficiency 69.7 and price spread of Rs. 2.12/kg in which producer sells their produce directly to the ultimate consumer. About 90% of the produce from culture fishery and 52.6% of capture fishery was disposed of through vendor. In some of the *chaurs* leased out to individuals or a group of individual, enhanced fisheries was under practices. Government owned land in *chaurs* was leased out to fishermans cooperative society and the society transfers the fishing right to the local fishers. The main constraint in managing the *chaur* fisheries was fear of failure (81.5%) and its multi-ownership (80.9%) for farmers whereas for fishers, it was weeds infestation of *chaurs* (85.3%) and their poor economic condition (80.8%). Though the cultured was most profitable, it devoid certain indirect uses of these water body. In absence of such loses, agriculture along with enhanced fisheries should be promoted for better return along with several indirect usesin *chaurs*

P9

Thesis Title : Production and Marketing of Cultured Shrimp in Thane District of Maharashtra

Student : Mr. Sushil Subhash Solanke (MFSc - FEC 2010-12)

Major Advisor : Dr. Krishnan M.

India is second largest producer of fish producing 8.29 million tons (2011-12). Maharashtra ranks 8th position in shrimp farming with producing of 1,120 mt (2011-12). The study "Production and marketing of cultured shrimp in Thane district of Maharashtra" was carried out in 3 selected Villages (Dhanua, Palghar & Vasai) covering 22 private, 44 leased out government and 1 co-operative shrimp farm. Economics of leased out shrimp farms have been worked out taluka wise for small, medium and large farms. In Palghar taluka the total variable cost was 95,140 while for medium farms it worked out 1, 60,750. It was 2, 05,834 for medium farms and 3, 55,665 for large farms. This yielded that the input output ratio 1:2.96 for large farms, 1:2.36 for medium farms and 1:2.13 for small farms among leased out shrimp farms in Palghar taluka of Thane district. The average production per ha was 1.17 t, 2.03 t and 1.18 t respectively in Dhanau, Palghar and Vasai talukas of Thane district. This yielded gross returns of 5, 78,000 in Dhanua, 6, 80,000 in Palghar and 5, 60,000 in Vasai. Net returns after the deduction of interest on capital cost was 2, 23,107 in Dhanua, 2, 60,020, in Palghar and 2, 95,439 in Vasai. The estimated production function for 3 types of farming situations in Thane district of Maharashtra were based on the 3 different types of farming situations i.e. private farms (n=22) leased out farms (44) and pooled data (n=66). The function has given a good fit to the data going by the R2. The overall fit is acceptable and hence the functional form described the response of dependant variables (gross income) to the changes in independent variable by 84%, 94% and 91% respectively in the 3 farming situations as listed above across the 3 talukas of Palghar, Dhanua and Vasai of Thane district. The marketing cost, marketing margins and efficiency indices for the three different Channels were estimated. It can be observed that the marketing efficiency in Channel I is better that Channel II and III. The growth trends do suggest a need for revised policy approach. The need of the hour is to advocate a balanced growth strategy, which would take care of the sustainability without sacrificing equity and economics.

P10

Thesis Title : Socio-Economic Evaluation of Fish Farming Practices in the Central Valley Zone of Brahmaputra, Assam

Student : Mr. Sonmoina Bhuyan (MFSc - FBM 2009-11)

Major Advisor : Dr. Swadesh Prakash

Fish farming practices in the central Brahmaputra valley zone of Assam have been reviewed based on the primary data collected through a sample of 150 progressive farmers during 2010-11. The study has revealed that vertically expanded farming systems like single stocking multiple harvesting (SSMH) and multiple stocking multiple harvesting (MSMH) were predominant in the study area. The socio-economic variables that accounted for observation stated that farmers with, age range (21-40) years; religion Muslim, education level secondary standards, family size (6-10) numbers and low experience were the major adopters of major farming systems. By and large it was found that small farmers of MSMH achieving the maximum unit production of fish. It was @ 5038.50 kg/ha followed by marginal farmers of same system @4687.17 kg/ha. As a whole, MSMH system records more unit fish production compare to other systems. Regardless of different farming systems, it was the small farmers who were receiving maximum rate of return and had less Pay Back Period. A range of (49-89) percent of total cost of different farming systems were contributed by the variable costs and out of these feed, labour and other variable costs were the major contributors to that. Multiple linear regression analysis was performed to determine input-output relationship of different farming systems and findings of this analysis exposed that in most of the farming systems variation in output were quite significantly described by independent factors (seed, feed, labour, manure, fertilizer and lime) those were taken for consideration except MSMH systems. Unregulated market, non-availability of good quality seed, non-availability of competent extension personnel and disease outbreak were the major constraints faced by the farmers.

P11

Thesis Title : An Economic Analysis of Fish Production and Marketing in Baratpur District of Rajasthan

Student : Mr. Brijesh Kumar (MFSc - FBM 2008-10)

Major Advisor : Dr. Biradar R.S.

Fish culture and management, its fish production, marketing and consumption pattern in Bharatpur district of Rajasthan was analyzed by using cross-section primary data. In general, fish farmers of the district were not found to be advance in nature and follow traditional to extensive kind carp culture technology with little management. Farmers were found to practice over-stocking of fish seed (25,000 to 1 lakh seed per ha per year) though the size of seed varies largely. Mostly, farmers were not applying manure, but application of lime, feeds like rice bran, wheat bran and mustard oil cake were in practice. Accounting profitability and economic profitability in terms of Benefit Cost Ratio (BCR) for private ponds were found to be 2.19 and 1.36 respectively and the same was calculated to be 2.28 and 1.57 for the leased ponds. Average yield of fish per ha per year (productivity) for private pond owners and leased ponds was found to be 1920 kg and 1884 kg respectively. In owned ponds, BCR was found higher in the farm with < 1 ha water area (BCR = 2.34) than that of farm with > 1 ha water area (BCR = 2.00), whereas for leased ponds, BCR was found lesser in the farm with < 1 ha water area (BCR = 2.12) than that of farm with > 1 ha water area (BCR = 2.71). While studying marketing aspects, 'Gobardhan gate' was the only local fish market which small in size, meager in infrastructure and managed by three retailer to handle an average quantity of 715 kg fish per day comprising mostly carps along with some other freshwater fish. The marketing cost for retailer was calculated to be Rs. 0.63 per kg irrespective of fish species. The highest fish producer's share of consumer price (93.2 %) was for Mrigal and retailer's margin was highest for Catla (Rs. 8.37 per kg). Consumers also get fish directly from producer without involvement of market centre and in another channel fish from Kama block moved towards wholesale market of Gaziabad and Faridabad (outside state) through intermediaries termed as contractors. Regarding consumers, It was found that the average per capita consumption of fish per year is 10.26 kg among the non-vegetarian population of the district. High price of fish seed, its quality and middlemen involvement in fish marketing was found to be major constraints in fish culture and management. Shortage of water during pre-monsoon season was also found to be an important constraints faced by fish farmers. There is a need to promote the fish and its importance in human nutrition security among the people of Bharatpur district as a major portion of population is vegetative in food habits.

P12

Thesis Title : Economic Efficiency of Shrimp Aquaculture in Maharashtra

Student : Mr. Nakul Sadafule (MFSc - FBM 2006-08)

Major Advisor : Dr. Shyam S. Salim

Fisheries play an important role in socio-economic development of the country. It is a valuable source of livelihood for a huge section of economically backward population and it also helps to generate employment, income and stimulates growth of new subsidiary industries. Aquaculture is important as it forms the cheapest and healthiest source of easily digestible protein for ensuring nutritional security for a majority of the Indian population. The shrimp industry has tremendous potential as it contributes significantly to the GDP and export earning to the nation. In India there exists about 1.2 million hectare of potential area suitable for shrimp farming. Maharashtra occupies the fourth place among the maritime states with about 80 thousand hectare of potential brackish water area for the shrimp farming. The shrimp farmers in Maharashtra are facing problems like lack of quality seed, occurrence of viral diseases, high cost of production, lack of technical knowledge, natural disasters and low rate of produce. Keeping in the view of all these constraints, an economic analysis was done in the coastal district of Maharashtra with the following objectives as to estimate the profitability of shrimp farming across the different coastal districts, analyze the technical efficiency of the shrimp farmers, deduce the different problems faced by shrimp farmers and to suggest policy guidelines for augmenting shrimp production in the state. The study was conducted during the period from September 2007 to June 2008. Coastal districts of Maharashtra viz., Thane, Raigad, Ratnagiri, and Sindudurg were purposively selected for the present study due to its paramount significance in shrimp farming and shrimp marketing in the country. Based on the profitability proportional sampling method, out of the total sample of 110 respondents, 44 was allotted to Thane district, 33 was allotted to Raigad district, and 33 to Ratnagiri and Sindhudurg District. The study was based on primary and secondary data. The primary data was collected from the sample respondents, in the selected four study areas, by personal interview method on the technical aspects of shrimp farming. The secondary data was collected from published material from different governmental and non-governmental sources. Inorder to draw meaningful conclusions conventional, functional (Cobb-Dougals production function) and Garette ranking analysis were done. The major findings of the study were that the experience in farming was less than 10 years. The average water spread area was 5 hectare with the majority of the respondents practicing a cropping intensity of 2 crops per year. The water exchange was to the extent of 100 to 300 percent. The average input wise cost indicated 12 percent for the seed was, 37 percent cost for feed, 24 percent on electricity per hectare of farming. The operation wise expenditure of shrimp farming indicated that 14 percent of the total expenditure was incurred for stocking, 27 percent on water quality management, 41 percent for feeding and 4 percent incurred for the pond preparation. The average productivity for Maharashtra was found to be 1.14 tons per hectare and the cost of cultivation was Rs. 2.31 lakh per ha. The profitability analysis revealed 1-1.5 t/ha productivity, 28-30 count/kg and feed conversion ratio of 1.5-2, and a market rate of Rs. 200-230/kg. The average profit earned by the respondents is Rs.42 thousand and the average cost of production is Rs.202 per kg of the shrimp. The Cobb Douglas production function analysis revealed that water spread area, stocking density per hectare, fertilizer used and stocking density were the most important factor determining the production of shrimp all over in Maharashtra. In the entire Maharashtra, the returns to scale were worked out to be 1.15 which indicated increasing returns to scale. The study recommends the scope of increase the area under shrimp in the state to augment the shrimp production.

P13

Thesis Title : Domestic Resource Cost Ratio Analysis of Selected Aqua-Enterprises in Eastand North-Eastern India

Student : Mr. Biswajit Debnath (MFSc - FBM 2003-05)

Major Advisor : Dr. Biradar R.S.

As aquaculture has become one of the fastest growing food production activities in the world, there is global concern about social and environmental consequences that accompanies aquaculture development and hence the sustainability of aquaculture. The study analyses resources economics aspects of five selected aqua-business units including the social and environmental consequences of their activities from East and Northeastern India. More specifically, Resource Cost Ratio (RCR), a variant of famous 'Domestic Resources Cost Ratio' (DRCR) methodology has been introduced for the first tome so as to be applied at individual farm level. Here, RCR is the ratio of net cost of non-marketable resources like unskilled local labor and the net value addition through marketable route like production of fish. Hence, RCR reflects the social profitability inversely. The study shows that RCR for Mudialy Fishermen's Cooperative Society (MFCS) was 0.56 for 2003-04, and when the estimated value of some apparently non-marketable i.e. purely intangible social and environmental outputs were included it gave rise to negative RCR (-0.46) in sensitivity analysis. This uncommon industrial situation of negative RCR was also a feature of Rangamayee Farm (-0.22), mainly because of its integration approach in farming systems. Negative RCR does not rule out social profitability, rather it automatically shows the positive profitability through non-marketable route in addition to the profit through marketable route. Two of the three entrepreneurs in the study had an efficient RCR in converting the local available non-marketable resources into a marketable commodity like fish. Overall, the study has been able to quantify the immense social and environmental resources beneficial activities of MFCS, the fruits of integration in Rangamayee Farm, as well as the technological innovativeness of aqua-entrepreneurs – Kripan Sarkar of Rainbow Ornamentals and Deepak Roy, the fish breeder par excellence. These successful aqua-units could act as lamp posts in initiating and sustaining the overall development of aquaculture sector in India.

ii. Markets and Trade Theme

M1

Thesis Title : Study of Organisational Structure, Market Dynamics and Livelihoods in Ornamental Fish Production and Trade in India

Student : Ms. Beishamyum Nightingale Devi (PhD - FEX 2009-14)

Major Advisor : Dr. Krishnan, M.

The ornamental fisheries sector is emerging as one of the lucrative commercial aqua-venture with great potential. Despite its potential this sub-sector remains unorganized and very limited information is available. This socio economic study revealed that the ornamental fisheries is a male oriented activity in all the three study locations and is a primary occupation only in Chennai. In all the three locations, the source of information is from informal sources and credit to start their ventures is from their own which shows the lack of institutional support. Pentagon diagram of the DFID model revealed that all the five capital assets of Chennai are proportionately networking which is not in case of Kolkata and Mumbai which shows that the activity are more or less organized and coordinated in Chennai as compared to other two locations. There is duplicity in the services offered by the government and lack of coordination among the agencies has been observed. Marketing channels are of six kinds in case of Kolkata which shows the existence of number of intermediaries as compared to Mumbai and Chennai. Furthermore, the post production services are important in Kolkata and Mumbai and institutional services in case of Chennai. Moreover, the study on local transportation performance in Kolkata revealed that the transportation and packaging system are very traditional and no scientific intervention has been observed. The one to one relationship in cross tab analysis noted that the number of responses with respect to transportation performance and independent variable like oxygen packing, technical skill and mortality rate are highly related. The constraints analysis using Principle Component Analysis revealed six factors in all the three study locations which are more or less same and appropriate solutions are proposed against each factor. SWOT analysis and TOWS matrix helps in finding out the appropriate strategies to deal with different internal weaknesses and external threat existing in the ornamental fisheries sector. After in-depth analysis of the pros and cons of the various institutions of the sectors it is highly recommended that adoption of the right business model depending on locational advantages would help address the issues as well as required awareness to cater to the need for development of this subsector in the country.

M2

Thesis Title : An Economic Analysis of Supply Chain Management of Inland Fish Marketing in Nanded District of Maharashtra

Student : Mr. Vinay Maruti Hatte (MFSc - FEC 2013-15)

Major Advisor : Dr. Swadesh Prakash

The present study was undertaken in Nanded district of Maharashtra to analyze the domestic fish marketing system. For this study, 125 respondents were randomly selected and interviewed by using personal interview schedule through survey methods. The socio-economic status of different intermediaries was explored and majority of respondents were of age group 36 to 45 yrs. Most of them were having the marketing experience of 9 to 15 years and 63% of the actors have earnings exceeding one lakh. The fish catch of Nanded district were disposed through five different supply chains. Out of five channels, fishers-wholesalers-retailers-consumers (2nd) were found to be the most prominent one. The marketing cost, marketing margin and price spread were evaluated for each supply chain. The results showed that channel 1st channel was most efficient having marketing efficiency index of 2.29 and the channel 5th was the least efficient having marketing efficiency index of 0.73. Present study reveals that 14.49% of the total fish landed were lost at different stages of marketing and is a major concern for people involved in marketing. The consumer liking was biased toward Rohu (*Labeo rohita*) which is the most preferred fish among them followed by Magur (*Clarias batrachus*). The constraint analysis showed that cold storage facility, transportation, marketing infrastructure and price fluctuations were major concerns in marketing channel. The marketing efficiency in Nanded district can be improved by providing financial and technical assistance along with basic infrastructural facilities to the marketing intermediaries.

M3

Thesis Title : Value Chain Analysis of Trout in Kashmir

Student : Mr. Stanzin Gawa (MFSc - FEC 2013-15)

Major Advisor : Dr. Nalini Ranjan Kumar

Jammu And Kashmir State especially Kashmir region is the key player in trout production in India. During 2013-14 the total trout production of state reached to 262 tons of Rs.200 lakh value. Looking at the potential of trout farming in hilly regions as source of livelihood and protein for deprived sections the present study was under taken to identify key actors, cost and value addition and constraints faced by actors in trout value chain in Kashmir. The study observed presence 5 core processes in trout value chain i.e. seed production, feed manufacturing, equipment dealing, trout production and consumption. A total of 125 respondents were interviewed from the identified players and their responses were analysed for the study. The trout culture was profitable business and there was high demand for trout in the valley. The consumer preferred trout than other fishes for its taste and freshness the most. In trout production the variable and fixed cost constituted 75.32 and 24.68 percent of the total cost incurred per annum. The feed and seed was found to be the key factors and absorb about 45.35 and 21.04 percent of the total cost of production per annum. The feed and labour hours were the factors affecting trout production. The estimated resource use efficiency found that feed was over-utilized while labour was under-utilized. The average cost incurred in producing per fingerling was Rs.7.71/fingerling ranging from Rs.7.28 per fingerling for Kokarnag to Rs.10.62 per fingerling for Mammar trout hatchery respectively. For feed producers the average cost of producing per kg of feed was Rs.84.33/kg which ranged from Rs.78.45 and Rs.90.21 per kg for Kokarnag to Manasbal trout feed mill respectively. The equipment dealer was found to incur major share cost of in purchase of equipment accounting for about 84.06 percent of total cost per annum. High cost of feed and seed, unavailability of trout in local market, lack skill labour are among the major constraints faced by different players in trout value chain. The feed and seed production is under government and there was strong need to privatize for its fast development and sustainability. The study concludes that trout value chain in Kashmir was at its nascent stage, its starts at farm and ends at farm. Efforts should be increased to popularize trout farming to increase the demand of trout feed and seed.

M4

Thesis Title : Value Chain Analysis of Farmed Shrimp in Gujarat

Student : Ms. Mahida Navghan (MFSc - FEC 2012-14)

Major Advisor : Dr. Nalini Ranjan Kumar

Navsari district of Gujarat possess second Largest potential brackish water area (89340.91 ha) after west Bengal. The productivity of shrimp farming of the district was highest in 2011-12 among all the Indian states and contributed 2.80% in national shrimp production. Value chain management can reduce various cost associated at each steps of value addition and can improve the productivity and profitability of the product. Therefore, Value chain analysis of shrimps had been studied in the district of Gujarat to map the flow and processes. The findings of the study may help in motivating shrimp farmers and for use of the most efficient and value chain. Actors involved in the chain like farmers, commission agents, processors and export agents were interviewed. A total of 110 respondents were interviewed and their responses were analysed for the present study. Black tiger shrimp farmers and white legged shrimp earned a net profit of Rs.19.63 Lakh/ha/crop and of Rs.5.57 Lakh/ha/crop respectively. The black tiger shrimp was less profitable (3.09) than white legged shrimp (1.95). Results showed a map of actors, activities and functions, costs and returns, employment distribution, facilities and difficulties of each stage. The *P. monodon* and *L. vannamei* value chain, the farmers absorbed 86.7% and 76.3 % of total profit respectively. Farmers, commission agents, processors and export agents are the four main actors which contributed directly to shrimp production and influenced the economic value. Others actors like seed supplier, feed supplier, medicine supplier, equipment supplier, transporters etc., impacted indirectly to the shrimp production as well as value chain development. The micro level producer, farmers are always in risk as their revenue and cost share are high but it is not consistent. Other three actors are in same position enjoying with positive profit. Processors did a critical job with some challenges to fulfil the demand of importers. To upgrade this chain, the actors specially the farmers should be trained up with scientific way, the corruption free environment should be established by government and micro level producers should be empowered to enjoy the perfect competitive market, there should be up gradation of domestic shrimp market to satisfy local shrimp demand. In addition, small farmers have to be facilitated with financial assistance by government with easy term and conditions.

M5

Thesis Title : Analysis of Fish Consumption Pattern in Rural and Urban Areas of Manipur

Student : Mr. Hoilenting (MFSc - FEC 2012-14)

Major Advisor : Dr. Rama Sharma

Present study was undertaken to analyze fish consumption pattern, consumers' demand for different fish form and fishery products and willingness to pay for preferred fish in Thoubal, Bishnupur, Imphal west and Senapati districts of Manipur. Primary data on 180 rural and urban households was collected during the year 2013-14 and was analysed. In both rural and urban areas, households were classified into four income groups and maximum of them were belonged to general category. Higher the income, higher the family size was found and majority of them were staying in nuclear family. Consumption pattern across the income groups showed that fresh, smoked and fermented fish were mainly consumed by majority of respondents and higher consumption of fresh fish (7.84 & 10.6Kg) was reported among higher income groups in rural and urban. On daily basis, fermented fish was consumed in maximum rural household whereas both smoked and fermented fishes were consumed in urban households. Husband mainly takes decision for purchasing fish followed by wife in households. About 50% of food expenditure was found on fish and fishery products, while average amount spend in rural was more than urban households. Fresh form of fish was the most preferred one followed by fermented. Most preferred fish species was *Labeo rohita* in all rural and urban households. *Puntius saphore* and *Amblypharyngodon mola* were most preferred fish used in smoked form in rural and urban households. Taste followed by nutritive value was the factor for purchasing fish form and fishery product. Maximum willingness to pay more prices for preferred fish *Labeo rohita* was found as Rs.250 per kg whereas the average willingness to pay price was Rs.198 per kg. Major constraints faced by the consumers were high price, market distance and non-availability of preferred fish. Therefore, it is suggested that state government should take suitable measures to enhance fish production and develop nearby markets, so that fresh form of fish will be available in abundance for consumption.

M6

Thesis Title : Marketing Analysis of Indian Major Carps (IMC) and Catfish in Patna District of Bihar

Student : Mr. Manish Rastogi (MFSc - FEC 2010-12)

Major Advisor : Dr. Swadesh Prakash

A study was undertaken in Patna district of Bihar to analyse the marketing system of IMC and Catfish. By using random sampling method, data were collected from different market intermediaries and the farmers. A total of 184 samples were collected. The marketing pattern and system show that most of the fishes were sold out by retailers. It makes a conclusion that it was basically a retail market. One major channel was identified in the case of live fish marketing and two major channels were identified in iced fish marketing. After analysis of cost of different intermediaries, it was found that, the highest percentage of the cost incurred was transportation cost i.e. 79.61 % in IMC and 64.29 % in catfish in case of wholesaler – I of iced fish because fishes come from outside of state, but in other intermediaries the major cost was icing or storage cost. In case of non-iced fish, the highest cost incurred was for feeding i.e. 23.26 % in IMC and 23.27 % in catfish in case of wholesaler-II but in case of retailer it was transportation cost. The price spread of IMC (non-iced) was highest i.e. 82.94 % due to high price paid by the consumer but marketing margin was highest in case of retailer i.e. 16.66 % in IMC and 11.24 % in catfish. In case of iced fish, the marketing margin was highest in vendor because they are door to door seller and fetching high price. In case of iced fish, the highest cost incurred by wholesaler – I because fishes are coming from outside of the state. The channel – II of IMC in case of both non iced and iced fish was found to be more efficient. After cost and return analysis, it was found that, the return per kg of fish was more in non-iced fish compare to iced fish due to high price of the non-iced fish but return per day was more in iced fish due to high quantity of selling. The study on postharvest losses showed that, there was a loss of 20.76 %(Quantity) & 6.36 %(net value) in non-iced fish and 24.38 %(Quantity) and 10.08 %(net value) in iced fish. In case of catfish, the losses was less due to hardy nature of species, it was 16.29 %(Quantity) & 4.80 %(net value) in non-iced fish and 21 %(Quantity) & 13.47 %(net value) in iced fish. The study also identified the different constraints faced by the market intermediaries in the different market. The cold storage facilities, platform for selling and high transportation cost were the major constraints. Therefore, the study suggests that, the suggested measure can be implemented in the market to improve the market infrastructure and the marketing of the fish.

M7

Thesis Title : Impact Analysis of Sanitary Measures of Export and Fish and Fisheries Product from West Bengal

Student : Ms. Shiwangi Gupta (MFSc – FEC 2010-12)

Major Advisor : Dr. Nalini Ranjan Kumar

The present study was undertaken to analyze the impact of sanitary measures for export of fish and fishery products from West Bengal. For the study, survey was conducted using personal interview method with the help of pre-tested schedule specially designed for the study during the month of October 2011 to February 2012. a total of 6 supply chains were identified individually in both the export of fish and fishery products from capture and culture sources. The most dominant supply chain for export of fish and fishery products from capture sources was "fishers'! auctioneer'!wholesaler'! agent'! processor/exporter'! importer" disposing off 64.1 percent of total fish catch from capture sources and "farmers'! wholesaler'! agent'! processor/exporter'! importer" was the most dominant supply chain from culture sources, disposing of 47.44 percent of total cultured shrimp. Though small quantity of fish was being disposed-off directly to processors with low marketing cost but the fishers and farmer share in processor's rupee was highest, 95.72 percent and 96.03 percent respectively in supply chain "fish/farmer'! processor/exporter'! importer" which was the most efficient among all the supply chains. The extent of adoption of sanitary measures was measured by using food safety index. Majority of farmers, wholesalers and processors were medium adopters while majority of fishers and transporters were low adopters. The higher adoption of sanitary measures enhanced the yield and hence the net return from Rs.2.83 lakh/ha/year on medium adopter to Rs.3.4 lakh/ha/year on high adopter shrimp farm. Though the adoption of sanitary measures is cost intensive, it has benefited all the stakeholders in supply chain. The exporters were compliances and poor awareness of sanitary measures were major constraints in adoption of sanitary measures which indicate the need for capacity building program for different stakeholders in supply chain and making easily available subsidized credit for facilitating the adoption of sanitary measures.

M8

Thesis Title : Marketing of Ornamental Fishes in National Capital Region

Student : Ms. Shivta Kureel (MFSc - FBM 2009-11)

Major Advisor : Dr. Swadesh Prakash

This study was undertaken in National Capital Region, India with the objective of assessing the marketing of ornamental fish in the region. Marketing channel, disposal pattern, marketing costs, marketing efficiency, price spread, factors affecting supply and constraints in ornamental fish market were studied. They were analyzed using primary data. Data was interpreted using percentage analysis, Rank Based Quotient and Shepherd's Index. The latter two methods were used for ranking and estimating market efficiency. The market channels were indirect, starting from wholesaler to customer, (channel I); wholesaler to customer via retailer (channel II); wholesaler to wholesaler cum retailer to retailer to customer (channel III). Disposal pattern of fish follows tessellation pattern. Ornamental fishes had higher sale during summer season whereas, price and quantity procured were higher during winter season. Price skimming and price discrimination were pricing strategies used. The cost enhancing elements were primarily cost of aquarium (Chinese & traditional), transportation, labor, electricity charge and rentals. The wholesaler has highest marketing cost and margin in NCR due to near monopoly in marketing system. Study revealed that the price spread was lower in channel II (Rs 17.67) as compared to channel III (Rs 21). Channel II was more efficient (1.336) than channels III (1.286) owing to less number of intermediaries reflecting less marketing cost. Customer preference, demand for common fish, current price, availability of fish and seasonality were the major factors controlling the supply of ornamental fish. Other factors included location of shop, production, infrastructure facility, water quality etc. The major constraints in ornamental fish market were high price of fish, mortality, demand for specific fish, diseases, maintenance of water quality and bargaining. Whereas, poor demand of good quality fish, production facility, access to market, handling, availability of fish and competition with alternative pets were also ranked in decreasing sequential order in the constraints in marketing of ornamental fishes.

M9

Thesis Title : Export Performance and Competitiveness of Indian Ornamental Fish Trade

Student : Ms. Prathvi Rani (MFSc - FBM 2009-11)

Major Advisor : Dr. Sheela Immanuel

Ornamental fish trade is a multibillion dollar industry with an annual turnover of USD 5 billion. Ornamental fish culture has emerged as a highly profit oriented lucrative sector. In the present study an attempt has been made to study and examine the export performance, export pattern and competitiveness of Indian ornamental fish trade in international market based on the data pertaining from 1991-2009 from UNCTAD and WTO statistical data base. Compound growth rate, market destination and species diversity were used to analyse the export pattern and performance. Percentage share, Unit value realization, Export Competitiveness Index (XCI), Revealed Comparative Advantage (RCA), Constant market share analysis (CMS) were used to study the competitiveness of Indian ornamental fish in international market. The result indicated that share of India's ornamental fish exports to Fisheries export, Agricultural exports, Fisheries GDP, Agricultural GDP and Total GDP has been increased over the years. India's ornamental fish exports showed a positive CGR in terms of value, quantity and unit value when compared to world's growth rate. India's ornamental fish trade has also been quite competitive but intensity being very less, in recent years its competitiveness was also declining. CMS analysis suggests India's ornamental fish exports are more competitive in USA rather than other major export destinations like Singapore, Malaysia etc. Therefore in order to sustain and enhance India's competitiveness, India needs to have manifold increase in ornamental fish production, grow parallel with world's trend in ornamental fish trade and export more to those countries where it is highly competitive. To achieve this India needs to invent and adopt better technologies to culture vibrant ornamental fishes rather than just depending on wild collection. More professionals need to enter this sector, and a strong distribution channel and good infrastructure facilities. As India has shown immense growth rate over the years, taking care of all its constraints using suitable policy measures it can emerge as a leading ornamental fish exporter of the world in years to come.

M10

Thesis Title : Socio-Economic Appraisal of Jagiroad Dry Fish Market of Morigaon District, Assam

Student : Mr. Dipanjan Kashyap (MFSc - FBM 2009-11)

Major Advisor : Dr. Swadesh Prakash

Jagiroad dry fish market is the Asia's largest dry fish market that supplies the dry fish products to the North-Eastern part of India. It is situated in Morigaon district, Assam which is 78 km away from the State's capital Dispur. It receives the dry fish products from the entire parts of the country. 150 respondents were selected for the study which comprises 15 fish dryers, 60 wholesalers, 25 retailers and 50 consumers. The market is functioning throughout the year except June to August that is almost closed due to rainy season. Dry fishes were mostly available in the winter season followed by the pre-monsoon season. *Puthi (Puntius* species) and Bombay duck (*Harpodon nehereus*) fetched higher prices in the market among the freshwater and marine fishes respectively. On an average 10-20% of dry fish loss took place due to inadequate drying and 10% loss due to breakage and insect attack. 81.67% of the wholesalers had storehouse facility in the market. Commercial banks (40%) were the major source of credit for the wholesalers, whereas 36% retailers borrowed their money from the middlemen involved in the system. Five major marketing channels were observed for marketing of dry fish and Channel l (Fish dryer – Assembler – Commission agent – Wholesaler – Retailer – Consumer) was predominant through which 56.17% of the total dry fish moved. Channel V (Fish dryer – Wholesaler – Consumer) was found to be the most efficient marketing channel, where net price received by the fish dryer was 53.49% of the consumer's rupee. Majority (46.67%, 44% and 46% respectively) of the wholesalers, retailers and consumers belonged to middle age group of 36-45 years, whereas 46.67% fish dryers belonged to the age group of 46-55 years. 73.33% fish dryers, 76% retailers and 98% consumers were literate, while none of the wholesalers were found illiterate. Average family members for fish dryers, wholesalers, retailers and consumers were found 6.1, 4.6, 5.5 and 4.4 respectively. Experience of the fish dryers was found higher than the other respondent groups, with 67% had an experience of more than 10 years. Respondents spent 60.2% of the monthly income on food items out of which amount spent on fish and dry fish products was found to be 13.7%. Product quality deterioration in rainy days, damage inside the storehouse due to flood, price/ demand fluctuation and lack of hygiene were the major problems encountered by the fish dryers, wholesalers, retailers and consumers respectively.

M11

Thesis Title : An Economic Analysis of Marine Fish Marketing in Ratnagiri District of Maharashtra

Student : Mr. Satendra Kumar Singh (MFSc - FBM 2007-09)

Major Advisor : Dr. Swadesh Prakash

The present study was undertaken in district of Ratnagiri with the objectives of analyzing the marketing costs marketing pattern, marketing costs, marketing margins, marketing efficiency, price spread, cost and returns, post-harvest losses and constraints, to suggest suitable technological and institutional interventions. Data on marine fish marketing and related aspects were collected with the help of structured schedule from four landing centers viz. Mirkarwada, Rajiwada, Sakhartar and Mirya. The primary cross section data were collected from the sampling units consisting of 65 fishermen respondents selected by using multistage sampling design, and 80 retailer, 15 auctioneer's, 38 wholesalers and 55 vendor's respondents. The price spreads and marketing efficiency was computed by using Shepherd's index method and Composite index method respectively. The study reveals that marketing pattern highest in wholesaler level, i.e., 70 to 80 per cent and lowest at vendor's levels was 3 to 8 per cent. The marketing channels wise, price spread wise and marketing efficiency have been studied for the fish species namely Pomfret and Ribbon fish. The price spread revealed that the fisherman share between 73.54 and 76.99 per cent and 53.77 to 61.09 per cent for Pomfret and Ribbon fish respectively. Comparison of price spread of different channels indicated that the price spread was lowest in channels II of both Pomfret (Rs.62.76/-) and Ribbon fish (Rs.19.10/-). Comparison of composite index of different channels revealed that channel II (1.66/-) was found to be most efficient since it reflects that linking fishermen's directly to retailer's without intermediaries. Comparison of Shepherd's index also indicated that channel I (4.34) was most efficient followed by channels II. In case of Ribbon fish, Channel II was found to be more efficient based on both criteria. The study reflects economic rationality on the part of fishermen as they were selling the produce to different buyers, seemingly depending upon the price elasticity of demand.

M12

Thesis Title : Supply Chain Management for Fresh Water Fishes in Selected Markets of Bangalore

Student : Mr. Vishwanatha B.S. (MFSc - FBM 2007-09)

Major Advisor : Dr. Biradar, R.S.

Supply chain management (SCM) includes the physical and financial flows from production to consumer. India produces around 7 million tons of fish annually and inefficient supply chain has been the major problem facing Indian fishery industry. Karnataka produces 2.75 lakh tons of fish annually contributing about 4.8% of India's total fish production. Bangalore, capital city of Karnataka has 5 fish markets and at present study of SCM of freshwater fishes was restricted to Russell market, City market and Yeshwanthpur market. The objectives of the present study were to identify supply chain of freshwater fish, estimating price-spread, and intermediaries cost of operation, consumer purchasing behavior, and identifying constraints in supply chain and suggestions suitable policy measures. Information was collected from Wholesaler, Retailers and Consumer through pretested interview schedules. Supply chain of freshwater fish consisted of 4 to 5 intermediaries such as assembler, local wholesaler, commission agents, wholesaler and retailers. Average price spread for Catla, Rohu, Common carp, *Murrel, Notopterus, Singhi*, Prawn, Tilapia, Cat fish were Rs. 36, Rs 41, Rs. 39, Rs. 71, Rs. 85, R. 59, Rs. 139, Rs. 36, Rs. 33 per Kg respectively across three markets. Producers share in consumer rupee for Catla, Rohu, Common carp, *Murrel, Notopterus,* Singhi, Prawn, Tilapia, Cat fish was 53, 50, 51, 52, 53, 49, 46 % respectively across markets. Total average marketing wholesalers and retailers across markets was Rs. 8.42/kg and Rs.7.28/kg respectively. About 68% consumers were willing to pay maximum price for freshwater fish for Rohu and *Notopterus*. Majority of consumers (67%) were willing to substitute freshwater fish by chicken with complimentary food items such as Rice/Fried rice, Ragi ball, Roti/Puri and Biryani. Taste, price and freshness were important factors in choosing substitute for freshwater fish. Constraints identified in SCM were increased marketing costs, lack of storage facilities, and market information, inventory losses, delayed supply, poor quality, and unhygienic condition in fish markets.

M13

Thesis Title : A Study on Organized Fish Retail Outlets and Consumers

Student : Mr. Mugaonkar Pankaj Hanmantrao (MFSc - FBM 2007-09)

Major Advisor : Dr. Ananthan, P.S.

India consumers had no choice but to buy from the unhygienic local fish market as the fish marketing in India is highly organised and unregulated with least premium on safety and quality. But with globalization and growing economy, today fish is available at many of the multi format outlets like Spencer's, Reliance's Delight Proteins, Foodland, Spinach, etc. However, as there has not been adequate literature on this growing organised fish retailing, study was conducted in Mumbai to understand how organised retail outlets function with respect to fish, to map the dynamics of consumers' purchase behavior, and to conduct sensory evaluation of CIFE's value added fish products to further improve them. Results have shown that average quantity of fish sale in the retail outlet was 188 kg a day with average price of Rs. 149/ kg. The product range included fresh fish as well as value added products. Thirteen fresh species of fish and 8 types of branded value added products were found to be sold. There is scope to introduce snacks and ready to eat fish products. There are inefficiencies in supply chain which can be overcome when purchase volume increases. Seventy four percent of consumers visiting were found to be in the age group 25-35, while the income of 73% of consumers was found to be between Rs. 3-5 lakhs / annum indicating young and upper middle class people constitute major portion of consumers. Forty five percent of the respondents visited the store once in a week. The average household fish consumption was seen as 6-8 kg/ month. About 97 percent of consumers have shifted their sources of purchase from unorganized/ local market to the organised retail outlets. About 60% of consumers emphasised freshness of fish rather than price. Majority of the consumers (84.3%) were found to be specific while buying the fish. Ninety percent prefer to purchase processed products in 500gm weight. Quality and convenience are found to be major factors responsible for shifting source of purchase. Sensory evaluation of CIFE's four value added products namely Fish Munch, Fish Kheema, Prawn Pickle and Prawn masala has received very positive feedback from consumers as majority of them (62%) have rated highly the taste, texture, odour, and price while appearance and packaging have received average feedback indicating that they have to be made more appealing and attractive. Interestingly, majority of consumers (72%) showed willingness to buy CIFE's value added products and 95% try new fish and fishery products, both in fresh and processed form indicating opportunities for entrepreneurs.

M14

Thesis Title : Market Research of Value Added Fish and Fish Products in Eastern Region of India

Student : Mr. Ramchandra Rout (MFSc - FBM 2005-07)

Major Advisor : Dr. Biradar R.S.

Our country produces 6.304 million tons of fish annually comprising 2.779 million tons of marine and 3.525 million tons of inland fish. Some of the fish species that are caught especially marine don't fetch high price. In order to ensure remunerative returns for the fishes, value addition to these fish is essential. Further, the scope for consumer preference and marketing of value added fish products also need to be looked into. It is in this context a study was undertaken in West Bengal and Orissa with the objectives of analyzing the fish products, scope for value addition along the porter value chain from fish institutional interventions necessary for improved value-addition and marketing. Data on fish consumption, value addition products and related aspects were collected with the help of structured schedule from three locations viz. Kolkata (urban), West Medinipur (semi urban) and Panchagachhina village (rural) of East Medinipur district of West Bengal. Data on case studies dealing with seed production (fish, shrimp and prawn), farm production (fish, shrimp and prawn), marketing functionaries and organizations working on fisheries sector were collected from West Bengal and Orissa States. the study of overall awareness about the value added fish product in all the three locations urban, semi urban and rural put together indicated that 28.88% of respondents are aware about value added fish products. Awareness was higher in urban (43.33%) than semi urban (26.67%) and rural (16.67%) areas. Over all about 50% of the respondents who were aware about the value added fish products, reported consumption of these products. Consumption of value added fish products was higher in urban (26.67%) than in semi urban (16.67%) areas and nil in rural areas. In urban areas, 63% of variation in demand of fish was explained by price of fish, price of the substitute, income of family size, age of respondents, quantity for substitutes and frequency of purchase of fish. In semi urban and rural areas, three set of explanatory variables explained respectively about 34% and 35% of variation in demand of fish. The major problems in fish consumption were irregular supply of good quality fish, high price, and wide price fluctuations. The case studies clearly brought out the scope for value addition in the porter chain in fish seed production, fish production, marketing of fish and development of value added fish products. Further Institutional and technological interventions of hatcheries fish and prawn farm, value addition and marketing were also emphasized in the case studies.

M15

Thesis Title : Market Research of Value Added Fish and Fish Products in Northern Regionof India

Student : Mr. Sunil Sabat (MFSc - FBM 2005-07)

Major Advisor : Dr. Arpita Sharma

Fisheries sector has witnessed an impressive growth from a subsistence traditional activity to a well-developed and diversified commercial enterprise. It has been playing a pivotal role in the economic development by the virtue of its potential contribution to its employment generation, income augmentation, addressing food and nutritional security concerns and forex earnings. World fish production has increased immensely and has arrived at a state of over exploitation. Whereas about one third of global fish catch is unutilized for human consumption because of post-harvest and processing loss. Value added fish and fish products would be magnificent means to meet the demand with more commercial benefits plus effective utilization of resources. Moreover, purchasing capacity and desire for better taste of people is increasing along with price of fish and fish products. Hence promotion and marketing of these products are highly essential. Till now market research of value added fish and fish products remain less explored. In this context a study was undertaken with the objective of analysing consumption pattern and consumer preference towards value added fish and fish products, to deduce the scope for value addition along the porter value chain from fish production to consumption pattern and to suggest suitable technological and institutional interventions necessary for improved value addition. Study was conducted in North India at Haryana, Punjab & Delhi. Pre-structured consumer survey questionnaires were administered to sample of 30 respondents each from Delhi (urban), Rohtag (semi-urban) and Lahili (rural). To focus on various segments along porter value chain, case studies of selected fish farms, fish hatcheries, prawn farms and prawn seed hatcheries and marketing functionaries were performed. The result revealed socio-economic variables affect consumption of value added fish and fish products. All were literates except 7% of rural respondents. All were purchasing fish at least once in 15 days. 90% in rural, 77% in semi-urban and 50% in urban area were unaware of value added fish products. About 10% of respondents have consumed it. From Garette ranking technique, major problems in fresh fish consumption were found to be irregular supply, lack of fresh fish, high prices and bones in fish, while lack of awareness, unavailability, no preference were limiting consumption of value added fish and fish products. From the analysis of case study it is deduced that there is scope for value addition along the porter value chain.

M16

Thesis Title : Market Research of Value Added Fish and Fish Product in Southern Region of India

Student : Mr. Shashidharan Praveen (MFSc - FBM 2005-07)

Major Advisor : Dr. Shyam S Salim

India is a fast marching on its way to become a global superpower. With it, the economic prosperity of its people is also increasing. This in turn is fueling the drive for increased consumerism and is therefore opening up broadening vistas for the different sectors of the economy to thrive. A declining trend in the agriculture sector calls for tapping alternative livelihood sectors like fisheries to sustain the "Evergreen Revolution". It is in this context that value added fish and fish products gather momentum. The completely export-oriented seafood industry is facing a dead-end with its myopic focus on primary and secondary processing instead of value addition. This is leading to lose much of its vaunted competitiveness in the international market sector. The aforesaid approach is also causing it to overlook and extreme lucrative domestic market. Gathering pace in the aquaculture sector will also ultimately call for value addition to generate better price realization of products. So an effort has been made in the said study to probe the nascent filed of market research for value added fish and fish products in selected Southern states of India, and add to the corpus of knowledge in it. The study as its primary objective analyzed the consumption pattern and consumer preference for value added fish and fish products in three study areas, namely, urban (Kochi), semi-urban (Kottayam) and rural (Kumarakom) in the selected state of Kerala through primary and secondary data. Socio-economic factors influencing the consumer, demand for fish and value added fish products and problems in awareness and consumption therein were found out through percentage analysis, functional analysis like demand function and Probit analyses and Garatte Ranking Technique. The secondary objectives added to complement the primary objective included deducing the scope for value addition along the Porter value chain, right from fish production to consumption; and suggesting suitable technological and institutional interventions to incorporate such value addition. These were elucidated through representative case studies along the whole of the value chain. The result indicated that socio-economic factors, especially income, family size, education, availability of substitutes, etc have a definite effect on the consumption of fish as also value added fish and fish products. The case study findings established need for technological and institutional interventions in the value chain starting from the seed producer/gatherer, farmer, marketing functionary, and processor down to the organizations working in the fisheries sector encompassing entire gamut of value chain.

M17

Thesis Title : Market Research on Value Chain in Fisheries Sector in Maharashtra and Gujarat

Student : Mr. Vishal G. Ghotane (MFSc - FBM 2005-07)

Major Advisor : Dr. Ananthan, P.S.

A declining trend in the agriculture sector calls for taping alternative livelihoods sector like fisheries. The completely export oriented seafood industry is facing a dead-end with a stronger rupee, declining profit margins, and stringent quality control norms by the importing countries. This approach overlook at the growing domestic market as well as the freshwater aquaculture sector. In this context the study was conducted to determine the scope for value addition along the porter value chain right from fish production to consumption pattern and to analyse the consumer preference and consumer pattern towards fresh fish and value added fish products. Within the methodological framework of porter value chain, detailed case studies on different seed production system, aquaculture systems, marketing and distribution systems were conducted. Case studies revealed that both the inefficient and efficient seed production system resulting mainly form poor backward and forward linkages. Also, it underscored how the interest, initiative and innovation of employees can significantly determine the performance of hatcheries. There exists a certain demand for quality fish and scampi seed, cost effective seed and easy credit and scientific advisory services on nursery management and grow-out techniques, partial harvesting procedures which are not met at present leading to less area under culture and low productivity. Case study of shrimp farmer has brought out the sustainability of less intensive culture based on small is more principle. Relationship among the porter value chain has brought out the issues of disorganized marketing, dominance of agent middlemen and lack of basic infrastructure facilities. The result of market survey on the consumption pattern in the urban, semi-urban and rural area indicated that price of fish and family size were the significant factors influencing the demand of fish along with income and price of fish substitutes. The quantity of fish demanded varied inversely with the price of fish. Problems in fish consumption were found to be high price of fish, lack of quality, hygiene and irregular supply. Lack of awareness, price constraint, limited variety and range of products, very low preference, quality of products plagued the consumption of value-added fish and fish products. Though there exists greater scope for value maximization along the value chain, institutional interventions and innovations like professionalism of DoF, credit reforms, encouraging PPP, more than technological interventions, are required.

M18

Thesis Title : Market Research of Value Added Fish and Fish Products in North Eastern region of India

Student : Mr. Jitendra K. Jena (MFSc - FBM 2005-07)

Major Advisor : Dr. S. N. Ojha

Present study was undertaken in Assam and Tripura with the objectives of analysing the consumption pattern and consumer preferences towards the value-added fish and fish products, scope for value addition along the porter value chain from fish production to its consumption and to suggest suitable technological and institutional interventions. Data on fish consumption, value added fish products and related aspects were collected with the help of structured schedule from three locations viz. Guwahati (urban), Dispur (semi – urban) of Kampur district and Raha village (rural) of Nagaon district of Assam. Data on fish consumption, value added fish products and related aspects were collected with the help of structured schedule from three locations viz. Guwahati (urban), semi urban and rural put together indicated that 25.55% of respondents are aware about value added fish products. Awareness was higher in urban (23.33%) than semi urban (26.67%) and rural (6.67%) areas. Consumption of value added fish products was higher in urban (30.00%) than in semi urban (23.33%) area and nil in rural areas. In urban areas, 56% of variation in demand of fish was explained by price of fish, price of the substitutes, income of family, family size, age of the respondents, quantity demanded of substitutes and frequency of purchase of fish. In semi urban and rural areas these set of explanatory variables explained respectively about 70% and 55% of variation in demand of fish. The major problems in fish consumption are found to be irregular supply of good quality fish, high price, and wide fluctuations in price. The major constraint in consumption of value added fish products are found to be the lack of awareness and non-availability of fish seed production, fish production, marketing of fish and development of value added fish products. Further, Institutional and technological interventions in management of hatcheries, fish farms, value addition and marketing were also emphasized in the case studies.

M19

Thesis Title : Marketing and Utilization of Low Valued Fish Caught in Thane District of Maharashtra

Student : Mr. Paras Narayan (MFSc - FBM 2004-06)

Major Advisor : Dr. Biradar R.S.

According to the FAO (2003), the world total marine fish production was around 86 million tons and around 27 percent of the marine fish catch were discarded comprising mainly of low value fish. In India also around 25 percent of catch is discarded annually. They can be productively utilized for making value added products. In this context, the present study was undertaken with the objective to know the present scenario of landing, utilization marketing of low value fishes in Thane district of Maharashtra. Data were collected from 15 fishermen government officials, fish markets, supermarkets and big bazaars in Thane and Mumbai districts. The landing of low value fish in the surveyed area was 4037 tonnes in 2004-05, consisting of Croacker, Moustached anchovy, Bombay duck, Pink prawn and Golden anchovy were most important in terms of catch. The catch per unit of effort of low value fish differed significantly among cooperative societies and years. Only 24 percent of the low value fish landed are freshly consumed, 74 percent are dried; one percent is used for making value added products like fish pickle, prawn pickle, fish papad and fish Chakali; and less than one percent is salted. There was no significant difference in utilization of fish in fresh as well as in dried form. Almost 85 percent of dried fish is sold in local market for domestic consumption and only rest are exported to countries like China, Singapore, Sri Lanka and Bangladesh. In dry fish marketing, middlemen take the major share of profit. There was significant difference in price per kg of dried Bombil, Mandeli, and Karidi over the years and among the cooperative societies. Only two cooperative societies are making value added products but in very less quantity. Marketing of value added products is not well defined as the manufacturers of value added products are not getting proper market to sell it. At the same time the quality of value added products is not satisfactory as traditional methods are used to prepare them. There is a need for effective market strategy for value added products along with technical and financial support to fishers for value addition.

M20

Thesis Title : Present Status and Future Prospects of Aquaculture in Haryana with Respect to Aqua Inputs

Student : Mr. Jetendra Kumar Singh (MFSc - FBM 2004-06)

Major Advisor : Dr. S.N. Ojha

Aquaculture is the fastest growing sector in aquaculture in the world, especially in Asia. However, in India, thought it has shown a similar encouraging growth rate, there is still much scope for horizontal and vertical growth. To support this rising trend, there is a need to strengthen the input industries as and the input marketing strategy in aquaculture. Almost the inputs, most of the studies are related to feed, depicting FCR, feeding methods and cost of feeding. Issues like, buying behaviour of the consumers are almost untouched. Therefore, there was a need to conduct this research. The present study, therefore, was undertaken in the two most progressive states of the country, Haryana and Punjab, assuming that these states would vividly show the factors of adoption of the inputs by the aqua culturist to formulate future strategy on aquaculture-input-marketing. In this context the study was under taken with objective to know the status, market structure, dynamics, demand and potential of aqua feeds and chemical in these two states of India, as well as, to provide focused marketing strategies for major aqua input industry. Study was conducted in collaboration with Biotadt India Ltd. Both primary and secondary data were collected from various sources through extensive market survey, personal interview and group discussion. Results depicted that buying behaviour of aqua inputs were dependent on cost, brand name, FCR, sales representatives, sale schemes providing additional benefits to the farmers, free training and consultancy services. It was also observed that if the input industries can solve the marketing problems of the farmers, they can further become effective in the area. Influencing the progressive aqua culturist by providing incentives by making them partners in the overall profit can be another strategy. Since Department of fisheries is close to the farmers, working with them under Public-Private-Partnership mode is also available.

M21

Thesis Title : Constraint Analysis of Fish Retailers in Municipal Markets of Mumbai

Student : Mr. Pravin R Patil (MFSc - FBM 2003-05)

Major Advisor : Dr. S.N. Ojha

Improved planning has increased fish production. However, fish marketing is still unattended. Therefore, there was a need to study the social aspects of fish retailers and the market of Mumbai were selected and classified into 3 categories and in each category around 30 retailers were randomly selected. Majority of the fish retailers were women (86.69%), Hindu (92.78%) and 86.60 % had family background in fish retailing. Most of the retailers (62.89%) were in middle age group (34 to 49 years). In the study of market dynamics the majority (54.64%) of the respondents produced fish on Sunday, Wednesday and Friday. For procurement of fish, Colaba Sasson Dock was preferred by the majority (48.45%) of the fish retailers for the freshness of fish. Fish traders (whole sellers and commission agents) were the major (71.19%) source of credit for the retailers. For the transportation of fish from landing centre to fish market, majority (70.10%) of respondents were using tempo. The retailers mostly (81.44%) stored fish in thermocol box with ice at the retailing spot due to lack of cold storage facility. in the retailing 59.09% reported 'less than 5%' wastage. Among the buyers, 86.60% were women. They ranked the quality of fish, as a first preference as indicated by retailers. Lack of market facilities (market space, security, shed maintenance and hygiene) and storage problems were the major constraints of the fish retailers. Institutional credits and grants in these markets may be provided to address these constraints on priority basis. A fish marketing federation may be established to monitor the logistics like ice plant, transportation, consumer awareness and response.

M21

Thesis Title : Market Research and Strategy for Market Entry of Shrimp Feeds in Gujarat, Maharashtra and Odisha States

Student : Mr. Sujeet Rajak(MFSc - 2003-05)

Major Advisor : Dr. Arpita Sharma

Shrimp farming industry is growing worldwide every year and it is known that feed is costliest component of aquaculture. On a global level no statistical information currently exists on total global production of aqua-feeds used for shrimp feeding even when production of aqua-feeds has been widely recognized as one of the fastest expanding agriculture industries in world. With the this background, the present study has been performed with the objectives of performing market research (existing shrimp feed companies, prevailing share in market, current demand) for shrimp feed in Gujarat, Maharashtra and Orissa and developing a strategy for market entry of shrimp feed in the states of Gujarat and Maharashtra as these are emerging in this field. Study has been done in collaboration with Godrej Agrovet Ltd. Sample from whom information is collected consisted of farmers, dealers, shopkeepers, technicians, marketing personnel and government officials. In addition to secondary data a questionnaire was constructed to elicit information. Results of study have found the following. State of Gujarat has 1,013 ha total area under culture and total feed demand in Gujarat is 4,000 ton with shrimp production of 1,510 MT. Surat district has more culture area than all districts. The company C.P feed major player in field of shrimp feed in state. In state of Maharashtra, total area under culture is 615 ha: total production is 981 MT with total demand of feed being 3,000ton. Thane district has largest area under culture followed by Raigad district. In Orissa, available area under culture is 12,116 ha and production is 12,390 MT. Total shrimp feed demand of Orissa is 18,000 ton. Bhadrak district highest area under culture among the four districts studied. In state of Orissa also, C.P feed is leading company as regards to market share. But it is important to note that Godrej has created a market share of 44% in the district Jagatsinghpur and Kendrapara and 15% in the state. An attempt has been done to forecast shrimp feed demand and it showed a percentage increase of 8% to 13%. Farmers reported that they are satisfied with brands; they will try new brands in case of good growth and lower FCR, if technical services are given and if feed is tested in their farm. They reported that they would change brand if growth and FCR is not good, technical services are not provided, feed not supplied in time; credit facility is not given and in case of failure of success crops. While selecting feed, farmers give importance to smell of feed, freshness and water stability along with other reasons. In addition to these parameters, there are financial reasons which from an important criterion for selection of feed. Accordingly, farmers expect improved technical support and good services, credit facility, improve quality / nutritive value and immediate supply. It can be concluded from study that there is a need of a good market entry strategy in case of shrimp feed. A model for market entry of shrimp feed. A model for market entry of shrimp feed (**The MESF model**) has been accordingly developed.

M22

Thesis Title : Competitiveness of Indian Squid and Cuttlefish Products in International Seafood Market

Student : Ms. Mary Wesna (MFSc - FBM 2002-04)

Major Advisor : Dr. Anathan, P.S.

World cephalopods market has more than doubled between 1990 and 2001 to reach 1.2 million MT (US $ 2.3 billion), although the growth since 1997 has become stagnant. From a by catch discard till late 1970s, India Squid and Cuttlefish the tune of 79,219 tons (Rs. 801 crores or US $ 165 million) accounting for 6.6 percent of world market in 2002-2003. In the Indian seafood export basket, it constitutes 17 percent (quantity) and 12 percent (value). Beside the variable foreign exchange, it significantly boosts the revenues of many a poor fisherman. However major changes in the exploitation of cephalopod resources, export markets, consumption pattern, trade liberalization, HACCP standards and non-tariff barriers have necessitated critical examination of India's export performance and competitiveness in squid and cuttlefish in relation to other exporting countries. Various quantitative measures like CGR, market share, unit value realization, Reveled Competitive Advantage (RCA) and Constant Market Share (CMS) Analysis have been used in the study. The study has revealed that India had a definite competitive advantage in the squid and cuttlefish export up till early 1990s, but has started eroding since 1995 in relation to major competitors like Argentina, Falkland is Spain and Thailand. To sustain our competitive edge, we need to shore up our production through deep sea fishing, add more value, and develop new products lines, foray into direct selling and branding in major markets. Besides, we need to negotiate strongly to bring down higher import tariffs for processed food products, and to remove other non-tariffs barriers and discriminatory import regulations by importers like European Union.

M23

Thesis Title : Competitiveness of Indian Shrimp in International Seafood Market

Student : Ms. Fathima K.B. (MFSc - FBM 2002-04)

Major Advisor : Dr. Biradar R.S.

The seafood trade is one of the world's largest and fastest growing international commodity industries worth more than US$ 60 billion a year. Shrimp is the world's most important commodity accounting for about 19 percent of international seafood trade in value terms. In India's export trade shrimp contributed about 29 percent in quantity and 67 percent in value in the year 2002-2003. In the present study, an attempt has been made to critically examine export performance and competitiveness of Indian shrimp in international seafood market based on the data collected from FAO fisheries statistics database, MPEDA statistics and Globe fish commodity update. Percentage share, Unit value realization, Export competitiveness index (XCI); Revealed comparative advantage (RCA), Michaely index (MI) and Constant market share (CMS) were used to study the competitiveness of Indian shrimp in international seafood market. Compound growth rate and Diversity indices were used to analyze the export performance and, both market and products diversity of Indian shrimp export. The result indicated that India has been quite competitive in the shrimp trade, although there is a decline in the competitiveness of Indian Shrimp in recent years. On the other hand, Thailand has emerged as a strong contender recording an increased competitiveness over the years. Certain policy measures are suggested to sustain the competitiveness of Indian shrimp exports in international markets.

M24

Thesis Title : Constraint Analysis in Implementation of SPS Measures in Seafood Processing Units

Student : Ms. Henna, O. (MFSc-FBM 2002-04)

Major Advisor : Dr. S. N. Ojha

Seafood safety has gained considerable importance over the last few decades, following rejection of consignments. With the recent agreement on SPS measures, WTO has made it mandatory for all member state to follow international food standards and guidelines in the sphere of foreign trade. One such international guideline is the compliance with HACCP, a quality management system for food safety. In this perspective the present study was conducted to analyze the constraints in implementing SPS measures in seafood processing units of Kerala State. Purposive and random sampling was adopted to select the seafood processing units for the study. Based on the production capacities the processing units were classified as small, medium and large units for the purpose of the study. It was observed that the capacity utilization and the status of EU approval were highest for small units. An exorbitant amount of investment was to be made for the upgradation of all units for meeting the requirements as per EU directives. The staff members particularly in the Quality Assurance department were increased and also a HACCP team was organized, resulting in greater inspection of product by way of online monitoring. Market wise, the EU remained the major market followed by the Japanese and the South East Asian countries. There were observable changes in the quantity of production and value of returns after implementation of SPS measures. General quality awareness and HACCP awareness were found to be high among the middle management personnel. In spite of all the measures taken by the industry to improve quality and strengthen safety regulations, the rejections were still on the increase. High cost of compliance, stringency of the standards and lack of good quality raw material were the main problems faced within led to unhealthy competition and lack of transparency were other major constraints faced by the industry in the global market.

iii. Finance and Cooperation

F1

Thesis Title : Women Empowerment through Entrepreneurial Activities of Fishery Based Self Help Groups in Kerala

Student : Ms. Shalumol Salas (MFSc - FEX 2013-15)

Major Advisor : Dr. S. N. Ojha

The study entitled "Women Empowerment through Entrepreneurial Activities of Fishery Based Self Help Groups in Kerala" was conducted to analyse the empowerment achieved by the fisherwomen through participation in the entrepreneurial activities of SHGs functioning in the fisheries sector. The study was carried out in six selected villages of three coastal districts (Kollam, Ernakulam and Kasargod) covering 18 SHGs and 180 members. Empowerment level of each SHG member was quantified by modifying the existing empowerment dimensions into an Empowerment Index (EI), consisting of 8 dimensions such as confidence building, self-esteem, decision making pattern, capacity building, psychological empowerment, social empowerment, economic empowerment and political empowerment. Extent of empowerment was found out by taking the difference of empowerment index before and after joining the SHG. Among the eight empowerment dimensions, higher difference was observed in confidence building (0.43) followed by economic empowerment (0.42) and decision making pattern (0.41). Farming (55.5%) and value addition of fish (45.5%) were the entrepreneurial activities adopted by fisherwomen SHGs in Kerala. Both these activities revealed the Benefit-Cost ratio of more than one, implying the feasibility of the enterprises. General performance of fisherwomen SHGs in Kerala was good with regards to NABARD checklist. All the 18 selected SHGs were performing in a similar way irrespective of the districts or the activity adopted. From the case studies, it was observed that those SHGs that were good at team work could get success. Therefore, team building exercises can be incorporated in the SHG training programmes.

F2

Thesis Title : Self Help Groupsin Fisheries Sector Chhattisgarh- A Performance Appraisal

Student : Ms. Shweta Kumari (MFSc - FEX 2012-14)

Major Advisor : Dr. Arpita Sharma

Performance appraisal of Self Help Groups (SHGs) in fisheries sector of Raipur, Chhattisgarh was conducted. Activities undertaken by SHGs, socio-economic status of SHG members, performance and constraints of SHGs were documented. A total of 115 SHGs are present in Raipur, out of which 40 SHGs with 20 male SHGs and 20 female SHGs were studied using questionnaire, interview and NABARD checklist. It was found that SHG members were from low socio-economic status. All SHGs had perennial pond of average 2.19 ha which is taken on lease by Gram Panchayat. No fish processing related activity was undertaken. Composite culture was practiced with Indian Major Caps and Exotic Carps. In marketing channel, their position was of wholesaler as well as retailer. Women were involved in all fisheries activities. As per NABARD checklist, overall performance score of SHGs was good with an average score of 2.17/3. Performance score for male and female SHGs were 2.15/3 and 2.21/3 respectively. However, no statistically significant difference existed between the two. But, Mann-Whitney U-test revealed that significant difference existed between male and female SHGs for parameters amount to be saved, utilization of savings amount by SHG and education level of members of SHGs. No significant difference was found as regards to performance scores of SHGs formed in 10th and 11th plan period. It was reported that SHGs' ranked financial constraints as first followed by infrastructure, social and core constraints. Rank Based Quotient was highest (91.87) for financial constraints and least (41.87) for core constraints. Kendall's Coefficient of Concordance (W) was 0.53 suggesting that agreement among SHGs for ranking the constraints was higher than it would be by chance had their ranking been random or independent. Mann-Whitney U-test revealed that significant difference existed between male and female SHGs as regards to financial constraints. Based on the study suggestions have been provided so as to improve the performance of SHGs.

F3

Thesis Title : Analysis of Aquaculture Credit Utilization of Fish Farmers in Thanjavur district of Tamil Nadu

Student : Mr. K. Ramkumar (MFSc - FBM 2008-10)

Major Advisor : Dr. Swadesh Prakash

The study was conducted in Thanjavur district of Tamil Nadu state covering a total of 80 aquaculture farmers comprising 40 carp culture farmers from Orathanadu block and 40 shrimp culture farmers from Pattukkottai block. The farmers who had borrowed credit either from formal or informal sources were selected through purposive random sampling. The results reveal that 50% of the carp farmers were assisted through formal credit institution but none of the shrimp farmer availed credit from formal institution. Among the formal institutional borrowers in carp culture, medium scale farmers having 2-5 ha received the maximum financial assistance. The credit assistance through formal source was irrespective of farm size. The credit borrowed both for investment and production expenditure by the carp farmers whereas the shrimp farmers borrowed only for production expenditure. However, the magnitude of credit assistance provided by formal sources decreased in amount given per unit area as the farm size decreased. With regard to adequacy, it was observed that the institutional credit assistance appears to be inadequate for investment in case of total as well as of beneficiary borrowers and also on the requirement based on scale of finance. Among the shrimp and carp farmers who had borrowed credit for culture activities only 70% of the shrimp farmers and only 42.5% carp farmers utilized the entire borrowed credit for culture purpose. Among the institutional borrowed carp farmers the above mentioned percentage was 50%. Fifty two per cent of the shrimp farmers and 60% of the carp farmers were regular in repayment. Among institutional borrowers of carp culture 50% were regular in repayment. Natural calamities and increased input costs were the major reasons towards non repayment of credit by carp and shrimp farmers respectively. No institutional loan for shrimp culture, high rate of interest, multiple and untimely disbursement are the major constraints faced by the farmers. Crop loan, crop insurance, timely institutional credit and fixing a minimum price scale for fish and shrimp were perceived by the farmers to improve the aquaculture credit.

F4

Thesis Title : Assessment of Potential for Microfinance among Fisherwomen in Dakshina Kannada District of Karnataka

Student : Ms. Reena, J. (MFSc - FBM 2004-06)

Major Advisor : Dr. Arpita Sharma

The growing importance of microfinance over the last two decades as an effective tool to poverty reduction has made it imperative to address the potential and relevance of microfinance in the fisheries sector with an objective to assist and empower poor women in the fishing community. Assessment of the livelihood and the potential of microfinance for different socio-professional categories, operating at the lower end of the Dakshina Kannada district by suitable statistical analysis revealed that the fresh fish and dry fish retailers have better living standards when compared to the fresh and dry fish labour in nearly all aspects taken for the study like income in relation to working hours, decision making, literacy and housing facilities. However there was no significant difference between these categories with regard to their health and nutritional status which entails improvement and awareness. Study of Self Help Groups (SHGs) reveal, they are focusing only on credit and savings activities, while there is immense potential for other services like insurance which mainly includes health insurance, micro financial services for housing, infrastructure, money transfer and education. The study reveals the heterogeneity in occupational profile of members of SHGs as a reason behind the group incapable of taking up any group enterprise. More than 60% of the members are not the members of SHGs and money lender constitute the major source of credit. Hence there is a potential for forming more number of SHGs. The study reveals lack of specialised NGOs or institution to focus exclusively on fisherwomen to identify main issues and challenges in providing micro financial services to poor fisherwomen. The study indicates the financial products offered at present are not suitable for fisherwomen especially the small scale traders and hence it is important to develop appropriate financial service to cater to their needs.

F5

Thesis Title : Comparative Evaluation of Primary Fishery Cooperatives in Thane District of Maharashtra

Student Name : Ms. Smitha Nair (MFSc - FBM 2002-04)

Major Advisor : Dr. Pandey S.K.

The present study has been taken up in Thane district of Maharashtra with an objective to evaluate the business performance of primary fishery cooperatives through quantitative and qualitative approaches. The data was collected from 30 primary fishery cooperatives through direct interview with the chairman/ secretary of the cooperatives. The ratio analysis result indicated satisfactory net profit and efficiency ratio for majority of the societies surveyed. However gross profit and operating ratio were found to be unsatisfactory. Five quantitative parameters viz. capital participation/member, sales turnover to total capital investment, sales turnover to total membership, debt equity ratio, reserve fund and seven qualitative parameters viz. audit classification, election, dividend, total membership, women membership, training provided and amount spent on welfare were studies under normalization, scoring and ranking method. The result revealed that the Arnala Macchimar Vividh Karyakari Sahakari Sanstha Ltd. got first rank among all the societies surveyed for its overall performance. The correlation analysis indicated a significant and positive correlation between sales turnover and total capital investment and sales turnover and total membership. The constraint analysis by Garrette Ranking Method indicated that the major problem of marine societies are lack of resources/ infrastructural facilities, while for inland societies, leasing of water bodies and pollution in Thane creek. The result showed that the societies need to improve its functioning giving more importance to management concepts. Based on the findings of the study some suggestions were made to improve the functioning and performance of cooperatives. There is a need to create an economically viable, technically sound and professionally managed fishery cooperative which should be capable of providing genuine support to fishers.

iv. Development and Policy

D1

Thesis Title : Assessment of Marine Fisheries Management Performance in Indian States of Maharashtra and Karnataka

Student : Mr. Suresha Adiga, M. (PhD - FRM 2009-15)

Major Advisor : Dr. Ananthan, P.S.

The RAPFISH analysis (consisting of Multi-Dimensional Scaling, leverage analysis and Monte-Carlo analysis) was carried out for the combined and separate scores of fishers and experts. In RAPFISH analysis, four sustainable categories viz. 'poor sustainable' (0-25%), 'less sustainable' (25.1-50%), 'quite sustainable' (50.1-75%) and 'good sustainable' (75.1-100%) are used. Results revealed that Maharashtra marine fisheries, with combined RAPFISH dimension score of 50%, is overall found to be *'less sustainable'* with only the technological and management dimensions in *'quite sustainable'* category. Karnataka marine fisheries is also overall (with 50%) in *'less sustainable'* category. However, three of five dimensions (ecological, economical and management) are assessed as *'quite sustainable*' indicating that Karnataka fisheries is relatively more sustainable than Maharashtra fisheries. However, individual fishery wise sustainability scores indicated varying degrees of (un)sustainability across the fishery groups in the two states. Experts' and fishers' assessment of sustainability diverged mainly in terms of their judgement of *degree of sustainability* while it mostly converged in labelling a particular fishery as '*quite or less sustainable' per se*. The modified RAPFISH methodology has been validated and successfully field tested as an appropriate, effective and handy tool for assessing the marine fisheries sustainability at the individual fishery level in a tropical multi-species and developing country context. This could help in developing and implementing state and fishery specific management strategies for sustainable management of marine fisheries.

D2

Thesis Title : Brackish water Aquaculture Development in East Coast States of Critical Evaluation of Policies, Regulations and Acts

Student : Mr. Suman, S. (PhD - FBM 2006-09)

Major Advisor : Dr. Biradar R.S.

Aquaculture plays an important role in the socio-economic development of the country. It has been recognized as a powerful income and employment generating sector as it stimulates the growth of a number of subsidiary industries and is a source of cheap and nutritious food besides being a valuable foreign exchange earner. Most importantly it is the source of livelihood for a large section of the economically backward population. India has a vast potential of 1.2 million ha of brackishwater area of which only nearly 12.6 percent (1.57 lakh ha) has been brought under culture and cultured shrimp contributes about 50 percent of the total shrimp exports from India. Till date no study has under taken to review the existing policies, regulations and programs implemented by CAA, MPEDA, and State Fisheries department, BFDA, NFBD and NACSA for promoting the brackish water aquaculture in East Coast states of India. To know the farmers knowledge level, standard of shrimp farming farmers' perception about the existing policies, regulations and programmes for promoting brackish water aquaculture, expectations from the government, the environmental effect of shrimp farming and to understand the different developmental schemes implemented by various agencies were the major objectives of this study. East Coast of India was taken as the study area including for states West Bengal, Orissa, Andhra Pradesh and Tamil Nadu. A random sample of 330 respondents shrimp farmers were selected from the four coast East Coast States along with the 58 technicians/ consultants and 42 government officials for the study. Both primary and secondary data were used for this analysis. It was found that there was no uniformity in implementing the development plan across the East Coast and socio-economic back ground, occupational status, agricultural land holding and annual income of the respondents varies across the States. It was revealed that due to high risk involvement, decreasing profitability and inadequacy of both technical and financial support, many farmers had not shown interest either to increase the shrimp culture area or to start the new farm. Coastal aquaculture has remained synonymous with shrimp culture. In Orissa most of the farmers (81 per cent) were under small size category (< 2 ha). The stocking density was found to be highest in West Bengal (15 – 18/m^2) and lowest in Orissa (10-12/m^2). It was observed that highest number of farms had registered under CAA in Tamil Nadu (96 per cent) while lowest was in Andhra Pradesh (51 per cent). There was no uniformity in submitting the documents for shrimp farm registration and in its process, leasing period, rent, terms and conditions across the states. The available infrastructure was found to be inadequate among the surveyed farmers. Difficulties in obtaining land for shrimp farming, development appropriateness of land leasing policy, time taken for shrimp farm registration, development appropriateness of program and support services and environmental appropriateness varied across the study area. In most of the cases State Fisheries Department, MPEDA, CAA, NACSA and private companies were involved in conducting training programmes. The banking institutions and insurance companies found it difficult to extend their services when the land leasing policy of the states were not uniform and of shorter duration. Suitable land leasing policy declaring brackish water aquaculture for all the purpose like tariff and taxes, bank finance, electricity, water tariff and insurance etc. will go a long way in popularizing brackish water aquaculture in East Coast of India.

D3

Thesis Title : An Assessment of Leadership in Fisheries Co-operatives in Kerala

Student : Ms. Sruthy P. Krishnan (MFSc - FEX 2013-15)

Major Advisor : Dr. S. N. Ojha

Cooperative is an institutional phenomenon involving set of roles whose influences are conditioned by characteristics of group members or its followers. Fisheries cooperatives plays a major role in developing the fisher community by providing institutional, financial assistance to their members, store and sell the fishing inputs at fair price, proper arrangement for procuring, handling, preserving, processing, transporting and marketing of fish. This study entitled "An assessment of leadership in fisheries cooperatives of Kerala" was carried out to record different functions of primary fisheries cooperatives and their performance in the state and the role of the elected representatives in these cooperatives in successful running of the organization and different challenges faced by them. Data from four districts comprising 160 cooperative leaders were collected for the study. Activities of MATSYAFED affiliated primary fisheries cooperatives and SIFFS affiliated fisheries cooperatives were significantly different. Beach auctioning was the common activity observed in all primary fisheries cooperatives. Performance was assessed using modified Cooperative Performance Index (CPI). Performance was significantly different in individual fisheries cooperatives and across the district. Men and women leadership showed significant difference in their leadership. Women leaders were more adaptable and task competent than men leaders. Men leaders possessed more decision making, problem solving and planning skills. Men leaders were more participative than women leaders. The leadership index was significantly different (0.003) in individual fisheries cooperatives. The major challenges faced by the leaders were, default in loan repayment by the society members, inadequate financial support from the lending institutions, group atmosphere and member characteristics, ignorance of cooperative rules, lack of professional management, gender biased leadership and political and other cooperative interventions. Organizing leadership training programmes, participation in other social organizations and encouraging the leaders to involve in more income generating can improve the quality of their leadership.

D4

Thesis Title : Economic and Institutional Arrangements for Financing Fisheries Development in North East India

Student : Mr. Naorem Dinesh Singh (MFSc - FEC 2012-14)

Major Advisor : Dr. Krishnan M.

Fisheries plays an important role in the socioeconomic development of the country and it also plays great role in generating employment, reducing poverty, earning foreign exchange and so on. Presently NE India contributes about 3.38 lakh tonnes from the total inland water bodies of 5.63 lakh ha during 2012-13 with the productivity of about 600 kg per ha and also NE India is importing 90,000 tonnes of fish from outside states. So, it is necessary to study and investigate this sector for exploiting it properly. The work of this research has been directed towards the analysis of economic and institutional arrangements for financing fisheries development in north east India. The investigation employed compound growth rate, data envelopment analysis (DEA), Holt's exponential smoothing model and regression analysis. The study revealed that 44 per cent of the sample fish farmers belonged to the 41-50 age group, 45 per cent were high school educated, 49 per cent were engaged in only fish farming as their primary economic activity, 80 per cent of the total sampled farms were owner operated and 92 per cent were being conducted with own capital. It was also found that 46 per cent of the respondents had opined that the biggest constraint in availing institutional credit was that it was not available on time, 35 per cent of the respondents that institutional funds are available in sufficient amounts and 46 per cent of the respondents felt that the cost of institutional funds for fish farming in Manipur was reasonable. The cost of production of fish was found to be Rs.1,73,470 per ha and the average gross income of the fish farming in Bishnupur was Rs.2,72,190 per ha while the average net return over cost B2 was Rs.98,720 per ha. The cumulative capital requirement during 2009-10 was found to be Rs. 262 crores in order to bridge the gap between the demand and supply of fish in NE India. Thirty nine per cent of all the sampled fish farmers across size groups expressed that obtaining institutional credit for fish farming is a complicated and time consuming procedure. Thirty three per cent of the total sampled farmers felt that it is necessary to simplify the loan procedures so that the stake holders can avail institutional finance on a regular basis. Procedural formalities appear to be a major stumbling block to fish famers from availing institutional finance for their economic activities and also felt that simplification of credit procedures would help them to avail institutional finance.

D5

Thesis Title : Contingent Valuation of Multiple Stakeholders' Response to Fish Production in Major Lakes of Kashmir

Student : Ms. Neha Wajhat Qureshi (MFSc - FEC 2011-13)

Major Advisor : Dr. Krishnan, M.

Owing to extensive urbanization and intensive tourism in the Dal lake and the severe siltation in the Wular lake, the fisheries in both these lakes have suffered adversely. Accordingly this study was attempted with the objectives of documenting the historical perspective of lake fishery in Kashmir valley, estimation of the trends in fish production, performance and socio-economic profiles of the fishers, assessment of stakeholders willingness to pay (WTP) for sustainable fish production in lakes and development of set of suitable policy measures. The results of the study revealed that the Dal and Wular lakes are existing in the valley from time immemorial and play a major hydro-biological role and contributes substantially towards fisheries sector of the state. The fish production in both the lakes reported multiple fluctuations as revealed by the secondary data of past 20-30 years. Also, the results show that the socio-economic status of both the lake fishers is poor. The Logit model was fitted to 8 sets of stakeholders independently while the Tobit model was used to address the common variables that influenced the WTP of the stakeholders across the two lakes. The Tobit results also yielded comparable results to that which emerged from the Logit analysis. In the case of Tobit results as far as primary stakeholders were concerned income, time spent on lakes and traders emerged significant and in case of secondary stakeholder income, education and consumers emerged as significant. On the whole, across the two models Logit and Tobit, income emerged the single most important variable that determined WTP of stakeholders. Unavailability of institutional credit, lack of awareness of environmental issues,fall in fish production, lack of infrastructural development were the serious constraints faced by Dal lake fishers. Power shortage, lack of educational institutions, siltation of lake bottom and non- implementation of subsidies and insurance schemes were the constraints faced by Wular lake fishers. Development of alternative livelihoods, establishment of public-private partnerships, strict enforcement of laws in respect of civic discharge into the lakes, establishment of a proper fisheries development programme, management of houseboats on the Dal lake, restoration of water quality, proper monitoring of marketing of inter-state fish, improvement in consumer awareness, specific focus on women awareness programmes on food quality were some of the policy prescriptions that emerged from the study.

D6

ThesisTitle : Study of Leadership Styles and Approaches of Leaders of Fisheries, Agriculture and Veterinary Education in Maharashtra

Student : Ms. Rashmi Ambulkar (MFSc - FBM 2008-10)

Major Advisor : Dr. Arpita Sharma

Leadership is the ability to influence a group toward the achievement of goals. Leadership is a complex process by which an individual influences others to accomplish a mission, task or objective. However, empirical findings reveal that contextual factors affecting the effectiveness of leadership should be examined. This study explicitly examines leadership should be examined. This study explicitly examines leadership within educational contexts in the areas of Fisheries, Agriculture and Veterinary education with the objective of studying leadership styles and approaches of the Deans and Heads of Divisions who are the leaders in the educational area of the respective field ad were the selected respondents for the present study. Data was collected with the help of questionnaires and scales (Donald Clarke Questionnaire, Fielders' Leadership LPC Scale Questionnaire and Schemerhorn Leadership Approach Questionnaire). Pilot study was conducted on a small sample in order to test the reliability and validity of questionnaire. The questionnaires were checked for their reliability by using test-retest method and the reliability was found to be high. Data was collected from nine colleges of Maharashtra which included three Fisheries colleges located at Ratnagiri, Latur, Udgir district, and Nagpur; three Agriculture colleges at Nagpur, Latur and Dapoli; and three Veterinary colleges at Mumbai, Nagpur and Latur Udgir taluka. Thus the study covered 9 Deans and 68 Heads of Divisions in all the nine colleges put together. Statistical analysis showed that there is a significant difference between the leadership style and approaches leader at 5% and 10% level of significance. Moreover, age, years of experience and leadership style was not found to be correlated. However, age was found to be highly correlated with the numbers of years of experience in all the three fields. Study also revealed that majority of leader had relationship oriented style; transformational leadership approach and participative leadership style rather than task oriented leadership style; transactional leadership approach and delegative and authoritarian leadership style. Percentage analysis of leadership styles and approaches in relation to respondent age was also done and in all the three fields respondents had varied leadership styles but relationship oriented and participative leadership style and transformational leadership approach was found to be more common.

D7

Thesis Title : Barriers to Trade in Fish Products: Case Studies of Indian Exporters

Student : Ms. Vincy K.J. (MFSc - FBM 2004-06)

Major Advisor : Dr. Ananthan, P.S.

International trade in fish and fishery products has grown rapidly over the last twenty years. There are concerns in many developing countries including India that gains in markets access obtained under WTO is being eroded by non-tariff measures adopted by developed countries. In this context, the study was conducted to know the specific protective and trade distorting non-tariff measures in sea food trade applied byUS and EU against Indian exports, and the obstacles/constraints faced by sea food processing and export industry. Extensive review of EU and US regulationspublished literature, along with detailed case study of 5 processing/export firms located in Kochi, Chennai and Mumbai were carried out. It was found that apart from the stringent HACCP quality regulations, many of the EU members regulations(on the limits on *Vibrio parahemolyticas*; heavy metals; histamine in canned sardines, mackerel and Anchovies, Dioxins, anti-biotic residues) were neither harmonized nor equivalent as warranted, and often discriminate against the imported products leading to increased instances of detention/rejection and economic loss. Also, EU's rapid alert network system, destruction of rejected consignments, testing for certain microbial contaminations are contrary to conformity assessment procedures as required by SPS agreement, is mostly flouted. Anti-dumping duties, customs bond requirement, COOL act, bio-terrorism act, discriminatory limits for anti-biotic residues are major productive measures used by US. Case studies have revealed that the cost of compliance has grown more than two fold in recent years, and stringent and discriminatory quality standards are the primary barriers. Most of the firms being small to medium size are unable to cope up with the pressure on quality and cost simultaneously and this has resulted in sick units, merger and consolidation, market diversion etc., in recent years.

D8

Thesis Title : Stakeholders Perception of Patenting in Fishery Sector

Student : Ms. Sunitha Ninan (MFSc - FBM 2002-04)

Major Advisor : Dr. Arpita Sharma

The growing importance of patents in post TRIPS era has made it imperative to address the relevance and scope for patenting in the fisheries sector with a focus on perceptions of the stakeholders. The stakeholders' perceptions on impact of patenting in fisheries sector validated by statistical analysis reveal a paradigm shift among the research community towards a pro patent environment. However, seafood industries prefer trade secrets, trademarks and market induced mechanism such as lead time, sales and services efforts. The stakeholders' perception reveal that the dynamics of patent and technology innovations have multiple and varied impacts on research activities, social groups, economy and aquatic biodiversity. These four impacts are not mutually exclusive but often overlap. The magnitude and nature of implications vary according to the category of technology patented. Analysis of documented patents in India reveals that there is a steady increase in average number of patents/ year after independence (1947-1970). After introduction of Indian Patent Act 1970, an average of three patents per year have been recorded. In post WTO era (1996-2000) average number of patents is six per year. While processing technology (83 patents) and aquaculture (31 patents) have shown a steady increase in patenting activity, the patenting activity in fishing technology (37 patents) has steadily declined. The result indicates an aspect of less innovation in fisheries sector as reflected by patent statistics. However, there has been a shift towards increased patenting activity in post TRIPs era particularly by domestic applicants. Case study on Taraporewala Hatchery for Carp Eggs concentrates on practical intellectual property issues that arise while patenting and commercializing the new technology by the public sector research organization and it also reveals that the patent right has not been exploited to the fullest in terms of enforcement and commercialization.

v. Livelihoods Theme

L1

Thesis Title : Fishers Livelihood and Institutional Arrangements in Hirakud Reservoir of Odisha

Student : Ms. Nibedita Palita (MFSc - FEX 2012-14)

Major Advisor : Dr. Ananthan, P.S.

Reservoir fisheries development is a holistic function of ecology, fisheries, livelihoods and governance with technology playing an intermediate role. Only few studies have addressed the issue this holistically, as most have studied only fisheries and ecology. Present study was undertaken in Hirakud reservoir (EWSA 56,980ha) region of Odisha focusing on livelihoods and institutional arrangements. Nearly 14500 fishers depend upon reservoir for their livelihood. Fish production from the reservoir is 4798 tons (2012-13) with a yield of 84kg/ha which is higher than the state average productivity (large reservoir) of100kg/ha. Stocking effort has intensified in the recent years with NFDB funding support. Non-motorised wooden boats are used predominantly while gill nets, cast net, hook & line are used. Nearly 90 numbers of zero mesh size nets (Dullungi net) are found being used illegally in the reservoir. Coming to socio-economic parameters, independent sample test and Mann-Whitney U test revealed the significant difference in family type, caste type, education, household amenities and household facilities among fishers and non-fishers. The occupational profile is diversified among both groups though to a greater degree in case of non-fishers (farm labor, farming, small business and private job). The annual income from primary occupation of fishers (Rs.1,75,270) is more than that of the non-fishers (Rs.66,097) resulting in significant difference in household income of fishers and non-fishers. Fishers spent less of their income on education and health but more on food as compared to non-fishers and the average rural Indians. The overall satisfaction index towards the interventions of DoF and functioning of PFCS is 0.459 indicating that majority of them were neither satisfied nor unsatisfied. Investigation of inequality and poverty has revealed that there are more numbers of fishers below poverty line than non-fishers based on different poverty lines defined by Planning Commission, Ministry of Rural Development and World Bank. Interestingly, while extent of poverty was more among fishers, depth of poverty was greater among non-fishers indicating greater inequality in income distribution among the poor non-fishers (mainly wage labours) than fishers. Human Development Index computed for fishers and non-fishers are 0.45 and 0.48 respectively showing medium level of attainments in terms of income, education and health while the same index value for India is 0.52. It was further revealed that though the income was higher among fishers, the health status and education were higher among non-fishers. Stepwise multiple regression revealed that age, number of boats, net weight, proportion of secondary income and the location within the reservoir (Sectors I to VI) and the number of family members involved in fishing were found to determine the fishing income while education, experience, caste, number of trainings attended did not seem to play any significant role. Fisheries Dept. has leased the Hirakud reservoir to PFCS sector wise as per the provisions of State Reservoir Policy, Odisha, 2012. There are few conflicts among fishers with respect to illegal use of zero size mesh net, among sectors regarding reallocation of fishing rights, between fishers/PFCS and DoF regarding fixation and collection of lease value. PFCS collection of licensing fees and enforcing its monitoring and control function were found to be inefficient with many non-licensed and non-member fishers fishing in the reservoir. Marketing system has many imperfections with fishers getting only 56% of wholesale price. The existing regulatory framework has many limitations with both DoF, PFCS and fishers compromised in effectively managing Hirakud fisheries. Recent attempts to bring out a revised Odisha Fisheries Policy, 2014 followed by enabling Inland Fisheries Act would be steps in right direction.

L2

Thesis Title : Fishers Livelihood and Institutional Arrangements in Ujjani Reservoir of Maharashtra

Student : Mr. Shaikh Yunus (MFSc - FEX 2012-14)

Major Advisor : Dr. Ananthan P. S.

The reservoir fisheries in India has vast potential but is underutilized at present. Most of the studies about reservoir fisheries so far focused on ecology, fisheries biology and technological interventions while the other equally important aspects of socio-economics, policies, institutional framework and governance did not receive adequate attention. The present study on Ujjani reservoir fisheries in Maharashtra was an attempt to shed light on the latter. The Effective Water Spread Area of reservoir is 25251 ha and fish production has increased more than 10 times from around 202 tons in 1982-83 to 2520 tons in 2012-13. The share of major carps and small indigenous fishes declined drastically during last 15 years while tilapia gained dominance with 92-95% of total fish catch. Since 2007, fisheries management rights have been withdrawn from Fisheries Department and are vested with parent Irrigation Department. It's now virtually an open access regime though fishers are charged penalty of Rs.500/month in lieu of licensing fee. There are approximately 7000 fishers who earn their livelihood through full- and part-time fishing. Local fishers use the gill net of 1.5" to 3.5" mesh size to catch tilapia of varied sizes while migrant fishers from Andhra Pradesh use bamboo traps for prawn fishing. An effective regulated marketing system (Agriculture Produce Market Committee, Indapur) got established wherein fishers get 93% share in wholesale price. In general, the study confirmed the existence of two occupational groups namely fishers' and non-fishers' in the region who are distinguishable by various social and economic parameters, poverty status and occupational profile. Fishers were found to be better off with an average annual household income of Rs.1,40,862 than non-fishers (average annual household income is Rs.1,10,508). Based on World Bank's poverty line (PPP $ 1.25/day) method, only one fisher was seen living below poverty line while in case of non-fishers it is seen as nil. The Watts index indicated that depth of poverty is less among the non-fishers as compared to fishers. Based on Planning Commission's poverty line (PCE Rs.27.2 / day), 24% of fishers were seen below poverty line while none were observed below poverty line among non-fishers. This puzzling finding of fishers 'high income but low expenditure' as compared to non-fishers needs to be explained with unaccounted for expenditure data like those on alcohol which many were found to be addicted to. The computed Human Development Index indicated that majority of fishers (85%) and non-fishers (86%) have medium level of human development in terms of income, education and health status, and there was no significant difference in HDI among them. Spearman's rank correlation has shown that, in case of fishers, family size, secondary income, housing facility, household amenities are positively associated with Human Development Index. Step wise multiple linear regression model showed that total gear weight and type of gear determines the average catch fishers explaining 93% of variability (R^2=0.93), while education, experience, caste and social participation were not found to have any significant role. Though Fisheries Department and Co-operatives failed to manage Ujjani reservoir fisheries, fisheries livelihood is largely unaffected and are largely satisfied with present condition thanks to tilapia and the competitive market. But the recent siting of Thai Magur (possibly released from nearby ponds) threatens the ecosystem, and hence the livelihood if goes unregulated.

L3

Thesis Title : Role of LeasedOut Water Tanks in Livelihood Generation in Maharashtra andEconomic Analysis

Student : Mr. Dhammapal Gadkar (MFSc - FEC 2012-14)

Major Advisor : Dr. Swadesh Prakash

Study was conducted to examine the resource use efficiency and constraint of fish farmers in tank based fisheries of Latur district of Maharashtra. Tanks are complex systems which have multiple uses and large section of small marginal farmers dependent on the tank for their livelihood. Tanks are very important source for inland fisheries more than 70 per cent of aquaculture production came from tanks and ponds. Data were collected from 80 tank holders selected randomly from study area. The economic analysis was carried out for collected data of tank based culture-cum-capture fishery by using parametric statistics and RBQ methods. To study more precisely the tanks were categorised into three categories namely small (<20 ha area), medium (21-40 ha area) and large (41-100 ha area). Multiple regression model was used to analyze factors affecting the yield. The log form of regression model (Cobb-Douglas) was found the best fit on the basis of R2. Estimates of model reveal that permanent labour, family labour, hired labour and stocking density were significant determinants of tank based fisheries. The paper focuses on resource use efficiency and Marginal Value Products (MVPs) which were 0.76, 1.75, -3.73 and 18.66 for permanent, hired, family labour and stocking density respectively. This implies over utilization of permanent labour and family labour and underutilization of hired labour and stocking density. RBQ analysis depicted the major constraints of difficulty in fishing followed by low fish catch, unavailability of credit & seed and small size fishes in tank based fisheries

L4

Thesis Title : Strategy for Empowerment of Fishers: A Case Study of Tehri Dam, Uttarakhand

Student : Mr. Arvind Singh Chauhan (MFSc - FEX 2011-13)

Major Advisor : Dr. S. N. Ojha

The basic intention of the present research was to explore the strategy for empowerment of fishers in the Tehri dam reservoir located in Tehri district of Uttarakhand. Structured questionnaire was used as a data collection instrument and total samples selected for the study were 80. SPSS 16.0 was used to analyze data. Uttarakhand fishery resources comprise of 0.21 lakh ha total inland water bodies, 2686 km rivers and canal, 0.2 lakh ha reservoir, tank and 0.01 lakh ha pond. Thus major fish production comes from reservoirs, out of which the Tehri Dam, reservoir having a vast water area of 42 square km for fulfilling primarily the power generation, irrigation and drinking water supply. Failure of institutional, technological, management and research requirements made the fisheries underdeveloped. The Tehri reservoir exhibits a huge potential not only for fisheries but also for tourism and sport fisheries. The study reveals that self-efficacy, participation, critical awareness and motivation were key factors promoting fishers empowerment. Community based fisheries management, licensing for fishing, culture-based fisheries, institutional arrangements and appropriate research support can augment the fisheries in Tehri dam, reservoir. The findings of the study establish a strong positive association between level of self-efficacy and motivation (Independent variables) and dependent variable (empowerment) as these independent variables caused 56.4% (.564) change in the dependent variable (empowerment). Hence, there is a strong dependency of empowerment of fishers upon their level of self-efficacy and motivation.

L5

Thesis Title : Fisheries Management and Fishers Livelihood in Selected Reservoirs of Vidarbha Region, Maharashtra

Student : Mr. Jitesh Keshave (MFSc - FEX 2011-13)

Major Advisor : Dr. Ananthan, P. S.

Reservoir fisheries has been identified as one of the engines of future growth in India. Since literature on effective governance, institutional framework and sustainable management practice of Indian reservoirs were scanty. Their present study documented fisheries governance of two remotely located reservoirs in Vidarbha region of Maharashtra and assessed the socio-economic profile of predominantly tribal communities. Adopting a comparative case study cum survey method, the study was conducted in 9 fishing villages of Lasapur reservoir (Yatamal district) and Itiadoh reservoir (Gondia district). Management regimes in both reservoirs differed significantly with Itiadoh reservoir (6,660 ha) being managed by fishers' cooperative society while Isapur reservoir (7,140 ha) is given on lease to private contractor who engages fishers for wages. Fisheries management practices in Isapur were found to be better with higher unit area fish production (62.05 kg/ ha/ year), whereas at Itiadoh it was very poor (18.4 kg/ha/year) though both are comparable. However, in terms of equity and livelihood opportunities, Isapur fares better as it provides good fish productivity/fisher, (1,129 kg/fisher/year) four largest number of fishers (378), whereas Itiadoh provides only 926 kg/ fisher/ year for 65 active fishers among total 302 fishers. Isapur uses diverse crafts and gears for harvesting multiple fish species, whereas in Itiadoh the fishery was mainly single craft and gear oriented with limited fish species. In general, confirmed that existence of two distinct occupational groups namely fishers' and non-fishers' whose class-like sub-groups are distinguishable by various social and economic parameters, poverty status and occupational profile, etc. fishers with secondary occupation were found to better off than non-fishers; otherwise both fishers and non-fishers shared almost similar standard of living. A reservoir fishery was found to be providing stable and continuous employment in remote tribal areas; formal education was to be irreverent as a support to fishers' livelihood. The fishers from Isapur and Itiadoh both regions got an average fish catch of 5.7 and 6.2 kg/ day respectively and earned an average annual household income of Rs. 1,44,750 and Rs. 1,30,257 respectively. The non-fishers of Isapur and Itiadoh reservoirs who were primarily engaged in Agriculture or farm laboring were earning an annual household income of Rs. 1,37,845 and Rs. 1,01,025 respectively. Based on purchasing power party ($1.25/day) method, about 50% population was living below poverty line (BPL) whereas per Planning Commission method none of them were leaving BPL. Majority (65 to 95 %) of despondence scored medium to high on social, economic and socio-economic status with satisfactory social and economic condition. The spearman's Rank correlation has shown favorable prognosis between Age, Education, Family size, caste hierarchy, social participation (social variables), land, household income, Extent of Debt, housing and household amenities, access to public services (Economic variable) and socio economic status. Step wise multiple regression analysis showed fishing income, land area, use of cast net and prawn traps significantly influenced the household income of fishers, whereas proportion of secondary income, extent of debt and education influenced it negatively. The unavailability of subsidy on craft and gear and accidental insurance were the major constraints at Ispur, where as inadequate and uncertainty in fish catch, inadequate labor charges and irregular seed stocking in reservoir in were considered so in Itiadoh reservoir. Overall the contractual management regime is found to be effective for fisheries development purpose, whereas cooperative management regime was found to be more effective for equitable fishers' (only who are active) development.

L6

Thesis Title : Study of Fishers' livelihood and Fisheries Management in Girna, Yedgaon and Manikdoh Reservoir Regions in Maharashtra

Student : Mr. Nikumbe Prabhakar Ashokrao (MFSc – FEX 2009-11)

Major Advisor : Dr. Ananthan P.S.

Reservoirs are one of the important inland fisheries resources as it significantly contributes to total inland production as well as provides livelihood opportunities and food security to many rural communities directly and indirectly besides. However, since there is dearth of studies on both the livelihood status of these fishers who often reside in remote areas as well as the management regimes of these resources, the present study was conducted. Adopting a comparative case study cum survey method, the study was conducted in 11 fishing villages of Girna reservoir (Nasik district), Manikdoha reservoir and Yedgaon reservoir (Pune district) areas of Maharashtra. The study confirmed the existence of three distinct occupational groups namely active fishers, non- active fishers and non-fishers whose class-like groups are distinguishable by caste (tribal categories), occupational status, education, income, social participation, basic amenities, access to public services, fishing activities and poverty status with non-fishers faring better than fishers in Girna while non-active fishers were at the lower rung on most parameters. However, socio-economic relationship among these groups is found to be complex and sometimes non-linear especially in other two reservoirs. Active fishers from Girna, Manikdoha and Yedgaon reservoirs had marketed an average fish catch of 101.46 kg, 102.9 kg,101.1 kg per month and earned an average annual household income of Rs. 78865,Rs. 72959, and Rs. 69544 respectively, whereas the respective figures for non-active fishers in Girna were 26.6 kg/month , Rs.62052/year. The non-fishers in Girna reservoir who were primarily either farmers or in job earned on an average Rs.85133/year while in Yedgaon and Manikdoha who were primarily farm labour earned considerably a lower income of Rs.58000/year. Spearman's Rank Correlation has shown strong association between demographic and social parameters on one hand and occupation and economic parameters on the other. Absolute poverty was found to exist only to a limited extent in Girna only among non-fishers with 6.7% BPL households and in Yedgaon among both fishers (6.7%) and non-fishers (13.3%), though relative poverty was found to exist. Management regimes in three reservoirs differed significantly with Girna and Manikdoha being managed by Fishers' co-operative societies while Yedgaon reservoir is given on lease to private contractor who engage fishers for wages. Fisheries management practices in all the reservoirs are less than satisfactory though the unit area fish production is moderate with 90 kg/ha in Girna, 73.5 kg/ha in Manikdoha and 77.5 kg/ha in Yedgaon reservoirs. However, in terms of equity and livelihood opportunities, Girna fares better as it provides for largest number of fishers per unit area (0.21/ha) which is three times higher than other two reservoirs, perhaps due to institutionalization of cooperative fishing for more than 30 years. Garrett's ranking technique was used to analyze the different problems faced by fishers. Non availability of subsidy on fishing nets and boats, irregular seed stocking in reservoir and presence of obstacles in reservoir bottom were considered as major problems in Girna while poisoning in reservoirs, and poaching were considered so in other two reservoirs.

L7

Thesis Title : Study of Fishers' Livelihood and Fisheries Management in Stanley Reservoir in Salem District of Tamil Nadu

Student : Ms. Agnes Daney Angela (MFSc - FEX 2009-11)

Major Advisor : Dr. Sheela Immanuel

Reservoirs assume specific importance in highly populous developing countries, such as India as a cheap source of animal's protein and employment. Fisheries activities in reservoir often play a significant role in the livelihood of rural communities. In this context, a study was undertaken in Salem district of Tamil Nadu to understand the livelihood of the inland capture fishers and the fisheries management in the largest reservoir in South India, the Stanley reservoir. An attempt was also made to comprehend the problems encountered by the fishers. Data from five villages comprising 150 respondents were collected for the study. Majority (58%) of the fishers belonged to the age group 45 years. More than 50% were illiterates. Majority of fishers had small and nuclear family. More than 90% were found to have houses of their own. All of them were found to watch television regularly. Extension agency contact was mostly limited to local officer from the Department of fisheries and secretary of the co-operative society. Social participation was found to be cent percentage in co-operative society. Women of the fishers' family were found to accompany them during fishing but were not involved in making decisions regarding fishing. About 72% were dependent solely on fishing for their livelihood. Majority (68.66%) were in the annual income range of Rs.50,001 to Rs.70,000. Money lenders were the major source of credit. Saving habit among the fishers was unsatisfying. Education was positively related to type of house, mass media and communication exposure and moveable assets possession whereas it was negatively related to fishing experience. Social participation was found to be positively related to occupation. DoF takes lead role in the management of reservoir including annual stocking of fish seeds. As a part of fisheries management rules and regulations are framed by the Department of Fisheries. Fishers are obliged to sell the Fishermen Co-operative Marketing Society which provides them reasonable price. The important problems faced by the fishers are the fluctuating income (2.51) followed by poaching (2.34).

L8

Thesis Title : Study on Property Regime and Livelihood in the Bheri Fish Farming System of Kolkata Peri-Urban areas, West Bengal

Student : Mr. Kundan Kumar (MFSc - FEX 2009-11)

Major Advisor : Dr. S. N. Ojha

A study was understand in Kolkata district of West Bengal state to analyze the livelihood status of different stakeholders, different types of property regimes and its present production relation and also to find out the employment opportunities in sewage-fed fish farming system. An attempt was made to understand the relationship between the dependent variable. Data from ninety fish farmers, thirsty labours, and ten fish seed marketing agents and ten fish marketing agents from the peri-urban areas ok Kolkata was collected for the study. Majority of the fishermen, bheri members (including the labours) and marketing agents pursued to medium livelihood status whereas majority of the casual labourers fell in poor category. It was observed a total of than 35% fish farmers had their own land followed by a total of 30% of the fish farmers occupying leased land, a total of 17.8% of them occupying encroached land, a total of 14.4% fish farmers occupying both own land as well as leased lands & a total of 2.2% land used Government owned property. Majority of the fish farmers (34.4%) had taken land lease from land owners where as a total of 53.6% farmers don't have their own land but were practicing aquaculture without paying any lease to anybody. A total of 17% of the fisherman owned less than 11.3 ha land and in majority of the bheries (63.3%), co-operative ownership was found to be practiced, 52% bheris both ownership and farming was co-operative and nearly in 20% bheris fish farmers membership ranged from 10 to 150 numbers. The findings revealed that multiple stocking and multiple harvesting was a common practice and in most of the bheris the number of the total harvesting was more than 250 times per year. The average fish production was 5.18 tonnes/ha/year and the average employment was found to be 6.57 people/ha. The maximum input cost in bheri fish farming accounted for the labour cost (more than 50% of total input cost) and fish seed cost. The findings revealed that fisherman had very less contact with government extension agencies however; with Pvt Extension agencies it was found to be better than government agencies. Bheris reduced depth, lack of capital, urbanization; sewage water quality, drinking water and fish growth were found to be major problems in sewage-fed fish farming system.

L9

Thesis Title : Study of Fishers Livelihood and Fisheries Management Loktak Lake Region of Manipur

Student : Ms. Bijayalakshmi Nongmaithem (MFSc - FBM 2009-11)

Major Advisor : Dr. Sheela Immanuel

Fisheries plays an important role in socioeconomic development of the country and it also provides livelihood for huge section of economically backward population. Fishing is an ethnic occupation of the inhabitants around the Loktak lake of Manipur. In the present study, five villages around the Loktak lake of Manipur were selected by adopting a case study cum survey method to analyse the fishers' livelihood and fishers' management of the region which is confronted by fluctuating fisheries resources. The study revealed that 44 percent of the fisher men belonged to old age group of above 46 years, 58.67 percent had family size more than 5 members, 88 percent had medium level of scientific orientation, 36 percent had annual income between Rs 20001-30000, 38.67 percent had 11-20 years of fishing experience, 96.6 percent lives in Kuccha house, 34 percent of fishers had middle school and 34 percent had high school level of education. Gender disparities among the fishers were not observed and early marriage system was not found to be practiced in the region. Fishers were also found to have rich traditional knowledge regarding fishing activities where they make used of wind direction, macrophytes abundance, turbidity and seasons as the thumb rule. After catching the fishes, the fishers marketed it immediately to the middlemen either in fresh condition or in processed form as there is no icing facility for storage. Gear and craft mainly operating in LoktakLake consisted of gill nets and dugout canoes respectively. Using Rank Based Quotient techniques, the problems of fishermen were anaylsed. Strong waves leading to the movement of phum was reported as the major problem as it destroys the crafts and gears of fishermen acts as borrowers are relatively well off fishermen as lenders. In the face of increasing poverty and gradual reduction in fish production after the construction of Ithai barrage, the fishermen were struggling to sustain their livelihood. Proper fishery management policies, effective input supply, technical and social support may improve the livelihood of the fishers and also in enhancing the fish production of the Loktak Lake.

L10

Thesis Title : Study on Migration and Livelihood in Coastal Fishing Villages of Odisha

Student : Mr. Srichandan Das (MFSc - FEX 2009-11)

Major Advisor : Dr. Ananthan, P.S.

Population dynamics combined with the rapid development in the fisheries sector as influenced the coastal fishers' livelihoods. Though several studies have attempted to analyse the impact of fisheries development on fisheries livelihood issues of population dynamics such as migration behaviour has been paid less attention. This study attempts to understand the complex relationship between migration of fisher folk, fishers' livelihood and related issues. Case study method was employed to study 2 fishing villages of coastal Odisha namely hamlets around Paradip in Jahadsinghpur district which is heterogeneous and urbanised, and Sana Arjipally in Ganjam district which is homogeneous and less affected by urbanisation process. Telugu speaking fishers who migrated to Odisha coast in second half of eighteenth century were the first to venture into marine fishing in the study area were later followed by Bengali from Bangladesh and they constitute the numerical majority even today. They have become naturalised along the Odisha coast co-existing along with Odia speaking fishers without any overt conflict. Interestingly several non-traditional castes Hariyan, Khandayat, Barik, etc. have taken over marine fishing. Now the in-migration has stopped were as the out-migration of fishers had started to various parts of India particularly west coast induced by conservatory ban along with mechanisation in the Odisha coast. Theproportion of out-migrants to total fishers is higher in Sana Arjipally (27%) compared to Paradip (16%) of which 89% in Sana Arjipally and 83% in Paradip of Total out-migrants were traditional fishers. Fishing effort (craft and gear) has reduced in Sana Arjipally but increased in Paradip mainly, in mechanised sector where about 86% mechanised trawler were owned by absentees. The mechanised craft owners had the highest average income (Rs. 697, 863)whereas traditional fishers and workers have lowest average income (Rs. 150- 170) per trip. Dominance of mechanised fishing with involvement of non-fishers and conflict with environmental conservation has led to marginalisation of traditional fishers who are forced to out-migrate. Involvement of unskilled labours in mechanised fishing from non-fishers background has led to deskilling of marine of marine fishing inclusion of traditional fishers in conservation, financial support for mechanisation and provision of alternative income source can mitigate the issues related to livelihood of fishers.

L11

Thesis Title : Study on Effect of Migration on Livelihood of Coastal Fishers in Maharashtra

Student : Ms. Priyanka Sadanand Vichare (MFSc - FEX 2008-10)

Major Advisor : Dr. Ananthan P.S.

Significant development in the fishing industry coupled with urbanization has been transforming the socio-economic life of coastal communities since 1960s. Though several studies underscore the effect of fisheries development, less attention has been paid on labour migration and its influence. The present study tries to understand the effect of migration on livelihood of coastal fishers especially on demographic, social and economic profiles of *different* social groups at village level. Adopting a comparative case study cum survey method, study was conducted in two fishing villages in Maharashtra (Versova in Mumbai and Satpati in Thane) assumed to be more and less influenced by migration & urbanization processes respectively. The study confirmed existence of five or six distinct social and economic groups namely mechanized boat owners, non-mechanized boat owners, native women fish sellers, native male fish workers, migrant male fish worker, and migrant women fish worker in a descending class hierarchy with former scoring high on most parameters. These class-like groups are distinguishable by caste categories, family size, occupational pattern, education, income, social participation, basic amenities, access to public services and programs as well as perception about and relationship with migrants. However, the socio-economic relationship among these groups is found to be both complex and sometimes non-linear. Majority of the male migrants (nearly 60-80%) have migrated from other districts of Maharashtra and those of women migrants in Versova (53%) have migrated from Andhra Pradesh with family during last 30 years. Earlier migrants (>50 years) have partially but successfully integrated with native population and enjoy near equal benefits. Tests of significance revealed significant difference among six social groups in both the villagesregarding their perception towards migrants/migration, while there was no difference between two villages. Spearman rank correlation further confirmed this difference while establishing strong association between independent variables of occupation, income and social group and the dependent variable perception about migrants with owner groups having more favorable attitude towards migrants than that of native workers. Interestingly, age, education and extent of urbanization did not affect the perception at all indicating determining influence of class interests over others. However, in the more urbanized Versova village, greater percent of youth are moving out of fishing as primary occupation as compared to less urbanized Satpati village indicating greater and inevitable role of migrants to fill the gap in labour supply.

vi. Adoption and Impact Assessment

A1

Thesis Title : Assessment of Role of Tripura Tribal Area Autonomous District Council (TTADC) in Fisheries Sector of Tripura

Student : Ms. Jamuna Debbarma (MFSc - FEC 2013-15)

Major Advisor : Dr. Rama Sharma

The study attempted to access the fisheries developmental role of Tripura Tribal AreaAutonomous District Council (TTAADC) – a set up by state and central government in tribalpredominant areas in development of fisheries sector of North Eastern state, Tripura. Theobjectives of the study was achieved by studying socio-economic profile of fish farmers,fisheries schemes implemented by TTAADC, the growth pattern and economics of fishculture in study area using percentile analysis, tabulation, graphical presentation, CompoundAnnual Growth Rate (CAGR) analysis, accounting profit analysis of farm production, benefitcost ratio etc. Analysis on the primary data collected four districts (viz. Dhalai, West Tripura,Gomti, and Khowai) revealed that majority (49.58 %) of fish farmers were of 41-60 years ofage group and had family size of 5 members (46.66%) with majority of primary leveleducation (37.08%) and 98.33% scheduled-tribe (ST) community. TTAADC had beingimplementing several schemes for the development of fisheries sector for last decades. Thegrowth of fish production and water resourcesfor fish culture for last decade was16.51% and9% respectively. Growth pattern study using CAGR across the districts revealed that Dhalai district had highest growth rate in available water area and fish production ascompared to other districts under TTAADC. Accounting profit analysis was carried out forbeneficiary and non-beneficiary farmers of TTAADC to get a comparative depiction ofTTAADC intervention on fish culture for profit generation. It showed a higher BC ratio (1.26)of fish culture practiced by beneficiary farmers than that of non-beneficiary farmers, whereas an assessment against recommended package of practice for fish culture showed that bothtype of fish culture followed by beneficiary and non-beneficiary farmers were not up to the recommendation level. It provided the reason for less profitability in terms of BC ratio as the farmers were not following the recommended package of practice given by Department ofFisheries, Government of Tripura up to optimum level to achieve maximum production andhence profitability. Cost of technology, less availability of fish seed and fish feed as well asthe limited credit facility for fish culture for the fish farmers were identified as major problemin constraints analysis of fish culture in TTAADC area. Overall, the study revealed the scopefor augmentation of fish production by horizontal expansion of fish culture technology throughTTAADC intervention and also by adopting recommended package of practice for fish culturecoupled with a serious attention to the constrains faced by the farmers.

A2

Thesis Title : Need Assessment for Empowering Fisher Community in Kerala

Student : Ms. Dona P. (MFSc - FEX 2012-14)

Major Advisor : Dr. Sheela Immanuel

Need represents an imbalance, lack of adjustment or gap between present situation and a new or changed set of conditions assumed to be more desirable. The assessment begins with "a need" which can be defined as the gap between what is currently in place and what is needed, now and in the future. This study was conducted to assess the needs of the fisher /shrimp farmers in Kerala for empowering them. Data from two districts comprising of 130 respondents were collected for the study. Majority (56.66%) of the fishers were in the middle age category and majority (72.5%) of shrimp farmers belonged to the old age category. Cent percentage was literates. Majority (58.9%) of the fishers have an experience of above 20 years and that of shrimp farmers (52.5%) have an experience between 11 to 20 years. Majority of fishers (66.7%) and shrimp farmers (52.5%) were having nuclear family. Majority (45.6%) of the fishers and majority of shrimp farmers (55%) were living in terraced houses. Cent percent of the fishers and shrimp farmers use mobile phones and watch television frequently. Extension contacts of fishers were mostly limited to MATSYAFED. No shrimp farmers were found to have regular contact with MPEDA, DOF, University/ Colleges. Majority (68.9%) of fishers had not attended any training and majority (67.5%) of shrimp farmers had attended training on shrimp farming. Diversity in occupation was observed among fishers as well as shrimp farmers. Shrimp farmers were found to have higher income than fishers. The need index for fishers was high (0.5) for marketing needs and that of shrimp farmers for environmental needs (0.68). The needs of the fishers (mechanised, motorised and traditional) and shrimp farmers were ranked in terms of weighted score. To cater to the needs of the fisher and shrimp farmers, a system of informal and formal institutional arrangements has to be developed. Government institutions, NGOs, cooperatives, fishers associations, and private companies should be seriously convened in order to meet the needs, to design future development programs, to organize training and to meet financial, marketing, environmental and information and communication needs of fishers and shrimp farmers so as to improve their livelihood.

A3

Thesis Title : Adoption of Scientific Aquaculture Practices by Fish Farmers in North Bihar

Student : Mr. Manoj Kumar (MFSc – FEX 2011-13)

Major Advisor : Dr. S. N. Ojha

Bihar is endowed with vast and varied water resources. The total fish production in the state is about 3.44 lakh tones. However, there are not many studies with reference to adoption of scientific aquaculture practices in Bihar. With this background a study on "Adoption of scientific aquaculture practices" was undertaken with the objectives to assess the socio-economic profile of fish farmers, and constraints prevailing to suggest suitable strategies for better adoption of scientific aquaculture practices in north Bihar. Poor socio-economic profile was observed for the most of fishers. The relationship between farmers 'socio-economic profile' and 'adoption level of scientific aquaculture practices' wasstudied. Information from 144 respondents was collected and analyzed with appropriate statistical tests. It was found that majority of the fish farmers belonged to medium (70.83%) and high adopter category (15.975) with regard to adoption level of scientific aquaculture practices to stop feeding six hours prior to harvest was 79.15%. Adoption index was low (18.80) for practices such as removal of sludge after draining of pond. Education, caste, house type, house area, land holding, conveyance, pumping set, participation in extension activity, contractual labour, training, pond number, pond area and gross income forms the decisive factor in determining the adoption level of the fish farmers. RBQ values for extreme climatic conditions was 84.03, for less extension person (71.33), lack of awareness about scientific culture practices (65.28), inadequate credit facility (60.42), Labour scarcity (57.64) and high cost of material input (52.08) forms the constraints in adopting the scientific aquaculture practices by fish farmers. Based on the study interventions and suggestion have been given.

A4

Thesis Title : Evaluation of FDA in Fisheries Development and Fish Farmers Empowerment in Uttar Pradesh

Student : Ms. Pooja Gautam (MFSc - FEX 2011-13)

Major Advisor : Dr. Ananthan, P.S.

Fish Farmers Development Agencies (FFDA), the most importantcentrally sponsored program for freshwater aquaculture development in India, has been providing both technical support and financial assistance since 1974. As there was no systematic and comprehensive study on their performance, the present study attempted to critically understand FFDA's performance in terms of extent of fisheries development as well as farmers empowerment within the structure and budgetary support provided over the years. A novel methodology (Empowerment Index) that measures Knowledge, Skill, Social and Economic dimensions of Empowerment was developed and utilized. In Uttar Pradesh, 19 FFDAs are functional in 19 districts, while in other districts, DoF runs FFDA programs. However, staffing and budgeting are integral part of DoF. Overall 40% of technical posts were lying vacant in DoF, while in sample districts, it was 25%. Both DoF and FFDAs have been inefficient in utilizing budget allocated through different FYPs, though they have over spent the XI plan budget of 160 lakh by nearly 40% in four study districts. FFDAs had succeeded in developing 70% of available Gram Panchayat ponds in Faizabad and Aligarh, while in Lucknow and Jhansi they could do so only in 40% area. FFDAs have trained 7671 farmers between 1982 and 2011 in study districts. Though the fish seed availability has increased over the years (from 400 lakh fry in 1982 to 3340.8 lakh fry in 2011) with FFDA/DoF efforts, their quality is perceived to be poor as compared to private hatchery seed. While provision of services like subsidies, technical and training supports were found to be satisfactory, services like seed, marketing and new pond construction supports were perceived to be unsatisfactory. Three fourth of beneficiaries score above average as regards their empowerment status with an average score of 6.3 on a scale of 2 to 10, indicating that farmers benefitted moderately in terms of their knowledge, skill, social life and economic wellbeing with FFDA's support. The t-test indicated that level of economic empowerment was higher in Lucknow and Aligarh than Faizabad and Jhansi while knowledge, skill and social empowerment levels were same across districts. Paired t-test testified that fish productivity (60%), profitability (41.5%) and culture area (72%) improved significantly after FFDAs intervention. Non availability of adequate financial support was perceived to be one of the major problems reported by beneficiaries. The Fish Farmers' socio-economic status, empowerment status and fisheries development on one side indicate that FFDA is moderately succeeded in increasing area under scientific fish culture, higher productivity, overall farmers empowerment, viability of aquaculture as a profitable occupation and moblising of farmers to take up in large scale. But on the other side, farmers still expecting higher subsidies only indicate that FFDAs, continue to become only a subsidy-dependent program.

A5

Thesis Title : Impact Assessment of Better Management Practices in Shrimp Farming in Selected Districts of Odisha

Student : Mr. Ramachandra Sahu (MFSc - FEC 2011-13)

Major Advisor : Dr. Swadesh Prakash

The present study was undertaken in Balasore and Puri district of Odisha state to know the adoption level of Better Management Practices (BMPs) and their impact on the socio-economic status of shrimp farmers. By using random sampling method, data was collected from 60 farmers each from Balasore and Puri districts. It has been found that about 63 percent and 46 percent of the BMPs of shrimp farming were adopted by the farmers of Balasore and Puri district respectively. Majority of the respondents belonged to medium and high category in adoption level of BMPs in both districts. The adoption level of BMPs was higher in case of middle age farmers. Higher adoption of BMPs by Balasore farmers was found to be the reason behind higher B-C ratio (1.24) in shrimp farming than that of Puri farmers (1.12). The study showed that farmers would continue to grow shrimp and sustain the shock of reduction in yield of 593.34 kg/ha of shrimp in Balasore district and 93.19 kg/ha of shrimp in Puri district, with the given cost and price structure. The price risk bearing capacity was found to be higher i.e. to the extent of ₹ 48.13/ kg of shrimp in Balasore district than ₹ 14.48/kg of shrimp in Puri district. However, the magnitude of these figures indicate that farmers of Puri district have lower shock absorbing capacity with respect of reduction in yield and price as well as increase in input prices. It was found that feeding, energy and seed stocking for Balasore district and feeding, seed stocking and organic fertilizers for Puri district are the highly significant influential factors for yield and gross income with R2 above 90%. The higher adoption of BMPs also resulted in increase of the employment opportunity in the study area. The study also identified different constraints faced by farmers in adopting BMPs. The present study suggested ways and means to enhance the adoption of BMPs by shrimp farmers.

A6

Thesis Title : Impact of Aqua-Societies on Shrimp Farmers In Andhra Pradesh

Student : Ms. Koteswari N. (MFSc - FEX 2010-12)

Major Advisor : Dr. Sheela Immanuel

An aqua society is formed by a group of farmers whose farms are closely situated together in cluster of locality of a village. Aqua societies are promoting the Better Management Practices (BMPs) to improve aquaculture productivity and profit. It supports the improvement in food security and sustainable livelihoods in aquaculture communities. A study was undertaken in Andhra Pradesh state to know the impact of aqua societies on shrimp farmers. An attempt was also made to comprehend the problems encountered by the farmers. Data from six districts comprising of 180 respondents were collected for the study. Majority (41.67%) of the farmers belonged to the age group of 35-45 years. Cent percentage was literates. Majority of the farmers had small (77.78%) and nuclear family (22.22%). All of them were found to watch television regularly. Extension agency contact was mostly limited to local officer from the DOF and aqua society. Education was positively related to family type, family size, mass media and communication exposure, scientific orientation and innovativeness, where as it was negatively related to farming experience. The impact of aqua societies are more in the Krishna district than that in remaining districts. The Perception index was high (95.37%) for increase in production, followed by skill improvement (88.52%), reduction in frequency of disease occurrences (87.78%) and it was low of price of the product (57.22%), social recognition (53.52%), NaCSA takes lead role in management of aqua societies. The important problems faced by the farmers were lack of good quality seed (2.8) followed lack of good seed (2.8) followed by lack of cold storage facilities (2.31). The model is good to overcome the risk factors in shrimp farming and the model could be made sustainable with the government support.

A7

Thesis Title : An Economic Evaluation of Aqua-Model Village Scheme of Tripura

Student : Mr. Apu Das (MFSc - FEC 2010-12)

Major Advisor : Dr. Nalini Ranjan Kumar

A study was undertaken in the state of Tripura to evaluate aqua-model village scheme implemented by Department of Fisheries, Govt. of Tripura during 2004-05 to 2010-11. By using multistage stratified random sampling, data were collected from 80 farmers from both the adopted and non-adopted villages. Farmers of adopted village have well adopted the improved package of practices recommended under the scheme. Age wise distribution of farmers implies that adoption of recommended practices was higher in case of middle age farmers. Higher adoption of improved packages of practices by the farmers of adopted villages led to higher B-C ratio (1.35) in aquaculture than that of non-adopted villages (1.29). The magnitude of Gini coefficient in case of adopted villages (0.396) was less than that of non-adopted villages (0.431), indicate that scheme helped to improve the income equality among the farmers. The scheme also resulted in increase of the employment opportunity in the study area. NPV of Rs.415.08 lakhs at 12% discount rate with B-C ratio of 1.40 and IRR of 53% showed viability of the scheme. At higher discount rates of 15%, 18% and 20% scheme remained viable. The scheme also remained viable with increase in costs by 10 percent and decrease in benefits by 20 percent at discount rate up to 15 percent. The study also identified different constraints faced by the farmers in adopting recommended package of practices and constraints faced by officials implementing the scheme. It is suggested that scheme with suggested measures can be implemented in similar area for the development of aquaculture which in turn will help in increasing the income of rural poor and also improve the nutritional security in the country.

A8

Thesis Title : Adoption of Better Management Practices (BMPs) by Shrimp Farmers in Karnataka

Student : Mr. Leo Cyril Antony (MFSc - FEX 2010-12)

Major Advisor : Dr. Sheela Immanuel

A study was undertaken in North Canara and Udupi district of Karnataka state to know the adoption level of Better Management Practices (BMPs) by shrimp farmers. An attempt was also made to understand the relationship between profile characteristics with the dependent variables 'Perception' and 'Adoption' level of the shrimp framers. Data from 120 respondents belonged to medium and high category in adoption level of Better Management Practices (BMPs). Shrimp farmers had maximum (100) adoption index on the practices like feed check trays and adjustment of feed during lunar cycle or moulting stage and adoption index was low for the practices such as release water only after bleaching (37.5), using reservoir ponds (12.5), use of sanitizer (3.33), and Effluent Treatment Plant (ETP) (0). Majority of the respondents belonged to medium and low category in perception level on adoption of Better Management Practices (BMPs). Respondents had maximum (85.88) level of perception index for strict regulations, development of suitable strategies (81.11), sharing of BMP messages (79.11%). Perception index was low for the items like profitability of shrimp culture (39.44), adoption of all BMPs (37.77), financial support from BFDA or MPEDA (37.77), adoption of BMPs only if there is credit facility (35.83), the findings revealed that majority to medium to big farmers had positive attitude towards adoption of BMPs. Education, income, experience, extension participation, information seeking ability, cosmopoliteness, scientific orientation and risk orientation forms the decisive factor in determining the adoption level of the shrimp farmers. Low price for the produce in the market (81.25), labor scarcity (79.64), high labor charges (75.25), low level of co-operation among farmers (74.57), White Spot Syndrome Virus (WSSV) (70.38), and inadequate credit facilities (51.66) forms the hurdles for the farmers in adopting the BMPs. The present study suggested ways and means to enhance the adoption of BMPs by shrimp farmers.

A9

Thesis Title : A Comparative Study of Traditional and Modern Marine Fish Supply Chain in Mumbai District

Student : Mr. Swapnil Shivdas Shirke (MFSc - FBM 2008-10)

Major Advisor : Dr. Nalini Ranjan Kumar

The present study was undertaken to have a comparative study of major modern and traditional marine fish supply chains operating in Mumbai district. For the study survey was conducted using personal interview method with the help of pre-tested schedule specially designed for the study during the month of December, 2009 to January, 2010. A total of 7 traditional and 2 modern supply chains were found operating in the area. The dominant traditional fish supply chain in Mumbai was "Fishers-wholesaler-retailer-consumer" disposing of about 45.4 percent of total marine fish production followed by "Fishers- agent of modern retail outlet – modern retail outlet –consumers" was the dominant one disposing of about 11.2 percent of total marine fish production in the area. The marketing cost of intermediaries in traditional marine fish supply chain per day varies from Rs.49.97/day for vendor to Rs.7286.75/day for fishers and from Rs. 541.8/day for agent retail outlets Rs. 7286.75/day for fishers. The overall marketing cost of wholesaler, retailer, vendor, commission agent for retail outlet of modern marine fish supply chain was Rs. 6.25/kg, Rs. 13.11/kg, and Rs. 18.0/kg, respectively. Among the traditional marine fish supply chain, the supply chain "Fishers-retailer-consumer"; was found to be most efficient as price spread for the chain was minimum 19.07 percent of fisher's price and marketing efficiency was highest 62.86 percent. In case of modern supply chain, the price spread was found to be lowest (Rs.109.21/kg) and marketing efficiency is highest (78.83%) in supply chain "Fishers-agent of modern retail outlet (vendor) - -modern retail outlet- consumer" as compare to the other one and hence the supply chain was better than the other. Majority of fishers face problems of declining fish catch (93%), auctioneer face problem of inadequate space for auction (87%), retailer experienced constraints of inadequate storage facility (70%) and consumers found improper cleanliness and hygiene (75%) as major constraints in fish marketing. About 80percent of agents of modern retail outlet expressed irregular demand of fish from retail outlet as major problems. In modern fish supply chain both the consumer and producer are happy because fishers getting better price and consumer are happy to get better quality of fish even though at higher prices. Intermediaries are also getting benefitted with higher margin and hence it can be concluded that the modern marine fish supply chain is better than traditional one.

A10

Thesis Title : Analysis of the Knowledge level of Fisher Folk about Marine Fisheries Management and Resource Conservation

Student : Mr. Sabri Shankar (MFSc - FEX 2008-10)

Major Advisor : Dr. Sheela Immanuel

A study was undertaken in Kanyakumari district of Tamil Nadu state to analyse the knowledge level of the fisherfolk on marine fisheries management and its conservation measures. An attempt was also made to understand the relationship between profile characteristics. An attempt was also made to understand the relationship between profile characteristics with the dependent variable "knowledge" and the "perception level" of the fisherfolk. Data from 150 fisherfolk comprising both fisherman and fisherwomen were collected for the study. Majority of the fisherfolk belonged to medium and higher category in knowledge level in marine fisheries regulation and mariculture practices. Knowledge was low for the items like conservation of marine parks and sanctuaries, artificial reefs, community fishing method, overexploitation and brood fish catching. Perception index was maximum for the items like bottom trawling, factory pollution, mariculture practices and it was low for the items like coral reef destruction, fisheries co-management and mangrove destruction. The findings revealed that majority of fisherman belonged to higher category in knowledge level compared to fisherwomen. Education, scientific orientation, extension participation and mass media utilization forms the decisive factor in determining the knowledge level of the fisherfolk. Less availability of bycatch reduction devices, invasion of foreign vessels, lack of contact with extension personnel, rough sea and coastal pollution forms the hurdles for the fishers in adopting marine fisheries management and mariculture practices. The study found that there exist significant difference in the knowledge level between fishermen and fisherwomen in marine fisheries management and its conservation measures. The present study suggested ways and means to enhance the knowledge gap between fishermen and the fisherwomen.

A11

Thesis Title : Tsunami Relief Measures and its Impact on Socio-Economic Condition of Fishers in Selected Districtsof Kerala and Tamil Nadu

Student : Ms. Nisha Elizabeth Joshua (MFSc - FBM 2007-09)

Major Advisor : Dr. Arpita Sharma

Indian Ocean tsunami in 2004 killed more people than all Pacific Ocean tsunami combined for 19th and 20th centuries resulting in heavy loss of life and property. With this background a study was undertaken to study the 'Tsunami Relief Measures and its Impact on the Socio-Economic condition of fisheries in selected districts of Kerala and Tamil Nadu' with the objective of documenting the Tsunami relief measures proposed by the Government and NGOs, To study the impact of Relief measures on the socio-economic conditions and changes in the fishing capacity of the fishers. The area selected for the study was Tamil Nadu and Kerala. Nagapattinam district in Tamil Nadu and Kollam district in Kerala were selected for study. Primary Data collection was done through Personal Interviews, Focused Group Discussions and Meetings with Department officials and NGO personnel and Tsunami victims, both men and women in affected areas in Nagapattinam and Alappad village. Number of fishers selected for study was 160. It was found that most of the respondents were literate and more than 80% were Hindus belonging to Pattinavar and Arayar sub caste. More than 75% were married with 1-4 children with nuclear families and male head. The occupations of the respondents were crew members, fish vending and boat owners while some were petty shop owners. Relief measures were provided by GO, NGO and also at the time of need the community came together to help each other. More than 50% respondents reported relief measures as adequate and accessible. Drinking water facilities have improved after tsunami, Electricity and Telephone connections were improved. Community centers, schools and bridges too were built by the GO and NGO which are useful for them. It was reported that the community spirit also has developed in them. It was reported that earning capacities reduced after tsunami especially in agriculture due to increased salinity and also in fisheries with decrease in catch due to changes in species composition. Changes in use of craft and gear were also reported. About 39.2% of the fishers began to use more small boats, 33.3% began using plywood boats, and 27.5% reported that reduced use in the number of Catamarans were widely use inn number of Catamarans for fishing after Tsunami. While big boats were destroyed, fishers were provided with small FRP boats. Catamarans were not used popularly in Kollam as in Tamil Nadu before tsunami. Fishers of Nagapattinam as well as Kerala reported that there was no change in trip schedule or duration after tsunami.

A12

Thesis Title : Fishers' Perception on Responsible Fisheries with Special Emphasis on Closed Season and Mesh Size Regulation

Student : Mr. Suresh Adiga M. (MFSc - FBM 2007-09)

Major Advisor : Dr. S. N. Ojha

Many of the stocks of global commercial fisheries are either totally depleted or heading towards the point of depletion owing largely to unsustainable fishing practices. India is no exception from the impending fisheries crisis. Conventional stock assessment models formed the basis for understanding the fisheries sustainability so far. It is increasingly realised that fisheries is a multidisciplinary human endeavour that has social, technological, economical and ethical implications besides the ecological dimension. This study was taken up with the primary objective of developing and validating an appropriate methodology for assessing the sustainability of marine fisheries in Indian states using a multi-dimensional approach. Of few such methods available, RAPFISH technique was found to be the most comprehensive one. Many modifications namely replacing the 'ethical' with 'management' dimension, addition/deletion of many attributes, modification of scoring procedure, etc. were done in the RAPFISH method to suit the Indian context. Extensive literature review, critical reasoning and experts' opinion provided the basis for this exercise. From the original set of 72 attributes classified under five dimensions (ecological, economic, social, technological and management), 60 were selected and subjected to validation process based on feedback from resource owners, users and experts using Weighted Sum Model analysis. Bottom three attributes with least scores in each dimension were dropped and only 45 were selected for further validation process using the mathematical procedure called Analytic Hierarchy Process. The validated methodology was then field tested in Maharashtra and Karnataka. For this purpose, distinct marine fishery groups (18 from Maharashtra, 17 from Karnataka) were identified based on landings data (1979-2009).

A13

Thesis Title : Social and Economic Impact of Self Help Groups (SHGs) in Fisheries and Allied Sectors in the district of Madhubani, Bihar

Student : Ms. Tanmaya Dev (MFSc - FBM 2006-08)

Major Advisor : Dr. Arpita Sharma

In India, out of the total population of 5.4 million active fisheries, 3.8 million are fisherman and 1.6 million are fisherwomen. Degree of visibility of women's participation in fishery activities varies from country to country and within a country from region to region. It is often reported that fishing communities are amongst poorest and most vulnerable. An effective way to tackle poverty through social mobilization of people, into SHGs, the present study was understand with the objectives of studying the impact of SHG on its members as regards to selected social and economic parameters in Madhubani district, to assess the performance of SHGs based on the checklist method of NABARD and Bihar to provide recommendations for improved working of SHGs. For the study, block Andhrathari was selected. Five Panchayats were selected from the block Andhratari. From each Panchayat two villages villages were selected. From each village two SHGs were selected. Data was collected from interview method, focused group discussion, meetings with SHGs and NGO staff, personal narrative method, scoring method and assessment of performance of SHG by checklist method. The statistical methods used were frequency distribution, percentage analysis and paired test by statistical software SPSS 15.0 version. Study of profile of village revealed that the area of study lacked the basic facilities. A total of 80.98% were married and the age ranged from 18-60 years. Male migration was high. A positive impact was found as regards to the social parameters namely political participation, mobility, access to different organization, access to Govt./Non Govt. organization, health care and sanitation and decision making ability regarding savings, taking loan and repayment, expenditure and work. Similarly, positive impact was reported towards the economic parameters namely status, work participation, income, family expenditure, saving pattern and life style. The results of the t-test showed that in most of the parameters there was a significant difference. 'Checklist method' for performance assessment of SHG revealed that performance of the SHGs was not up to the mark and requires improvement on many factors. Accordingly, recommendations have been suggested.

vii.Extension Systems Theme

E1

Thesis Title : Fisheries Extension Strategy for Agricultural Technology Management (ATMA), Kerala

Student : Ms. Nisha Elizabeth Joshua (PhD - FEX 2009-14)

Major Advisor : Dr. S.N. Ojha

Several extension initiatives were attempted since India's Independence to meet the needs of the farmers. To further strengthen, the innovations in Technology Dissemination component of National Agricultural Technology Project implemented Agricultural Technology Management Agency (ATMA) in 2005 by Department of Agriculture and Cooperation, Government of India. Since ATMA started in 2010, a concurrent evaluation is made between the farmers who got ATMA support between 2010 and 2012 in districts like Kollam, Alappuzha, Kottayam, Ernakulam and Thrissur in Kerala with the objective like 'To study the fisheries extension strategies promoted through ATMA', 'To study the stakeholders perception of fisheries extension strategies in selected ATMA districts' and 'To explore the performance appraisal indicators for fisheries development in selected development in selected ATMA districts'. Primary data were collected through administering a schedule and secondary data was collected from published government and non-government sources. A total of 225 fish farmers, 165 staff of Department of Fisheries, 80 ATMA Governing Board members and 80 ATMA Management Committee members were selected. Statistical tools available in SPSS 16.0 and MS Excel were used. The tools used were percentage analysis, weighted scoring method, resource person contact index, Garrette ranking , bar chart, Spearman's rank correlation, factor analysis, ordinal regression, Rank Based Quotient, Mann Whitney U test, Krushall-Wallis test, Kendall's W, Cohen's Kappa, DoF staff proficiency index, multidimensional scaling and performance appraisal using scoring. Further, based on the analysis, strategies to refine the extension system were attempted in this study. Strategy, as such, is operationalized into three elements, namely, diagnosis, guiding policy and action plans. All the socio economic data of farmers in the study were directed towards diagnosing the problems faced by farmers. Based upon the diagnosis, the guiding policy is recommended. Therefore, the action plans designed for ATMA were refined as per the guiding policy. While diagnosing the socio economics of the farmers through factor analysis, it is observed that there can be four approaches of the aquaculture extension, namely Line Department Convergent Extension Approach, Marketing Extension Approach, Elementary Extension and Commodity Specific Approach and Information Communication Technology or Media Facilitated Extension Approach. Later, using the ordinal regression, it is observed that variables like pond ownership, ATMA support received by farmers and expenditure in aquaculture are significantly associated with farmer's gross income. Therefore, while implementing these four approaches, the farmers with own ponds, like family farmers, who invest more in aquaculture practices and who are receiving more ATMA support activities shall be purposively selected in order to raise their income. From these, purposefully chosen farmers, Farmer Friends (FFs) shall be identified and ponds of selected FFs shall be converted to Fish Farm Schools (FFSs). The guiding policy strategies proposed and action plans recommended under the different approaches is thus applicable to the four types of FFs and four types FFSs coming under the four different approaches. Later, after getting success with pond owners (93.33%), the tenant farmers in consultation with owners may also be invited to participate in the ATMA programmes.

E2

Thesis Title : Conflict Management Strategy in Flood Plain Wetland of North Bihar

Student : Mr. Ramesh Kumar Mehta (MFSc - FEX 2012-14)

Major Advisor : Dr. S.N Ojha

Wetlands are considered to be one of the important resources that can ensure environment and livelihood security to many citizens. However, the fluctuating resource use over the season by the farmers and fishers has manifested many conflicts and has restricted the adoption of new technologies, especially amongst fishers. Absence of grass-root level extension education mechanism that also addresses the conflicts may aggravate the environment and livelihood insecurity in the wetland. Therefore their study was conducted with the purpose of identifying the conflict management style of the stakeholders, mainly the fishers and farmers in the selected wetland. It was observed that fishers were different, in terms of their conflict management style than the farmer. Fishes were observed to have harmonizing, avoiding and compromising style of conflict management. Sixteen conflicting issues were observed within the area under study. Amongst them four conflict, namely, poaching, poisoning, stealing of the fodders and uncontrolled gazing were observed to be settled through court. However, in terms of innovativeness both the stakeholders were similar. Based on that finding, a conceptual model for wise use of wetland was evolved in the study.

E3

Thesis Title : An Assessment of Fisheries Extension Strategies and Delivery System in Assam

Student : Mr. Parag Saikia (MFSc - FEX 2010-12)

Major Advisor : Dr. Krishnan M.

The objective of establishing an extension mechanism is to propagate and popularizes information and education to people in all walks of life. Aquaculture development is the responsibility of the state government. At the field level, aquaculture programmes (both central and state) are implemented by the state fisheries department. The study "An assessment of Fisheries Extension Strategies and Delivery Systems in Assam" was carried out to understand and map the fisheries extension delivery system of Assam. The study was carried out in three selected districts (Nagaon, Golaghat and Sonitpur) covering 90 beneficiaries and 90 non-beneficiaries from the nine selected villages. All the available 30 Fishery extension officer & Districts fishery extension consultants in position in Department of Fisheries (DoF) in the three districts were contacted to fulfill the objective of measuring the development competencies of the personal and to assess the constraints as perceived by them in achieving organizational and functional objectives. The general performance of fisheries in Assam and that of DoF is very satisfactory. Despite several structural and other constraints, commitment and involvement of DoF staff has contributed to positive performance of fisheries sector in Assam. The DoF officials scored highly on technical knowledge skills (84%)and managerial skills (81%). They also scored well on training skills (68%), communications skills (66%) and social mobilization skills (69%). Based on the Rank Based Quotients (RBQ) groupism and political pressure in the area emerged as major social constraints, lack of staff strength emerged as major economic constraint while poor economic conditions of fellow famers emerged as major economic constraint faced by DoF staff. The training need indices showed that fish and prawn culture practices followed by fish and prawn health management were two most desired area of technical training and procurement of loans from different agencies emerged as the primary extension related training needs of the DoF staff. In the three districts some schemes were moderately satisfactory to the beneficiaries; therefore these schemes need to be streamlined in order to get better response from the beneficiaries. The DoF, Assam has been doing a reasonable well based on the overall satisfaction to the services provided by DoF; 62% of the respondents were moderately happy with the services provided by DoF. Despite being non-beneficiaries 61% of them had sought assistance from DoF. Among the various expectations the non-beneficiaries ranked field visits by DoF staff (97%) as the primary requirement and rank it first among all expectations. Therefore the DoF, Assam is expected to go from strength to strength based on its performance so far. The XII plan should open up new vistas of fisheries development during this decades turning Assam to be a self-sufficient state in production and consumption of fishes. This decade also should see further streamlining of the DoF, Assam which will enable the state to emerge as one of the leading states in fish production in India.

E4

Thesis Title : Potentialities of Public-Private-Community Partnership in Fisheries

Student : Mr. Bhaskar Chakravarty (MFSc - FEX 2010-12)

Major Advisor : Dr. S.N. Ojha

Indian capture fisheries is declining and is under the control of a centralized authority, as a result of which, local fisheries are unable to secure the resources on which their livelihood depends. Similarly, in case of small-scale inland aquaculture farmers, who are in majority, are not able to take the advantage of economies of scale. In both the situations community organizations are to be strengthened with adequate participation of input suppliers and marketing agents to augment its business as well as Government has to regulate the partnership and facilitate the welfare schemes meant for the poor. Thus public-private-partnership arrangements need to be developed for fisheries and small scale aqua culturist. The present study outlines an innovative framework of Public-Private-Community-Partnership (PPCP) based on field studies conducted in Kampur District of Assam during 2011-2012 by ex-post-factor research design. Majority of the fish farmers in the Hajo block were at the age group of 40-49 years. Majority of the fish farmers in the Hajo block were at age group of 40-49 years, whereas, it was 30-39 in the Bezera block. Variations of age were also observed with fishers. There were difference in the expenditure pattern among the farmers and fishers of both the development blocks. Result shows that banks and Kisan credit Card (KCC) are the major sources of credit. Capital investment fund from commercial banks and other institutional sources are more among the fish farmers of Hajo block. The fish farmers' income depended on their caste, participation in community organization, and degree of expectations from government, input suppliers, and marketing agents. Similarly fishers income were dependent on the degree to which they make contacts with government, input were dependent on the degree to which they make contacts with government, input suppliers and market agents to which they make contacts with government, input suppliers and market agents and their agreement for having fishers organization. Based upon this finding, the framework on PPCP was envisaged to capture the existing linkages to empower the community at large through leadership identification method.

E4

Thesis Title : Performance Appraisal of Field Functionaries in Department of Fisheries, Tamil Nadu

Student : Mr. Ajay Anand G. (MFSc – FEX 2008-10)

Major Advisor : Dr. S.N. Ojha

A study was undertaken to analyze the performance level of 70 officers of the Department of Fisheries of seven coastal districts of Tamil Nadu. In this study an attempt was also made to understand the relationship between profile characteristics, job satisfaction, job esteem, achievement motivation and organizational climate with their performance. It was observed that the officers were able to perform better in the areas of registration of fishing crafts and issue of license, providing free training to fishers and creating awareness under technical activities; and providing subsidy for HSD oil, distribution of diesel oil to traditional fishing crafts, distribution of life jackets to the traditional fishers, distribution of icebox to fisherwomen and subsidy for the purchase of OBM under welfare activities. Age, education and experience formed the decisive factor in determining the officers' performance. The present study suggested ways to improve the performance of activities and to reduce the constraints encountered by the employees of Department of Fisheries, Tamil Nadu.

E6

Thesis Title : Study on Fisheries Extension Service Delivery System in Maharashtra

Student : Ms. Pawar Manali Suvichar (MFSc – FEX 2008-10)

Major Advisor : Dr. S.K. Mishra

Fisheries development programmes including aquaculture extension are executed exclusively by the respective State Fisheries Departments, but there is no exclusive fisheries extension service as such in most of the state level fisheries organizations. Hence, the present study entitled "A Study on Fisheries Extension Service Delivery System in Maharashtra" was undertaken to know the present status of fisheries extension services delivery system with special reference to organizational profile, fisheries activities undertaken, benefits received by beneficiary fishers/fish farmers and future expectations of both beneficiaries as well as non-beneficiaries from the DoF (Department of Fisheries), Maharashtra. The study was carried out in one marine district (Mumbai) and two inland districts (Nagpur and Satara) covering 72 beneficiaries and 18 non – beneficiaries from nine selected fishing villages. Attempt was also to evaluate Development Competencies of the field functionaries of DoF by using Development Competency Index scale (DCI) and also to assess the constraints and training needs as perceived by all the twenty-one filed functionaries. It was found that more than 70% class-I posts and more than 71% class-II posts of DoF, Maharashtra were lying vacant. Among the respondents DoF staff, only 24% were having fisheries as their educational background. They scored about 73% both in technical knowledge and managerial skills, but scored about 55% in training skills, communication skills and social mobilization skills. They perceived 'lack of infrastructural facilities' (62%) as major constraints in achieving organizational objectives. DoF staff from marine districts need training on 'Fish/ shrimp seed production and culture technologies' (91%), 'Code of Conduct for Responsible Fisheries (CCRF)' (91%), 'Communication skills' (82%) and 'Training management skills' (82%), while staff from inland districts need training on 'Aquaculture policies' (90%), 'Development of Farm plan' (70%) and 'Scientific fish and prawn culture practices' (70%). According to the beneficiaries, expect some schemes; they were not satisfied with the services provided by the DoF. They expect facilities like jetties, hygienic fish market, transport facility, quality fish seed and timely delivery of benefits. Non-beneficiaries were not going to DoF due to complicated and lengthy procedures for availing benefits and 94% of them suggested that need – based training programmes and timely relief measures were required to them while, 89% suggested that awareness campaigns about government scheme and legislations were needed for them.

E7

Thesis Title : Developing a Professional Extension Service Delivery Model for Fisheries and Aquaculture

Student : Ms. Jeevitha C. (MFSc - FBM 2007-09)

Major Advisor : Dr. Ananthan, P.S.

Extension system acts as an interface between technology generation system and client system. In fisheries sector, extension is often portrayed as the weakest link. Since there is no systematic study on this, a study was designed with three objectives: i) to critically study the organizational structure, function and performance of Department of Fisheries and SIFFS (South Indian Federation of Fisherman Societies) Tamil Nadu as development agencies; ii) to evolve and compare the employees development competencies and expectations about the development functions of DoF and SIFFEs. A novel methodology called Development Competency Index (DCI consisting of 4 dimensions - Technical Knowledge, Training and Communication Skill, Social Mobilization and Organizational Skill, Managerial Skills) was developed to measure different capabilities of development practitioners. The salient findings are: the review of organization structure, function and performance of the Directorate of Fisheries (DoF) revealed that 33.2% of technical positions remain vacant while administrative and regulatory functions constitute major functions in terms of time and effort and hence development and extension activities are considered minor activities. However, DoF was efficient in budget utilization as it has over spent to the tune of 19% during the last three plan periods. The average DCI score of the staff was 5.87. The score was particularly low across the cadre for the social mobilization and organization skill indicating the training requirement. Social participation among fishers and farmers (membership in co-operatives and extension agency contact) were found to be high but it was mainly for availing subsidizes and welfare benefits and not for obtaining technical knowhow. Only about 37% of fishers were satisfied with DoF services. Farmers and fishers expectations are mainly technical support, effective delivery of welfare benefits, training on aquaculture, sea safety.

viii. Indigenous Knowledge Theme

I1

Thesis Title : Systems Approach to Grassroots Level Innovations in Fisheries Sector

Student : Ms. Shivta Kureel (Ph.D. – FEX-PA1 2011-15)

Major Advisor : Dr. Arpita Sharma

In this decade of innovation, it is of paramount importance that innovations happening in fisheries sector and more importantly at grassroots level, which are developed by fishers/farmers, be recognized. Realising the importance of this, a study was conducted to document grassroots innovations in fisheries sector, to test their appropriateness and develop case studies using systems approach. Results revealed that, a number of grassroots innovations are being practiced in fisheries sector and this may be just the tip on the iceberg. In this study, 182 endogenous and 26 exogenous grassroots innovations were documented. Innovations documented during the national convention organized at Central Institute of Fisheries Education, Mumbai were selected by an expert group. In addition, personal and telephonic interviews were done to verify and document additional innovations. It was found that maximum grassroots innovations were from culture fisheries. Moreover, 61% of total innovations were from coastal states of India. Appropriateness of innovations was tested by Innovation Appropriateness Scale by 149 fisheries' graduates (89 males and 60 females) on a five point Likert scale with 5 being highly appropriate and 1 being least appropriate. Appropriateness for grassroots innovations was operationalized using 6 parameters i.e. economic advantage, ease of use, sustainability, easy replicability, uniqueness and scientific explanation. Overall, 97% innovations were perceived to be appropriate with score 3 or above. Innovation of trapping solar energy through plastic bags to raise temperature in winter season was perceived to be most appropriate with a score of 4.0. Kendall's Coefficient of concordance revealed that respondents had agreement in scoring of innovations. Mann Whitney U test revealed that there was no significant difference among male and female respondents in judging appropriateness of innovations. Systems approach was used to develop case studies wherein select grassroots innovations were studied in detail. Rank Based Quotient for factors that motivated innovators was highest for need with value of 95. Suggestions and recommendations were compiled as 4C model for improving innovation system. Where the 4Cs are credit to innovators, concentrating database, consolidate institutional mechanisms and constitution of networks.

I2

Thesis Title : Sociology of Fishing Knowledge of Thoothoor Shark Fishers

Student : Mr. Hino Fernando E. (MFSc - FEX 2013-15)

Major Advisor : Dr. Ananthan, P.S.

India, a major shark fishing nation, is responsible for 9% of the global shark catch and ranks second in terms of global shark production. Thoothoor, a small coastal village in Kanyakumari, district of Tamil Nadu is selected for the study as the fishers of the village have specialised shark fishing knowledge and follow the unique hook and line. The present study documents their specialized shark fishing knowledge and practices and locates them in their historical and socio-cultural contexts. Case study method was followed where in the specific tools like key informant interviews, snowball technique, participant observation and focussed group discussion were made use of to collect first-hand information. The study revealed that shark fishing is usually carried out for 35-40 days in deep sea by mechanised vessels using hook and line fishing method. Fishers use live bait to catch sharks and use different accessories like metal rods, water resistant light and large hooks for hauling to support fishing. Due to lack of fishing harbour in Thoothoor, catches are landed and sold mostly in Kochi fisheries harbour. The fishers of Thoothoor belong to *mukkuvar* community, in which fishing is the primary occupation. Christianity is the major or only religion to which the fishers belong, due to it, parish priest of the village is considered to be the *defacto* leader and all decisions are taken with the priest's authority. In general, Thoothoor fishers are highly religious and have great faith and respect for the occupation they do. Rituals like blessing of boats, not carrying money onboard etc. are performed. Organizations like ADSGAF, QTC, NLT, TFCYM are functioning for the betterment of the economic and socio-cultural aspects of Thoothoor fishers. Shark fishing practices of Thoothoor fishers are found to be sustainable, as they use passive gears which does not harm resources. According to the study conducted, the fishers feel that the huge quantities of sharks are available in the deep sea, which have a great potential to be exploited further in a sustainable way. Shark catches are declining across globe and India, but deep sea shark resources are still under exploited in Indian Ocean. So to tape the under exploited resources available in the deep sea and to get maximum catches they have been finding new ways then and there to mould the gear and craft to sustain deep sea fishing. Fishers knowledge and skill in deep sea fishing augurs well to exploit the available resource in the near future.

I3

Thesis Title : Livelihood, Culture and Innovation in Paddy cum Fish Farming System in Apatani Plateau of Arunachal Pradesh

Student : Mr. Dusu Nobin (MFSc - FEX 2009-11)

Major Advisor : Dr. S.N. Ojha

Apatani rice cum fish farming practice in Arunachal Pradesh, India, is one of the success stories in the field of aquaculture. The study was conducted in seven villages of Apatani plateau of Lower Subansiri district, Arunachal Pradesh. The data collection was done through qualitative (Focus Group Discussions) and (survey) methods. For this survey, 105 respondents were randomly selected and for Focus Group Discussions, experienced farmers, seed producer and market agency (each having 14 members) were selected. Most of the respondents were middle aged (42.9%), 60 percent of respondents were found to have some level of education. Majority of farmers (54.3%) had small family upto 5 members. Most of the respondents (99%) were married. 45.7 percent respondents were having agricultural activities as primary occupation. It was also observed that socio culture of Apatani tribe had played an immense role in the success of paddy cum fish farming in plateau and also had remarkable influence of technology on the socio cultural aspects of Apatani people. Over the period, many innovations were found to have taken place of which, culture of stunted fingerling is paddy field and practice of multiple stocking and harvesting of fish in paddy field were the latest one. Despite many salient features, the system was facing certain problems which need to be improved; it was recommended that there is a need to meet the demand of improved market infrastructure with cold storage facility, proper transportation, proper marketing plan, provision of training fish seed producers, reconsideration and enhancement of extension activities and increase in the number of staff in the department.

I4

Thesis Title : A Socio-Cultural Study of Indigenous People and Indigenous Knowledge in Fisheries of Mizoram

Student : Mr. Zohmingthanga (MFSc – FEX 2009-11)

Major Advisor : Dr. Ananthan, P.S.

A study was conducted in Mizoram State covering all the districts to study the socio-cultural and livelihood status of the indigenous people involved in fisheries as well as to document their fisheries related indigenous knowledge. Using a semi-structured interview schedules the survey was carried out in 16 villages among 137 respondents besides detailed interactions with few key informants. Interestingly, the study revealed that irrespective of the family income and occupation, majority of the respondents (54%) were engaged in fisheries as a means of recreation or enjoyment rather than as a source of income or livelihood, a unique feature in India. All the respondents dwelled in their own houses and majority (66.4%) of them lived in Assam type houses. It was observed that there was no social or cultural distinction between people who were involved in fisheries and those not involved in fisheries which is again unlike in most other States. Average fish production of District was highest in Kolasib District with 770Kg/ha/year and the state average production was 627 Kg/ha/yr. Average fish catch per fishing day among the people involved in fishing was 7kg. Indigenous Knowledge related to fisheries documented were categorized into predator control (13 nos.), harvesting technology (18 nos.), processing technology (8 nos.), Fishing craft and gear technology (6 nos.) feeds and feeding technology (4 nos.), postharvest technology (5nos.), plant extract piscicides (19 nos.) used for stupefying fishes and pond construction and design (1no). Many of the technologies are on the urge to extinction due to environment conservation aspects while many technologies are yet to be validated and disseminate. Many of the technology documented could be blended with modern technology and could be improved for further usage.

I5

Thesis Title : Indigenous Technical Knowledge in Fisheries of Tripura

Student : Ms. Banti Debnath (MFSc – FEX 2008-10)

Major Advisor : Dr. Arpita Sharma

Indigenous Technical Knowledge (ITK) is the knowledge that a local community accumulates over generations of living in a particular geographical area. It is developed around the specific conditions of men and women, indigenous to a particular environment and provides basis for problem solving strategies for local communities. It represents an important component of global knowledge on development issues. These ITKs are seldom documented, such information are lost if not passed from generation to generation or protected and practiced by the local people. Various ITKs are practiced in the field of agriculture and fisheries. ITKs in agriculture sector have been documented but there are few studies focusing on ITKs in fisheries sector. Move over ITKs in the North Eastern region of India have also been researched by only few. In this context, documentation of ITKs of North East region which is one of the hot spots of biodiversity is of high importance. With this background, a study was undertaken to document the ITKs in fisheries sector of Tripura which will be helpful for the policy makers, planners, administrators and fisheries scientist in incorporating the modern technology with the indigenous knowledge effectively. Fisheries have a unique status in Tripura and fish is an integral part of the people of the state. Study was conducted by interviewing the fishers, fishery officers, fishery experts in all the four districts of Tripura. The ITKs documented were from different fields, such as, pond management, fish aggregating device, traps, fish health management, processing, water quality management, fish attractant, bait, gear, nursery pond management, harvesting, aquaculture, fish storage device and conservation. In addition to this, appropriateness of thirty selected ITKs used by the fishers of Tripura was also attempted. Appropriateness of ITKs was studied on parameters, such as, cost effectiveness, complexity, environment friendliness, social and cultural acceptance, trail ability, uniqueness, scientific value and relative advantage. From the assessment of appropriateness it was found that according to the fisheries scientist preventing the entry of otter using egg shell and lime was the most appropriate ITK, scoring (3.19/5), whereas, from the students' point of view use of neem dust to control EUS scored the highest (3.58/5). Most of the ITKs were found to be very much appropriate for further studies and validation.

I6

Thesis Title : Indigenous Technical Knowledge in Fisheries and Aquaculture of Manipur

Student : Ms. Beishamayum Nightingale Devi (MFSc - FBM 2007-09)

Major Advisor : Dr. S.K. Mishra

Now-a-days indigenous knowledge's (ITKs) in fisheries are considered to be the backbone of sustainable fisheries development, which are developed by the people based on their experience, continuous observations, evaluation and improvement over a period of time by trial and error, and they use these traditional wisdoms to solve many of their problems. It plays an important role directly or indirectly in the protection to a large number of people in the state of Manipur. Very little effort has been made so far to study the ITKs of the state. Therefore, the present investigation was undertaken to study details of different indigenous technical knowledge being practiced in the central valley of Manipur, which comprises of four districts of the state. The specific objectives of this study were to document the different indigenous technical knowledge relating to fisheries activities in Manipur by surveying, interviewing, site-observations and also from the available secondary sources, and to explore the fishermen's rationale and perception behind the use of these knowledge. The socio-economic profile of the study area revealed that respondent fisherman were well-experienced in fisheries activities, but need improvement in their living conditions. ITKs in fisheries activities of central valley region were found widely distributed in different fields starting from fishing methods, fish aggregating devices (FADs), fish health management practices, processing & preservation methods to the importance of fish in different rituals and customs of the state. In addition to this, efforts have also been made to assess the appropriateness and scientific value of twelve selected Indigenous technical knowledge as perceived and score by different experts from different organizations, based on six parameters, viz. cost-effectiveness, materials availability, social acceptability, cultural appropriateness, environmental soundness and scientific value. As per the experts' assessment, all the twelve selected ITKs were found more than 75 percent appropriate and having scientific value.

ix. Gender Analysis Theme

G1

Thesis Title : Gender Perspectives in Fisheries Development in Tripura: Determinants, Adoption Behaviour and Sustainable Livelihood

Student : Ms. Banti Debnath (PhD – FEX 2010-15)

Major Advisor : Dr. Krishnan M.

Fisheries have a unique status in Tripura and fish is an integral part of social and cultural life of the people of the state. The increasing role of women in the socio-economic and cultural-political relationships results in enhanced access to their social capital. Objectives of the study were i)To document the current socio-economic and political profile of women in fisheries in Tripura ii)To study the existing institutional arrangements for supporting livelihoods of women in fisheries and related economic activities iii)To assess the adoption level of new and modified technologies and approaches in fisheries by women stakeholders iv)To identify systemic constraints, development externalities and explore the possibilities of scaling up specific identified economic opportunities. Primary data has been collected through pre-designed structured interview schedule from 360 respondents from six sectors, i) aquaculture ii) reservoir fisheries iii) fish processing iv) fisheries casual labours v) fish marketing in plain areas and vi) fish marketing in hilly areas. From each sector 30 women and 30 men active respondents were selected. Results show dependency ratio of women was found to be lower than men but in case of their income from fisheries and education, with a significant statistical difference women scored lower than men. Kruskal Walli's test revealed a significant difference between educations, income and dependency ratio among respondents from different sectors. Though women participate actively in different fisheries activities but their participation in decision making is very low. Institutions like DoF, ICAR, NGOs, CoF, Credit institutions and press are the major stakeholders in fisheries and have a major role in development of the both the fisher/fish farmer and the fisheries. Study reveals a considerable gap between the knowledge and adoption level of the improved technological practices among both the women and men and majority of them are partial adopters. Binary logistic regression in aquaculture sector shows gender and total family Income positively affect the respondent's level of adoption, while the influence of age is negative. In fish processing sector the determining variables for adoption of improved practices are respondent's total family income and their participation in SHGs. The major constraint faced by the women from all the sectors is gender discrimination followed by lack of resource and information. Fish production can be increased by the involvement of both the genders equally. Development programs and schemes are to be framed, implemented, followed-up and managed both sensitively and scientifically.

G2

Thesis Title : Gender Roles in Matrilineal Society of Meghalaya: A Study in Fishery Sector

Student : Mr. Balkam R. Sangma (MFSc - FEX 2013-15)

Major Advisor : Dr. Arpita Sharma

Meghalaya the state which lies in north eastern corner of India is home to few remaining matrilineal societies. A study was carried out on a sample size of 80 with a view to highlight gender roles in matrilineal society in respect to fishery sector. Study was done in 5 districts of Meghalaya viz. East Garo Hills, West Garo Hills, North Garo Hills, Ri-Bhoi and East Khasi Hills. Personal interview coupled with focus group discussion was conducted employing snowball technique of sampling. First objective was to study gender roles with regards to matrilineal society and to document the contribution of women towards their family income. In context of fisheries, activities ranging from pre stocking to post stocking activities including marketing activities were studied for both genders. Average annual income showed a plausible difference in the income earned by men and women. Women had high contribution towards family income and their contribution towards saving was 60%. Second objective was to undertake gender based Time Use Survey (TUS) in fisheries as well as agriculture and horticulture and to statistically test if there exists any significant difference among these sectors. Activities that receive remuneration were recorded as per the classification of United System of National Accounts (UNSNA) as SNA, productive activity that did not receive remuneration were extended SNA and time spent on personal activities were Non SNA. Time spent on SNA and Non SNA activities for women was observed to be less than male counterparts in general; however the trend reverses in respect of extended SNA. Time spent on SNA activities in fishery sector was higher for women (0.56 hours) than men (0.42 hours). Furthermore, study on agricultural activities employing TUS presents slightly different findings wherein the extended activities shows higher for women (6.59 hours) than male counterpart (3.5 hours) the trend reverses in case of SNA activities as men (3.5 hours) were observed to spent more in comparison to the amount of time spent by the women (0.30 hours). As far as horticulture is concerned the time spent on SNA and extended activities shows maximum participation for women than men. Time spent on SNA activities were estimated at 2.9 hours for women and 1.42 for men. With respect to extended activities in horticulture the time spent by men and women were estimated at 2.3 and 2.5 hours respectively. T test was undertaken with the view of testing the hypothesis and the revelation implied that there is significant difference between the time spent by men and women in different activities under different sector. Third objective was to document constraints and formulate gender neutral policy. Timely availability of input and the need for credit was observed as the major constraint highlighting the need for policy makers to incorporate basic needs to achieve self- sufficiency in fish production besides strengthening the extension farmer interface. Mann Whitney U test was applied in the study to assess the significant difference with respect to the constraint faced by men and women. Significant differences were found for low level of education, mobility, awareness training and the availability of market. The study has revealed that women are playing significant role in fisheries as well as other sectors. Even in matrilineal society of Meghalaya, gender differences exist between the number of hours spent on SNA and Non SNA activities. Contribution of women towards family income is high. Regarding constraints faced by them too, gender differences exist. This study is in interest for economic policy to answer questions such as how to arrive at more inclusive economic growth, calling for enhanced integration of the results from micro-surveys to the system of national accounts.

G3

Thesis Title : Analysis of Women Co-operative Societies in Ornamental Fisheries, West Bengal

Student : Mr. Sumit Mondal (MFSc - FEX 2013-15)

Major Advisor : Dr. Arpita Sharma

West Bengal State Fishermen's Cooperative Federation Ltd. (BENFISH) has taken up a project on Ornamental Fish Culture through Fisherwomen Cooperative Societies (Rangin Matsya Chas Mahila Samabaya Samiti) sanctioned by Fisheries Department Government of West Bengal and the NCDC, New Delhi. A study was conducted to assess the organizational structure and financial performance of these cooperatives, to analyze activity profile of women members by Time Use Survey (TUS) and UN-System of National Accounts (UNSNA), to analyze practical and strategic gender needs of women members, to study the control of resources and decision making of women members using Moser Gender Framework Analysis and to identify constraints faced by women members in functioning of cooperatives. The study was done in 3 districts North 24 Parganas, Howrah and South 24 Parganas. From each cooperative 6 members were selected, so total 90 women members were interviewed. Discussion was held with chairpersons of societies to elicit additional information. It was found that 74.4% women were Hindus and rest were Muslims. Women belonged to General and OBC (35.6%) followed by SC 16.7% and ST 12.2%. Around 90% women were in the 30-50 age group with at least primary education with all being married and 62.2% families having nuclear families. Cooperative had a 3-tier structure with 16 to 28 members. Chairperson holds the top position in a cooperative, and then were the supervisor, cashier and treasurer. Information flow was found to be horizontal and vertical. Regarding financial performance, cooperatives of South 24 Pargana had better sales turnover than cooperatives of other two districts. Women spent 15% of their time to SNA activities, 68% to non-SNA activities and 17% to extended SNA activities. Age had a negatively significant correlation with time spent in cooperative work. Coefficient of determination (R2) was 0.604 i.e. the independent variable (age) explains 60.4% variability in the time spent in cooperative works. Poor transportation was found most important practical basic need. Among fishery needs, availability of seed was most important. Regarding strategic needs, leadership, control on resources was ranked high. Women's involvement in decision-making related to financial, family and social aspects was studied using five point scale. As regards to financial decisions, women had highest participation in marketing whereas least participation in taking loan. In family aspects, women had least participation in decision making about mobility. In social aspects, they had high participation in decision making in cultural activities. Decision score of financial aspects was found to be less. Age and education had a positively significant relation with decisions taken on financial aspects. Regarding control of resources study revealed that ownership of land was mostly with males (70%) but women had the power to control over operational area or farm (48.9%) where they work. Fish culture and breeding activities were done mostly by women (66.7%). Women also had the control on attending training or exposure visits (72.2%). But both men and women decide matter of purchasing and selling of fish (58.9%). Major constraints for women members were lack of training followed by getting proper information. Among financial constraints, seed and feed cost ranked first followed by labour charges. Among core constraints, occurrence of fish disease ranked first followed by availability of inputs. Poor transportation ranked first followed by poor road facility under infrastructure constraint. Kruskal-Wallis H test result showed a significant difference existed among the 3 districts with respect to every constraint. Study has revealed that organizational structure is 3-tier. Flow of information can be improvised by having more interaction among BENFISH, Dept. of Fisheries and the members of cooperative societies. Regarding financial performance, maintenance of records is not up to date for which trainings are needed. Women are spending time in household works as well as in fisheries activities. Though they are earning income, doing all the farm activities, when the time comes to take any financial decision and control of resources, women members' participation is not so high. Trainings on leadership and decision making is required. Women are actively engaged in ornamental fisheries sector through women cooperatives and playing vital role both in on-farm and off-farm activities.

x. ICT Applications Theme

C1

Thesis Title : Effectiveness of Fisheries Based Television Programmes in West Bengal

Student : Mr. Amitava Ghosh (MFSc – FEX 2011-13)

Major Advisor : Dr. Arpita Sharma

Aquaculture is a growing sector with an ability to have significant impact on economic development of country. Out of total fish product Bengal ranks first in this regard. In the state a number of agriculture based audio-visual programmes are telecasted via public (DD-Bangla) as well as private (ETV- Bangla) television channels. There are specific fisheries based programmes telecast on DD- Bangla (Krishidarshan) and other private channels like ETV Bangla (Annadata). Effectiveness of these programmes is normally not measured. With this background, a study has been carried out with the objectives to perform content analysis of fisheries based television programmes telecast by public television channel in West Bengal, to study effectiveness of fisheries based television programmes telecast by public and private television channels in West Bengal and to develop package of suggestions for improving effectiveness of fisheries based television programme. North 24-Parganas and South 24-Parganas district respectively were considered as locale of study. A total of 60 respondents were purposively selected from each district making a total of 120 respondents covering sic blocks of the two districts. Content analyses revealed that majority of programs were related to agriculture (83.13%) followed by animal husbandry (8.48%) and fisheries based topics (8.39%). ANOVA results showed (test statistic Fcat (2-12)= 45.34> Fcirt 0.05; (2.15) = 3.89 at 5% level of significance) statistically significant differences as regards to number of agriculture, animal husbandry and fisheries based programmes. In case of fisheries, majority of topics were related to fish breeding, seed production and hatchery management (28.72%) followed by general fisheries based topics, scientific aquaculture practices (20.215) and brackish water aquaculture (11.07%). Effectiveness of fisheries based television programmes in West Bengal has been studied on the basis of parameters related to modes of programming, segments of programming, contents of programmes and other related parameters. The Mann-Whitney U-test revealed statistically significant difference with respect to effectiveness. Likert scale score for Krishidarshan and Annadata was 3.36 on a scale of 5. Both the scores were above 3 but less than 4 suggesting that both the programmes were moderately effective. Based on the suggestions of respondents and experts, efforts were made to suggest 4 P's for effective fisheries based television programmes. The suggestions provided by respondents were tested by Kendall's Coefficient of Concordance (W) = 0.63 suggesting agreement among the respondents in ranking the programmes topics.

C2

Thesis Title : ICT Based Extension Interventions in Fisheries and Aquaculture Development in Tamil Nadu

Student : Mr. C. Lloyd Chrispin (MFSc - FEX 2010-12)

Major Advisor : Dr. Ananthan, P.S.

The study was undertaken to identify, document and understand the performance of existing Information and Communication Technology (ICT) based extension interventions in Tamil Nadu fisheries and aquaculture. Twelve ICT based interventions were found and documented in marine fisheries while there was only pilot scale initiatives found in aquaculture. Among them, Government Organisations (GO) led initiatives were found less effective but more sustainable whereas non-governmental organisations (NGO) led initiatives was found to be more effective but less sustainable as they critically depend on external funding support. Detailed field study on the performance of Indian National Centre for Ocean Information Services' (INCOIS) Potential Fishing Zone (PFZ) and Ocean State Forecast (OSF) advisory services as an ICT based extension intervention was carried out in coastal north Tamil Nadu around the major fishing harbours of Chennai, Cuddalore and Nagapattinam. In the study area, fishers, irrespective of craft type and location, were aware about these advisory services but their usage varied. Presence of service providers as well as its frequency of service delivery was found to be single most important role with respect to awareness and usage of PFZ advisory service as well as use of ICT tools to access PFZ & OSF services. Awareness of eleven types of Indigenous Technical Knowledge (ITK) related to identification of fishing ground, distance, direction and depth was observed among the fishers, but their usage were more among motorised as compared to mechanised fishers. The possession of new ICT tools and their usage like mobile, TV, VHF radio, and GPS were very high across the study area. Overall, levels of education seems to have an important and positive role in usage of ICT tools, as well as usage of INCOIS advisory services, while the role of age and fishing experience play negative but significant. When it comes to awareness and usage of ITK, the role of education and fishing experience seems to be opposite. Based on the inferences drawn, an ideal ICT based extension intervention model for marine fisheries shall consist of sector specific information, direct service to vessel, effective public-private partnership, validating and integrating ITK through community participation, usage of most effective ICT tools, and dedicated 24x7 radio service from INCOIS as its key elements for both effectiveness and long term sustainability.

C3

Thesis Title : ICT Based Extension Interventions in Fisheries and Aquaculture Development in Andhra Pradesh

Student : Mr. Sandeep P. (MFSc - FEX 2010-12)

Major Advisor : Dr. Ananthan, P.S.

The study was undertaken to identify, document and understand the performance of existing ICT based extension interventions in Andhra Pradesh fisheries and aquaculture. Only two ICT based interventions were found and documented in marine fisheries as well as marketing while there were four initiatives found in aquaculture. Of these, only aqua-choupal and INCOIS advisory services were found to have wider coverage and utility. Detailed study on performance of INCOIS potential fishing zones (PFZ) and ocean state forecast (OSF) advisory services as an ICT based extension intervention was carried out across five coastal districts of Andhra Pradesh. In the study area, fishers, irrespective of craft and location were aware about these advisory services but their usage varied. Presence of service provider was critical factor in determining the usage of PFZ advisories though the extent of usage itself was very limited (10%). Awareness of eleven types of ITK related to identification of fishing ground, distance, direction and depth was observed among the fishers,but their usage were more among mechanized (70%) as compared to motorized fishers(66%). The possession of new ICT tools and usage of mobile and TV were high but navigational equipment like VHFs (41.7%) and GPS (25.8%) were very low across this study area. Awareness of ITK positively correlated with experience, type of craft, ICT ownership and types of services provider, implying that the experienced fishers with mechanized crafts and ICT tools have higher awareness on ITK and their level of ITK usage was also high. Awareness of INCOIS services was more among the ICT owners and type of services provider. The NGO (MSSRF) presence widened awareness and usage levels, though its coverage was limited. Positive relation between type of craft and usage of INCOIS services use was due to mechanized craft owners having sophisticated ICT tools on board. Ownership of mobile or ICT tools in particular positively affects use of INCOIS services. Further, services provider like MSSRF encourage use of mobile for accessing INCOIS services through their unique SMS services on mobile. An effective ICT based extension model for marine fisheries shall consist of generating and disseminating a valid craft and gear specific direct advisory service to vessels in partnership with NGOs/CBOsfor its validation and uptake. However, it presupposes, unlike now, the availability of highly valid, useful, regular and consistent information from INCOIS /other agencies underlining that information generation stage is as important as information dissemination stage.

C4

Thesis Title : Study on Dissemination of Ocean Information and Advisory Services to Fishers in South Tamil Nadu

Student : Mr. Jackson Paul M. (MFSc - FEX 2010-12)

Major Advisor : Dr. Sheela Immanuel

There is an increasing realization about the potentialities of Ocean Information and Advisory Services. Fishers, who have been living in the area for more than two or three generations, have enough know-how of their fisheries operation, but the new generation fishers mostly depend on the Ocean Information and Advisory Services. Climate changes lead to natural calamities which affects the livelihood security of the fishers. In that case, Ocean Information and Advisory Services are very useful to the fishers. The study was carried out in Kanyakumari, Thoothukudi and Ramanathapuram districts of southern coastal districts of Tamil Nadu with the sample of 180 respondents selected equally from mechanized and motorized sector, skippers of the vessel selected as respondents. The purpose of the study is to explore the existing dissemination of information to the fishers and their perception towards ocean information and advisory services. Results are discussed in terms of their implications for future development of ocean information and advisory services. Results show that, fishers were not using PFZ advisory regularly, which is due to non-availability of the information for all the fishing days, but fishers of motorized (80.4) and mechanized (76.8) sector had higher perception of PFZ advisory in terms of reduced searching time, leads to the reduction of fuel consumption, and increased CPUE and increased net profit. Fisher of the motorized (89.9) and mechanized (89.2) sector also had high perception on the ocean state forecast in terms of saving life by knowing upto date information on disastrous events and high wave alerts. Most of the fishers were expressed non willingness to pay to receive ocean information and advisory services and requested to disseminate at free of cost. The present study suggested ways and means to improve disseminate at free of cost. The study suggested ways and means to improve dissemination of ocean information and advisory services to the fishers.

C5

Thesis Title : Communication Behavior of Fishers, Fish Farmers and Officers of Fisheries Department in Manipur

Student : Ms. Bala Thongam (MFSc - FEX 2010-12)

Major Advisor : Dr. S.N. Ojha

To improve fish production and modernize aquaculture in the state of Manipur, it is essential to disseminate the most recent information on fisheries and aquaculture technologies and management practices not only among fisheries and fish farmers, but also to fisheries officers of the state Fisheries Department by various means and channels. Purposive and random sampling was adopted to select 120 respondents, fishers (40) and fish farmer (80), from 8 villages. From the study, it has been observed that the age group of 31-45 years mainly involved in fisheries and aquaculture activities. 35% of the fishers are illiterate whereas, 30% of the fish farmers have attained high school level of education. Majority of the fishers (82.5%) and fish farmer (68.75%) are not able to participate in social participation due to inadequate time. As the cost of living increases, in order to meet both fishers and fish farmer as seen to be involved in other secondary occupations. For the last several years there were no recruitments against the vacant posts in the Department of Fisheries, majority (96.42%) of the fishery officials have 40-60 groups with professional (53.57%) and non-professional (46.42%) education qualification. The fisher and fish farmer seek majority of the information from personal localite sources like neighbour, friends and progressive farmers. Radio plays an important role in disseminating information to fisher (100%), fish farmer (90%) and fishery officials (96.4%). The fishery officials seek maximum information from all sources followed by fish farmers and fishers. The level of understanding, interpretation, analysis, evaluation and storage of the information has been observed best in case of fishery officials but the level of dissemination by the fishers are of more uniform and fast. Inadequate time and lack of contact with experts are the major constraints which hinder the communication behavior among fishers and fish farmers and poor economic condition of the fishermen in case of fisheries officials respectively.

C6

Thesis Title : Communication Behavior of Fishers, Fish Farmers and Officers of Fisheries Department in Arunachal Pradesh

Student : Mr. Kaling Padung (MFSc - FEX 2010-12)

Major Advisor : Dr. S.K. Mishra

Communication and information play an important role in public as well as private extension. An understanding of communication behavior of fish farmers, aquaculture practices and improve fish production in Arunachal Pradesh. Information seeking behavior fishers and officers of DoF is essential in formulating effective communication strategies to modernize of fisheries were considerably poor with median value of 22%, while fish farmers and DoF officers exhibited moderately high degree of information seeking behavior with median values of 72% and 78% respectively. The result were similar with respect to information processing behavior and information output behavior wherein maximum score was obtained by officers followed by fish farmers and fishers. The Development Competency Index (DCI) of DoF staff was found to be 58.24%. The DCI was found to differ significantly among DoF staff across district with HQ staff having highest score (76.31%) and upper Siang district staff having lowest (48.84%) score. Also, the DCI score differed significantly across the cadre with senior officers having higher score and lower level staff having low score which was further explained by their differential educational qualifications and experience. The components of DCI namely technical knowledge, training skills also differed among cadres as well as districts indicating the strong necessity to train the lower and middle staff especially in districts. Significance tests also revealed that information seeking, information processing and information output behaviors differed significantly among fishers, fish farmers and officers of DoF. Television was found to play a major role in disseminating information to fish farmers (66.7%). Lack of adequate infrastructure facilities with DoF for training and demonstration was found to be the major constraint (93%) followed by lack of adequate officers strength (80%).

Index

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About the Association

Agricultural Economics Research Association (India), a registered society which came into being in 1987, has on date more than 800 life members, 110 ordinary members, more than 115 institutional members and 25 honorary life members from India and abroad. The mandate of the Association is to promote the study of agricultural economics in particular and socio-economic problems in general. The Association has been regularly publishing a six-monthly research Journal "Agricultural Economics Research Review" since 1988. Besides refereed research articles, comprehensive review articles in the area of agricultural economics (including horticulture and fisheries), conference/symposia proceedings and book reviews are also published in the Journal. To encourage the young researchers, abstracts of M.Sc. and Ph.D. theses in agricultural economics are also published in the Journal. The Association has been successfully organizing national conferences regularly on topical policy issues, the proceedings of which have been published. The Association undertakes sponsored research studies. Over the years, the Association has attained a wide visibility and professional credibility. The official journal of the Association, namely, Agricultural Economics Research Review has been highly rated by National Academy of Agricultural Science, New Delhi.

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