



**PROCEEDINGS OF THE NATIONAL  
WORKSHOP  
on  
FISHERIES ECONOMICS RESEARCH AND  
EDUCATION IN INDIA : AN OVERVIEW**

**28-29 June, 2001**



**Organised by**

**Central Institute of Fisheries Education**

(Deemed University),

Indian Council of Agricultural Research

Versova, Mumbai-400 061

and

**Indian Fisheries Association**

Mumbai - 400061

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Versova, Mumbai-400 061

**Proceedings of the National Workshop  
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INDIA : AN OVERVIEW**

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**PRELUDE**

Indian fisheries sector plays an important role in the socio-economic development of the country, in view of its potential contribution to national income, nutritional security, employment opportunities, social objectives and export earnings. Fisheries contributes 4.3 percent to the agricultural GDP and export earnings are presently valued at over Rs. 6,400 crores. In addition, it provides direct and indirect employment and dependency for over seven million people in the country.

With an estimated production potential of 8.4 million tons (MT), the present level of production in the country is 5.9 MT with almost equal contribution from inland fisheries and marine fisheries. The fisheries sector in the country presently has an annual growth rate of about 6 percent. Fisheries Economics has been playing a prominent role in different facets of fisheries and aquaculture.

The Central Institute of Fisheries Education, (CIFE) Mumbai, in association with the Indian Fisheries Association organised a national workshop on "Fisheries Economics Research and Education in India : An Overview", at the CIFE, Mumbai during, 28-29 June, 2001.

### **Objectives :**

- ◆ To identify course needs in fisheries economics at postgraduate (PG) level.
- ◆ To identify thrust areas in fisheries economics.
- ◆ To form a national networking of fisheries economists.
- ◆ To develop inter institutional linkages.

### **PARTICIPANTS :**

The esteemed participants included the invited faculty members and researchers from Fisheries Institutes of ICAR, State Agricultural Universities, Financial Institutions, Management Institutions, Government Departments etc.

The participants included

- |                      |   |
|----------------------|---|
| ❖ Dr. M. Mahadevappa | Chairman, Agricultural Scientists Recruitment Board, ICAR, New Delhi  |
| ❖ Dr. S. Ayyappan    | Director, Central Institute of Fisheries Education, Mumbai  |
| ❖ Dr. S. D. Tripathi | Former Director, Central Institute of Fisheries Education, Mumbai   |
| ❖ Dr. Dayanatha Jha  | National Professor and Former Director, National Centre for Agricultural Economics and Policy Research (NCAP), New Delhi. |
| ❖ Dr. S. Paul        | Former Senior Scientist, Central Inland Capture Fisheries Research Institute, Barrackpore.                                |
| ❖ Prof. P. S. Rao    | Former Principal Scientist and Head of Fisheries Economics Division, Central  |

- Institute of Fisheries Education,  
Mumbai.
- ❖ Dr. B. S. Saxena Former Principal Scientist and Head of Economics Division, Central Institute of Fisheries Education, Mumbai
  - ❖ Dr. S. C. Mukherjee Joint Director, Central Institute of Fisheries Education, Mumbai
  - ❖ Dr. M. D. Zingde Scientist-in-Charge, National Institute of Oceanography, Regional Centre, Mumbai.
  - ❖ Dr. K.K.P. Panikkar Former Senior Scientist, Central Marine Fisheries Research Institute, Cochin.
  - ❖ Dr. R. S. Biradar Principal Scientist and Head, Fisheries Informatics and Technology Evaluation and Transfer Division, Central Institute of Fisheries Education, Mumbai
  - ❖ Shri Anil Agarwal Principal Scientist, Indian Council of Agricultural Research, New Delhi.
  - ❖ Dr. D.B.S. Sehera Principal Scientist, Indian Council of Agricultural Research, New Delhi.
  - ❖ Dr. S. N. Gajbhiye Senior Scientist, National Institute of Oceanography, Regional Centre, Mumbai.
  - ❖ Dr. M. Krishnan Senior Scientist, Central Institute of Brackishwater Aquaculture, Chennai.
  - ❖ Dr. Samar K. Datta Professor, Indian Institute of Management, Ahmedabad.
  - ❖ Dr. Ramachandra Bhatta Associate Professor, College of Fisheries, Mangalore.

- ❖ Dr. S. K. Chakraborty Senior Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. Pradeep K. Katiha Senior Scientist, Central Inland Capture Fisheries Institute, Barrackpore.
- ❖ Dr. S. N. Ojha Senior Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. Geetanjali Deshmukhe Senior Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. Latha Shenoy Senior Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. G. Venkateswarulu Senior Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. K. Pani Prasad Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Shri P. K. Pandey Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. Anjani Kumar Scientist, National Centre for Agricultural Economics and Policy Research, New Delhi.
- ❖ Shri Shyam S. Salim Scientist, Central Institute of Fisheries Education, Mumbai
- ❖ Dr. Joseph Durai Reader, Presidency College, Chennai.
- ❖ Shri K. Veeranjanylu Assistant Professor, College of Fisheries, Muthukur, Nellore
- ❖ Dr. T. Ravishankar Scientist, Central Institute of Brackishwater Aquaculture, Chennai.
- ❖ Shri Satish Barve Assistant Professor, College of Fisheries, Ratnagiri.
- ❖ Shri S. K. Bhatnagar Deputy General Manager, National Bank

- ❖ Dr. K. S. Mayadevi for Agricultural and Rural Development, Mumbai  
Manager, National Bank for Agricultural and Rural Development, Mumbai
- ❖ Shri Chandrakanth, M.H. Technical Officer, Central Institute of Fisheries Education, Mumbai
- ❖ Shri A. K. Reddy Technical Officer, Central Institute of Fisheries Education, Mumbai
- ❖ Shri S. K. Pandey Technical Officer, Central Institute of Fisheries Education, Mumbai
- ❖ Shri Mukunda Goswami Senior Research Fellow, Central Institute of Fisheries Education, Mumbai
- ❖ Shri K. N. Sahoo Senior Research Fellow, Central Institute of Freshwater Aquaculture, Bhubaneswar, Orissa
- ❖ Ms Maya R. J. Ph.D. Student, Central Institute of Fisheries Education, Mumbai
- ❖ Shri Manush, S. M. M.F.Sc. Student, Central Institute of Fisheries Education, Mumbai
- ❖ Shri Suresh Babu M.F.Sc. Student, Central Institute of Fisheries Education, Mumbai
- ❖ Shri Ganesh Kumar M.F.Sc. Student, Central Institute of Fisheries Education, Mumbai
- ❖ Shri Grinson George M.F.Sc. Student, Central Institute of Fisheries Education, Mumbai
- ❖ Shri Vijay Venugopal M.F.Sc. Student, Central Institute of Fisheries Education, Mumbai.

## INAUGURAL SESSION

Date : 28.07.2001

Time : 10.30 a.m.

Venue : D. V. Bal Auditorium

The inaugural session of the National Workshop on “Fisheries Economics Research and Education in India : An Overview” commenced with the welcome address by Dr. S. Ayyappan, Director, Central Institute of Fisheries Education (CIFE), Mumbai. In his welcome address he stressed the importance of Fisheries Economics in Fisheries Research and Development in the changed economic scenario of the country.

Dr. R. S. Biradar, Principal Scientist and Head, Fisheries Informatics and Technology Evaluation and Transfer Division outlined the objectives of the workshop. He listed the topics that are scheduled for discussion during the workshop, which included :

- † Human Resources Development (HRD) in Fisheries Economics.
- † Fishery policy formulation.
- † Impact assessment of fishery technologies.
- † Research prioritization in fisheries.
- † Trade and WTO related aspects.
- † Application of analytical techniques in fisheries research.
- † Property rights and sustainability issues in fisheries resource management.
- † Marketing in fisheries - problems and prospects.
- † Role of fisheries economics in fisheries research.



Dr. M. Mahadevappa, Chairman, Agricultural Scientists Recruitment Board, New Delhi, the chief guest of the inaugural function in his inaugural address stressed the importance of economic evaluation of various technologies.

Dr. S. D. Tripathi, Former Director, CIFE, who was the guest of honour, in his address shared his experiences of strengthening the discipline of Fisheries Economics, during his tenure as Director at CIFE, Mumbai and CIFA, Bhubaneswar.

Dr. S. C. Mukherjee, Joint Director, Central Institute of Fisheries Education proposed the vote of thanks.

## TECHNICAL SESSION I

**Chairman : Dr. M. Mahadevappa**

**Rapporteur : Mr. Shyam S. Salim**

The session included two papers - the theme paper by Dr. R. S. Biradar and the other by Dr. B. S. Saxena. The details and highlights of the papers are given below:

### (i) **Fisheries Economics Research and Education in India :**

#### **An Overview**

- *R.S.Biradar, Shyam S. Salim, Mukunda Goswami and S. Ayyappan*

The paper high lighted

- ⇒ Importance of fisheries in the national economy.
- ⇒ Economic opportunities and incentives in adoption of fish farming
- ⇒ Lack of opportunities for pursuing Masters and Doctoral programmes in Fisheries Economics in India.
- ⇒ Graduate level fisheries economics restricted to one or two courses in economics and three or four courses in management.
- ⇒ Uniform syllabus has been recommended at undergraduate level.
- ⇒ So far research on fisheries economics mainly covered marine capture fisheries.
- ⇒ Lot of work has been carried out on socio-economic aspects of marine fisheries.
- ⇒ Infrastructure needed for domestic fish marketing is not adequately researched.
- ⇒ Role of financial institutions for planning of fisheries sector in India, need critical analysis.
- ⇒ Aquaculture economics on the lines of agricultural economics is yet to take off.

**(ii) Role of fisheries economics research and education in the development of Indian fishing industry.**

- *B. S. Saxena*

The paper covered the following aspects

- ⇒ Evaluation of Indian fishing industry from subsistence stage, to development stage.
- ⇒ Lack of analysis and interpretation of fisheries economics.
- ⇒ Stages of fisheries research.
- ⇒ Inadequate statistical data, particularly economic data.
- ⇒ Special features of economics of fishing industry.

## TECHNICAL SESSION II

**Chairman :** Dr. S. D. Tripathi  
**Rapporteur :** Mr. Shyam S. Salim

In this session the following papers were presented and the highlights included :

**(i) Importance of Fisheries Economics in Marine Research**

- *P. S. Rao*

- ⇒ Cost of production of many sub-systems of fisheries are yet to be worked out.
- ⇒ Earnings of fish exports vis-à-vis investment needs to be studied.
- ⇒ Transfer of technology needs perfection.
- ⇒ Location specific cost of earnings studies are need of the hour.

**(ii) Need for innovative fisheries policies for development**

- *P. S. Rao*

- ⇒ Policies are required for production, export and import of fish, price support mechanism, marketing etc.
- ⇒ Policies for employment generation, aquaculture, mariculture etc.

**(iii) Possible thrust areas in fisheries economic research**

- *S. Paul*

- ⇒ Need for a new social rate of return comparable with Government rate of interest.
- ⇒ Shadow prices are to be stressed and worked out.
- ⇒ Demand supply aspects need thorough investigation.

**(iv) Resource Management and Sustainability Possessory rights in Fisheries**

- *S. Paul*

- ⇒ Fisheries of open water is a common property resource.
- ⇒ Common property resources are to be evaluated.

**(v) Certain institutional and legal bottlenecks in fishery policy formulation**

- *S. Paul*

- ⇒ Neglect of open water fisheries.
- ⇒ Fishery policy should combine growth, equity and ecological balance.

**(vi) Research in marine fisheries economics in India - An Overview.**

- *R. Sathiadas and R. Narayankumar*

- ⇒ Marine fisheries in India is accorded priority on the planned development.
- ⇒ Fishing units on an average run on profit.
- ⇒ Marginalisation of indigenous sector and over capitalisation poses a serious problem.
- ⇒ Growth of fish production and overall development of fisheries sector depend largely on an efficient marketing system.
- ⇒ Post-harvest sector shown substantial growth in infrastructure development, expansion of internal marketing and boost in export earnings.
- ⇒ Lack of socio-economic information is an impediment to framing of effective policy.
- ⇒ Census of marine fisherman, craft, gear and other socio-economic conditions on regular basis is required.

**(vii) Fishery Economics Courses in College of Fishery Science, Acharya N.G. Ranga Agricultural University, Muthukur : An Overview**

- *K. Gopal Rao and K. Veeranjanyulu*

- ⇒ The profile of College of Fishery Science, Muthukur, Nellore was outlined.
- ⇒ Fisheries Work Experience Programme (FIWEP) for a period of one semester during the final year stressed.
- ⇒ Uniform curriculum in the Fishery Economics Courses.

**(viii) Reorienting Fisheries Economics Education in India**

- *Shyam S. Salim, R. S. Biradar and Grinson George*

- ⇒ Socio-economic concerns, Responsible aquaculture and new EXIM policies added new vistas to research and policy concerns.
- ⇒ Lack of full fledged fisheries economics programme is a major constraint in developing human resources in fisheries economics.
- ⇒ Environmental resource economics, predictive modelling, production and marketing relation, socio-economics, WTO agreements, sustainability studies, impact assessment, research prioritisation are new frontier areas in fisheries economics education.

**(ix) Marine Fisheries Resources Management in Gujarat**

- *D. B. Sehera*

- ⇒ Favourable policies of Gujarat Government to enhance fish production.
- ⇒ Growing concerns due to reduction in the mesh size.
- ⇒ Role of government to guide fishermen in conserving valuable resources.
- ⇒ Fisheries management equilibrium would be a bio-equilibrium accompanied by safeguarding of society's interest.

**(x) Brackishwater Aquaculture : Issues of Sustainability, Economics and Equity**

- *M. Krishnan*

- ⇒ Need for a revised policy approach in brackishwater aquaculture based growth trends.
- ⇒ Balanced growth strategy is required which would take care of the sustainability without sacrificing equity and economics.
- ⇒ Legislative support required in addition to the monetary support for popularising brackishwater aquaculture.

**(xi) Organisational and Operational Infrastructure for Fisheries Research, Development and Education in India.**

- *Anil Agarwal*

- ⇒ An account of Fisheries Institutions in the country was given.
- ⇒ Production and productivity in the different Fisheries Sectors discussed.

**(xii) Socio-economic impact of changing fish utilisation pattern in Karnataka**

- *Ramachandra Bhatta*

- ⇒ Changes in the fish utilisation pattern in Karnataka in the post-economic reform period.
- ⇒ Total fish production and the quantity of high value species are declining after an initial increase during the process of mechanisation.
- ⇒ Steady and substantial increase in the demand for fresh fish at the cost of dry fish, in the last few years.
- ⇒ Considerable attention had been received on the social and economic costs of economic reforms and growth from the policy makers and researches.

**(xiii) Prioritisation of Fisheries Research in India.**

- *Pradeep K. Katiha*

- ⇒ The agenda for demand driven fisheries research based on the need of the clientele.
- ⇒ Fisheries problem should undergo a priority setting analysis.
- ⇒ Participatory Rural Appraisal and Rapid Rural Appraisal need increased application.



### TECHNICAL SESSION III

**Chairman : Dr. Dhayanatha Jha**  
**Rapporteur : Mr. Shyam S. Salim**

The third session started with Brain storming session on the following topics :

- (i) Fisheries Economics Education and Research in India
- (ii) WTO and Fisheries Sector
- (iii) Impact Assessment of Fisheries Technologies
- (iv) Indices for Fisheries
- (v) Policies in Fisheries and role of NCAP
- (vi) Networking of Fisheries Economists

#### **(I) Fisheries Economics Education and Research in India**

**Dr. Dhayanatha Jha**, stressed

- Familiarity with fishes
- Involvement of the human element
- How sociological aspects impinge on fishers economy
- Collaboration between NCAP and CIFE
- Need for the fisheries ministry in the Centre
- Price system and the marketing system
- Separate Fisheries Economics Division at PG and Ph.D level.
- A small committee should look after the content of M.F.Sc . Course
- Aggressive marketing of Fisheries postgraduates.

**M. Krishnan**, emphasized

- Need for Fisheries Economics Courses

**Pradeep Katiha**, expressed the need to

- Distinguish Agricultural and Fisheries Economics

**R. S. Biradar**, suggested

- Uniform syllabus at B.F.Sc level is in vogue.
- Need of M.F.Sc. (Fisheries Economics) course vis-à-vis manpower requirements.

**P. S. Rao**, said that

- There is need for introducing M.F.Sc in Fisheries Economics.
- Uniform syllabus focusing emerging trends in Economics should be introduced .
- Entrepreneurship oriented post graduate programme.

**R. Sathiadas**, said

- There are lot of opportunities for fisheries economists in Government and Banking Sectors.

## **(II) WTO and Fisheries Sector:**

**S. Paul**, mentioned

- restrictions on import

**Dhayanantha Jha** said there is need to study

- Demand pattern in domestic sector.
- Review current status of IPR , patenting or other regulations

**Pradeep Kumar Katiha** advocated for

- Value addition and maintenance of quality

**S. Basu**, suggested

- Research on quality for minimizing rejection.

**Anjani kumar**, advocated maintenance of

- Quality Standards

**Grinson George**, opined

- Policy of patenting indigenous species

**S. N. Ojha**, stressed on

- Quality maintenance

**Ramachandra Bhatta**, stressed on

- Microlevel research studies

### **(III) Impact Assessment of Fisheries Technologies**

**Dhayanantha Jha**, opined that

- Techno Economic Evaluation is not done properly.
- Adverse effects are to be looked upon in these approaches.

**D. B. S. Sehera**, clarified that

- All the techno-economic parameters are to be included for calculation.

**S. Paul**, suggested need for

- Location specific parameters for the self style evaluation

**R. S. Biradar**, emphasized the need for

- Multilocational and Farm trials before the release of technology

**S. D. Tripathi** recalled that

- Viable technologies exist for induced breeding and culture of air breathing fishes. Time is required for validation of technologies.

**K. N. Sahoo**, cited

- Technology evaluation and environment impact study of Andhra Pradesh

**D. B. S. Sehera**, suggested that

- There is a need to take the social cost into consideration
- Economists should be associated in the projects

**Manush**, said that

- Technology transfer takes time and hence the time value of money should be taken into account

**Dhayanantha Jha** stressed that

- Syllabi should include technology evaluation.

(iv) **Indices for Fisheries**

**Pradeep Kumar Katiha** ,explained

- The output indices in the case of rice
- Cost of cultivation and production

**M. Krishnan** , suggested

- Change in the value based on the base values

**Ravishankar** , mentioned

- On the carrying capacity of fishery resources

**S. D. Tripathi** opined

- The concept of sustainability indices

**S. Ayyappan** , stressed on

- Performance index which help in generation of more investments.

**K. K. P. Panikkar** , suggested

- The collection of price data along with catch and effort data.

**Dhayanantha Jha** concluded that

- The lack of quality data on cost of research
- Institutionalization of data collection.
- Output index
- The indices are Production, Productivity and Prices
- Consumption weights
- Input saved approach
- Estimating the total factor productivity
- Information on production and price

(v) **Policies in Fisheries and Role of NCAP**

**R. Sathiadas** suggested that

- CIFE in collaboration with other fisheries Institutes should work on policies
- Allocation of fishing rights
- Existing policies should be documented

**S. Ayyappan** assured that

- There will be coordination between all the institutes
- One pilot or model exercise may be undertaken

**Ravishankar** pointed out

- Financial constraints involved

**P. S. Rao** CIFE said that

- No uniform fisheries policy .
- Policy for the production, export and import.
- Review on the need of a policy
- Policy seminar for the fisheries can be organized by the NCAP

**Dhayanantha Jha** , concluded that

- Policies can be developed based on the potential and constraints
- Constraint analysis can be done.
- Classification based on the biotic and socio- economic parameters
- Rapid Rural Appraisal and Participatory Rural Appraisal
- The socio-economic issues will be addressed by the Government and the abiotic and the biotic aspects by the research institutes
- Need of a background paper and the conduct of a seminar
- Three day meeting with sessions on trade and infrastructure .
- NCAP will provide the guidance in this area

**(vi) Networking of Fisheries Economists**

The suggestions put forward stressed on

- Sub-network of fisheries economists.
- Use of network to enrich ideas and outputs.
- Collaboration with NCAP

## TECHNICAL SESSION IV

Chairman : Prof. P. S. Rao

Rapporteur : Mr. Shyam S. Salim

In this session nine papers were presented and the highlights include :

**(i) Eco-friendly fisheries extension policy.**

- *S. N. Ojha and Shyam S. Salim*

- ⇒ Need to strengthen people's participation for the implementation of regulated legal acts.
- ⇒ Modern aquaculture is seen from its exante consequences on environment by the fisheries department EIA studies.
- ⇒ To encourage eco-friendly cultural practices the department should start adaptive trials.
- ⇒ Resource mobilization, privatisation of the extension services also need serious considerations.
- ⇒ Self Help Groups for two fishermen needs to be developed.
- ⇒ Department of Fisheries should strengthen extension intervention. To start with, the apex level of the department should emphasis on mass contact. Middle level should work for group contract and entrepreneurship and the lower level should emphasis on personal contract method.

**(ii) Application of Analytical tools of measurement of economic sustainability in aquaculture - an outline.**

- *T. Ravishankar and M. Krishnan*

- ⇒ Need of sustainability indicators for the integrated management of sustainable aquaculture.
- ⇒ Dimensions of sustainability, ecological, socio-economic, community and institutional.



- ⇒ Analysis of inter-generational equity.
- ⇒ Sustainability function analysis based on input and output indices.

**(iii) Fisheries Financing - Problems and Prospects**

- *S. K. Bhatnagar*

- ⇒ Role of institutional financing for fisheries activities in commercialisation.
- ⇒ Activities supported through institutional finance in different fisheries sectors.
- ⇒ Future possibilities for fisheries financing.
- ⇒ Problems encountered at different stages by various financial agencies.

**(iv) Coastal Management to protect the fisheries resources of Gujarat coast - A case study.**

- *Geetanjali Deshmukhe, Shyam S. Salim and R. Sen Gupta*

- ⇒ Emphasis should be given to the development and exploitation of deep sea fisheries.
- ⇒ In coastal zone management, assessing impact of critical habitats on socio-economics are important.
- ⇒ Education of critical habitat is a dire need.
- ⇒ Increased use of Remote Sensing Techniques.

**(v) Cost estimation of a model semi-intensive shrimp farm.**

- *Chandrakant, M.H. and A. K. Reddy*

- ⇒ Combination of engineering skills and efficient management is required.
- ⇒ Semi-intensive shrimps are efficient and easy to operate.
- ⇒ Capital cost, operational cost and fixed cost are to be calculated.

**(vi) Aggregate level Research Priority Assessment.**

- *Anjani Kumar*

- ⇒ Concepts in research priority assessment.
- ⇒ Organisational hierarchy for resource allocation decisions.
- ⇒ Dimensions of research prioritisation.
- ⇒ Steps and methods in research priority assessment.

**(vii) Tamil Nadu Fisheries : Significance**

- *A. Joseph Durai and R. Srinivasan*

- ⇒ Importance of fisheries in the state economy.
- ⇒ Demand and supply estimation of fish in Tamil Nadu.
- ⇒ Policies and performance of fisheries in Tamil Nadu.

**(viii) Impact of Technological Transformation in Carp Culture in Kolleru Lake area of Andhra Pradesh**

- *K. N. Sahoo, G.S. Saha, A.K. Roy and K.P. Saradhi*

- ⇒ Impact assessment of different technological levels of carp culture indicated that carp culture is set for a take off.
- ⇒ Economically favourable vis-à-vis environmental stability.

**(ix) Quantitative methods of evaluation of aquaculture projects.**

- *K.N. Sahoo, G.S. Saha, A.K. Roy and K.P. Saradhi*

- ⇒ Benefit cost ratio.
- ⇒ Net present value.
- ⇒ Internal rate of return.
- ⇒ Pay back period.

## TECHNICAL SESSION V

Chairman : Prof. P. S. Rao  
Rapporteur : Mr. Shyam S. Salim

(i) **Quantitative Restrictions and Indian Fisheries Sector - Facts and Fears**

- *Maya, R.J., Shyam S. Salim, John Joseph Raj and G. Venkateswarlu*

- ⇒ Fish and Fisheries products figure prominently in the list of items on which QR's are removed.
- ⇒ Policy plans to focus on the changed scenario and gear up to utilise the full benefit after QR removal.

(ii) **Food security in India : Aquaculture an option.**

- *Vijay, V. and Shyam S. Salim*

- ⇒ Need for food security and its concern for the general masses.
- ⇒ Optimum utilisation by horizontal and vertical expansion for development of aquaculture.

(iii) **Tools for financial analysis of fisheries projects.**

- *Manush, S.M.*

- ⇒ Importance of planning before implementation in percolating government policies to grass root level.
- ⇒ Commonly used tools include pay back period, discounted pay back period, discounted benefit cost ratio method, net present value, internal rate of return, sensitivity analysis.

**(iv) Comparative Evaluation of Various Intergrated Farming Systems in Pokkali field of Kerala.**

- Suresh Babu, P.P., Manush, S.M. and Pradeep, B.

- ⇒ Integrating various production systems improved benefits in terms of profit and efficient utilisation of available resources.
- ⇒ Rice-cum-fish-cum-*Penaeus monodon* gave the maximum profit over the other systems.

## PLENARY SESSION

**Chairman :** Dr. Dayanatha Jha  
**Rapporteur :** Dr. R. S. Biradar

The plenary session was chaired by Dr. Dayanatha Jha, National Professor and Former Director NCAP, New Delhi. Based on the deliberation and discussions held during the earlier sessions of the workshop and further discussions during the session, the following recommendation emerged :

- (i) There is a need to introduce M.F.Sc. and Ph.D. programmes in Fisheries Economics in view of globalization of fisheries sector. CIFE being a Deemed University may introduce these courses in collaboration with other ICAR institutes wherever expertise is available.
- (ii) A common minimum syllabus for M.F.Sc. and Ph.D. in Fisheries Economics at national level may be prepared, on the lines of other disciplines of Masters' degree courses as has been done by Education division of ICAR, New Delhi.
- (iii) In the emerging free trade market under WTO agreements, competitiveness of Indian fish and fishery products may be studied. Indigenous methods, environmental legislations, exploitation and conservation of fish stocks etc. have to be assessed and documented for patent-related items in Trade Related Intellectual Property Rights (TRIPS) and Trade Related Investment Management Measures (TRIMS). ICAR institutes and fisheries colleges may take up compilation of Indigenous Technical Knowledge (ITK) on priority basis in their respective areas of work. In view of sanitary and phyto-

sanitary measures, quality requirements in processing units need to be studied.

- (iv) Ex-ante analysis, particularly techno-economic evaluation and socio-economic assessment of various fishery technologies need to be done for proper evaluation and impact assessment. Social scientists should be involved in this exercise from the planning stage itself.
- (v) CIFE and NCAP in collaboration with other institutes should develop indices on production, productivity and prices which are necessary for studying relative changes over time and space in fisheries.
- (vi) Studies on returns on research investment in fisheries are lacking. It was suggested that NCAP, New Delhi may be requested to prepare background material on methodological aspects to initiate research projects in this area.
- (vii) Studies on demand-supply estimation are required to be carried out in fisheries sector, as such studies would help development of subsectors.
- (viii) A quinquennial survey for updating the existing database should be made. Steps are to be taken for improving economic parameters for proper assessment. CIFE and other sister institutes may pursue this through the Department of Economics and Statistics, Ministry of Agriculture, Govt. of India.

- (ix) State Fisheries Policies should be reviewed and a national policy with adequate flexibility for maritime states and land locked states are to be developed. A national seminar on this aspect may be convened at NCAP or any of the ICAR fisheries institutes, to suggest national level fisheries policy.
  
- (x) NCAP which is the administrator of Network of Agricultural Economists, may be requested to activate this network for research purpose especially in fisheries economics. CIFE will involve as a subnetworking in the networking of fisheries economists.

# FISHERIES ECONOMICS RESEARCH AND EDUCATION IN INDIAN : AN OVERVIEW

## Organizing Committee :

Dr. S. Ayyappan	Chairman
Dr. S. C. Mukherjee	Vice-Chairman
Dr. M. D. Zingde	Vice-Chairman
Dr. R. S. Biradar	Member
Dr. S. N. Ojha	Member
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Mr. P. K. Pandey	Member

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Dr. K. Pani Prasad  
Mr. Shyam S. Salim