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National Centre for Agricultural Economics and Policy Research

राष्ट्रीय कृषि आर्थिकी एवम् नीति अनुसंधान केन्द्र

Annual Report
2008-09

राष्ट्रीय कृषि आर्थिकी एवम् नीति अनुसंधान केन्द्र
National Centre for Agricultural Economics and Policy Research
New Delhi

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PREFACE

Indian agriculture outperformed its expectations during the past six decades in terms of increased production and productivity, technological changes and structural adjustments, and enhanced well-being of the people. By adopting modern and innovative practices, farmers are reaping the advantages of technologies, facilitated by various reforms such as modern infrastructures, innovative supply chain and retail markets, seed, credit, insurance and other policy support for institutional reforms. The reform processes provide required impetus for commercialisation of Indian agricultural sector. At the same time, growing concern over the decline in crop and livestock productivity, per capita availability and access to food, rising market prices, degradation of natural resources, volatile international trading environment and climate changes induce newer sources of agricultural risks, food and income security. Thus, the Indian agriculture and rural communities are at the cross road. However, in the present scenario, Indian agriculture experiences enormous challenges as well as opportunities.

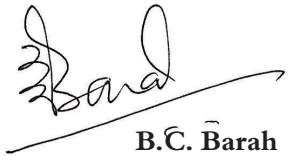
The National Centre for Agricultural Economics and Policy Research (NCAP) responds to the emerging situations and undertakes various research programmes to provide required empirical evidences, necessary for designing strategies and interventions to harness the uncommon opportunities. Studies undertaken by highly professional and motivated scientists at NCAP contributed towards understanding the issues of rural well-being and add value to the debates of topical importance, both at the national and international levels. The year 2008-09 has been very productive in terms of research and policy communication, which is a matter of satisfaction and rewarding to every one at NCAP. During the year, the scientists undertook as many as 35 research programmes, six contract consultancy projects, four capacity building trainings, and five new projects in pipeline, which have enhanced our understanding of the complex agricultural economy. The scientists of the Centre were rewarded for their excellence in scientific contributions, and also invited to many high-level national and international policy forums and committees. In recognition of achievements, the year also attracted national and international agencies to support research and seek advice from the Centre. Apart from the Centre's own research projects, the various states and central governments, national and international research organisations, and corporate bodies assigned several important projects. The prominent among them include : (a) Agricultural Risk Assessment and Insurance Products, (b) Developing Decision Support Systems for Agricultural Commodity Market Outlook, (c) Visioning, Policy Analysis and Gender (V-PAGe)) under the World Bank-aided National Agricultural Innovation Project, and (d) Developing Domestic Fish Markets in India sponsored by the National Fisheries Development Board and Economic Impact of the FMD by Indian Council of Agricultural Research (ICAR) and Ministry of Agriculture, Government of India. The way and manner in which our scientists respond to the emerging phenomena such as changing pattern of monsoon and its governance, price spiralling of agricultural produce, incidence of environmental and weather related perils like untimely floods in unusual areas as in North-East India, market volatility and global downturn, deteriorating hunger and malnutrition within the poverty space, urgency of producing more with less, etc. clearly speak of their sensitivity to contemporary developmental issues. The best infrastructural facilities are being provided to create a congenial working environment to undertake quality research and interact with

its stakeholders. Our stakeholders appreciate the research outcome of the Centre. This has resulted in the rising demand for scientists' time, not only within the system but also outside, signifying that NCAP is on the move. It is also a matter of great satisfaction that our ambassadors are carrying goodwill across the country and abroad, wherever they are.

In pursuing our research programmes and accomplishing the targets, the Centre received overwhelming support and encouragement from the ICAR. We are especially grateful to Dr. Mangala Rai, Director General, ICAR and Secretary, Department of Agricultural Research and Education, Government of India, for extending his continuous encouragement and guidance to make the Centre more vibrant and responsive. Dr. K. M. Bujarbaruah, Deputy Director General (Animal Sciences) and Dr. S. Ayyappan, Deputy Director General (Fishery Sciences) provided exceptional support guidance and motivation in strengthening the Centre's activities and programmes. We offer our sincere thanks to them for their persistent support. Last but not the least, we express our sincere thanks and gratitude from the bottom of heart to Dr. P. K. Joshi, who steered the Centre with a great missionary zeal in all its activities.

My colleagues, Dr. S. S. Raju and Dr. Rajni Jain rendered hard work and took responsibility of compiling, editing and bringing out the Report in the present form; Dr. S. K. Pandey helped in Hindi translation of the relevant portion, and Dr. B. Ganesh Kumar, Dr. P. Shinoj, Dr. P. A. Lakshmi Prasanna and Dr. Diana S, helped in various stages of the preparation of the Report. Mr. Ajay Tanwar patiently processed and formatted the manuscript. I sincerely acknowledge their incredible contributions in bringing out this Report. I also acknowledge the outstanding contributions and team efforts of all the staff of NCAP for their overwhelming support in fulfilling the Centre's mandate.

I am sure that the research outputs and contributions of the Centre would be useful to our partners and stakeholders. We always look forward to their valuable support and suggestions in accomplishing our mission.



B.C. Barah
Acting Director
21 September, 2009
New Delhi

LIST OF ACRONYMS

ACIAR	Australian Centre for International Agricultural Research
ADG	Assistant Director General
ADWDRS	Agriculture Debt Waiver and Debt Relief Scheme
AERA	Agricultural Economics Research Association (India)
AF&AO	Assistant Finance and Accounts Officer
agGDP	Agricultural Gross Domestic Product
AIC	Agricultural Insurance Company
AIM	Amity University
AKI	Agricultural Knowledge Initiative
ANA	Animal Nutrition Association
ANGRAU	Acharya N G Ranga Agricultural University
APMC	Agricultural Produce Marketing Committee
ARIS	Agricultural Research Information System
ASEAN	Association of South East Asian Nations
ATMA	Agricultural Technology Management Agency
B:C Ratio	Benefit Cost Ratio
BRAC	Bangladesh Research Agriculture Centre
CACP	Commission for Agricultural Costs and Prices
CAPSA	Centre for Alleviation of Poverty through Secondary Crops' Development in Asia and the Pacific
CARP	Council for Agricultural Research Policy
CAS	Centre for Advanced Studies
CECOEDECON	Centre for Community Economics and Development Consultants Society
CESS	Centre for Economic and Social Studies
CGIAR	Consultative Group on International Agricultural Research
CIBA	Central Institute of Brackishwater Aquaculture
CIFA	Central Institute of Freshwater Aquaculture
CIFE	Central Institute of Fisheries Education
CIFRI	Central Institute of Fisheries Reserch Institute
CIMMYT	International Maize and Wheat Improvement Centre

CMFRI	Central Marine Fisheries Research Institute
CODEX	Commodity Exchange
CPRI	Central Potato Research Institute
CRIDA	Central Research Institute for Dryland Agriculture
CSAUA&T	Chandra Shekar Azad University of Agriculture and Technology
CSIR	Council of Scientific and Industrial Research
CTRI	Central Tobacco Research Institute
DAC	Department of Agriculutre and Cooperation
DARE	Department of Agricultural Research and Education
DD	Door Darshan
DDA	Doha Development in Agriculture
DDG	Deputy Director General
DEAP	Data Envelopment Analysis Program
DEAR	Department of Economic Analysis and Research
DHV	Demersal High Value
DIPA	Directorate of Information and Publications of Agriculture
DLV	Demersal Low Value
DMR	Directorate of Maize Research
DNSCRI	DNS Crop Research Institute
DRDA	District Rural Development Agency
DU	Delhi University
ECM	Error Correction Model
ERIA	Economic Reseraech Institute for ASEAN and East Asia
ERNET	Education and Research Network
ESM	Economics, Statistics and Management
EU	European Union
FAO	Food and Agriculture Organization
FICCI	Federation of Indian Chambers of Commerce and Industry
GBPUA&T	Govind Ballabh Pant University of Agriculture and Technology
GIS	Geographic Information System
GKVK	Gandhi Krishi Vigyan Kendra

GoI	Government of India
IAASTD	International Assessment of Agricultural Science and Technology for Development
IAFP	International Association for Food Protection
IARI	Indian Agricultural Research Institute
IASDS	Institute of Applied Statistics and Development Studies
IASRI	Indian Agricultural Statistics Research Institute
ICAM	Institute of Computer Applications and Management
ICIMoD	International Cetnre for Integrated Mountain Development
ICAR	Indian Council of Agricultural Research
ICARDA	International Centre for Agricultural Research in the Dry Areas
ICDM	International Conference on Data Management
ICRAF	International Centre for Research on Agro Forestry
ICRIER	Indian Council for Research on International Economic Relations
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
ICT	Information Comunication Technology
IDE	Integrated Development Environment
IDS	Institute for Development Studies
IEF	International Extension Forum
IFAD	International Food for Agriculture Development
IFPRI	International Food Policy Research Institute
IGIDR	Indira Gandhi Institute of Development Research
IHC	India Habitat Centre
IIC	India International Centre
IIFT	Indian Institute for Foreign Trade
IIM	Indian Institute of Management
ILRI	International Livestock Research Institute
IMT	Institute of Management Technology
IP	Intellectual Property
IPM	Integrated Pest Management
IPRs	Intellectual Property Rights
IRC	Institute Research Council

IRRI	International Rice Research Institute
ISAE	Indian Society of Agricultural Economics
ISEC	Institute for Socio Economic Change
ISNAR	International Service for National Agricultural Research
IT	Information Technology
ITC	Indian Tobacco Company
IVRI	Indian Veterinary Research Institute
IWMI	International Water Management Institute
JETRO	Japan External Trade Organizaton
JNU	Jawaharlal Nehru University
KVK	Krishi Vigyan Kendra
LAN	Local Area Network
MANAGE	Natioanl Institute of Agriculture Extension Management
MBPS	Mega Bytes Per Second
MC	Management Committee
MoA	Ministry of Agriculutre
MPEDA	Marine Products Export Development Authority
MSP	Minimum Support Price
MSSRF	M S Swaminathan Research Foundation
NAARM	National Academy of Agricultural Research Management
NAAS	National Academy of Agricultural Sciences
NABARD	National Bank for Agriculture and Rural Development
NAFED	National Agriucltural Cooperative Marketing Federation
NAIP	National Agriculture Innovation Project
NAIS	National Agricultural Insurance Scheme
NARS	National Agricultural Research System
NASC	National Agricultural Science Centre
NATP	National Agricultural Technology Project
NBFGR	Natonal Bureau of Fish Genetic Resources
NBPGR	National Bureau of Plant Genetic Resources
NCAER	National Council of Applied Economic Research

NDRI	National Dairy Research Institute
NER	North-Eastern Region
NFDB	National Fisheries Development Board
NFSMEC	National Food Security Mission
NGOs	Non-Governmental Organizations
NIC	National Informatics Centre
NIE	National Institute of Ecology
NIPCCD	National Institute of Public Cooperation and Child Development
NISTADS	National Institute of Science, Technology and Development Studies
NMTPF	Natioanl Medium Term Priority Framework
NPL	National Physical Laboratory
NRCWA	National Research Centre for Women in Agriculture
NREGA	National Rural Employment Guarantee Act
NSSO	National Sample Survey Organization
O&M	Organization and Management
OFWF	Other Fresh Water Fish
OPV	Open Pollinated Variety
OTS	One Time Settlement Scheme
PAU	Punjab Agricultural University
PHV	Pelagic High Value
PLV	Pelagic Low Value
PME	Prioritization, Monitoring and Evaluation
PMO	Prime Minister Office
PPII	Pro-Poor Infrastructure Index
PPP	Public-Private Partnership
PRA	Participatory Rural Appraisal
PRAN	Policy Research and Advocacy Network
PRIs	Panchyati Raj Institutions
PVP & FRs	Plant Variety Protection and Farmers Rights
QRT	Quinquennial Review Team
R&D	Research and Development

RAC	Research Advisory Committee
RBRC	Rural Biofuel Resource Centre
RCT	Resource Conservative Technologies
RKVY	Rasthriya Krishi Vikas Yojana
RRBs	Regional Rural Banks
SAARC	South Asian Association for Regional Co-operation
SFC	State Farmers Commission
SHGs	Self-Help Groups
SIC	Scholar Information Criteria
SMEs	Small and Medium Enterprises
SPIA	School of Public and Inforamtion Affairs
SPS	Sanitary and Phyto Sanitary
SPSS	Staistical Package for Social Sciences
SRI	System of Rice Intensification
TAAS	Trust for Advancement of Agricultural Sciences
TBT	Technical Barriers to Trade
TCARD	Technical Committee on Agriculture and Rural Development
TE	Triennium Ending
TFP	Total Factor Productivity
TNAU	Tamil Nadu Agricultural University
UAS	University of Agricultural Sciences
UNCTAD	United Nations Conference on Trade and Development
UNESCO	United Nations Education and Scientific Cultural Organization
USDA	United States Department of Agriculture
V-PAGe	Visioning, Policy Analysis and Gender
WBCIS	Weather Based Crop Insurance Scheme
WTO	World Trade Organization

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Executive Summary

The National Centre for Agricultural Economics and Policy Research (NCAP) continued its efforts towards achieving excellence in agricultural economics and policy research in the country. The research studies of the Centre have enormously helped the Council in participating in agricultural policy debates and decisions more vigorously. The Centre has 20 scientists (including one ICAR National Professor) and 15 other staff in the year 2008-09. The total expenditure of the Centre during the financial year 2008-09 was Rs. 517.37 lakh.

A high-powered Research Advisory Committee guides the Centre on its research programmes, and a Management Committee administers the functioning of the Centre. Besides, a number of internal committees like budget committee, store purchase committee, publication committee, library committee, ARIS committee, consultancy processing committee, etc. facilitate the decentralised management of the Centre.

Research studies which are topical in nature are conducted at the Centre under five broad themes, viz. technology policy, sustainable agricultural systems, markets and trade, institutional change, and agricultural growth and modelling. Each theme area is headed by a senior professional with the support of designated team of scientists. Research programmes within and across the themes are so designed as to accomplish the mandate of the Centre. During the year 2008-09, the Centre has conducted 35 research studies. Six consultancy projects have also been completed by the Centre during the year. The research achievements and a glimpse of activities undertaken during 2008-09 are reported below:

In recent years, the role of agricultural technologies in agricultural productivity is questioned. Hence, the Centre has conducted several impact assessment studies.

- Studies have shown that applications of improved technologies increased productivity manifold in various crops and species. Analysis has revealed that on an average, 19.8 per cent gains in wheat yield were attributed to improved technologies during 1999-00 to 2004-05. Technology led growth in livestock sector contributed to annual growth rate of 2.3 per cent during the period 1970-71 to 2003-04. Adoption of pen culture of fish in Bihar has shown that average Benefit Cost Ratio (B:C ratio) was 1.39.

- Based on a study on research impact, it may be inferred that favourable pricing and research efforts have helped in promoting potato production in India level. At all-india level, one per cent increase in research expenditure on potato would increase the supply of potato production by one per cent, and one per cent increase in price of potato would increase the production by 0.68 per cent.

With increasing feminisation of Indian agriculture, it was considered important to analyse the contribution of female folk in agriculture and impact of technologies on them.

- The study on female participation in agriculture has revealed that over the period of past 20 years, female participation in entire agricultural sector has increased barring fisheries, maximum increase being in the livestock production and agricultural sector (12%). Hence, research investment in livestock production can provide them better opportunities in terms of income and employment.

- In a study of impact of Integrated Pest Management (IPM) on women farmers, analysis showed that IPM in vegetable cultivation increases yield (12%) and reduces cost (16-20%). It caused positive impact on women farmers as female participation rate is more than double in vegetable cultivation (67.4%).

The studies of the performance of production of important food commodities like wheat and potato suggest various measures needed to increase production. Another study identified the determinant of technical efficiency in milk production and suggested ways forward.

- Study has shown that the recent negative growth rates in almost all crops across regions including wheat production is due to unfavourable policies. In case of potato, the negative growth in yield has been due to injudicious use of nutrients, erratic irrigation, poor seed replacement and wide fluctuations in temperature, causing diseases and frost during tuber setting. The Total Factor Productivity (TFP) led growth in food crops is necessary to meet the challenge of food security.

- A study on technical efficiency in milk production explored the possibilities of productivity enhancement through improvement in technical efficiencies of the existing resources and technologies. It concluded that average dairy farmer could enhance milk production by 25 per cent with existing level of technology and resources. The technical efficiency has shown a scale-biasness against small farmers which suggests that small holders need special attention in terms of technological policy and institutional intervention.

The quality deterioration of the resources is becoming a major constraint to agricultural development. Intensive cultivation practices in agriculture have posed severe stress on agricultural resources, resulting in degradation of soil and rapid consumption of finite resources. Therefore, the Centre has undertaken studies to suggest policy options for sustainability of agriculture.

- A study on desertification in India examines the impact of desertification on food production, livelihood securities and human development indicators. The study concluded that in sample districts, cereal-based farming system is the most important livelihood strategy followed by livestock based systems. Also, due to sub-divisions of landholdings into tiny pieces, the livelihood strategy is undergoing a change towards cash crops and non-farm employment opportunities.

- A study was conducted for evaluating the economic and ecological benefits and other impact of System of Rice Intensification (SRI) in Tamil Nadu. The findings showed that SRI gives higher returns and conserves water to the tune of 22-39 per cent over the normal practice. It provided higher production at lesser cost along with fulfilling economic as well as environmental criteria. Therefore, such innovative practices address the burning issues of productivity enhancement and conservation of precious resources in agriculture.

- A study on valuation of crop biodiversity cautioned that the magnitude of genetic erosion of crop diversity is alarmingly high at national level. Loss of 95 per cent of local land races of rice in Andhra Pradesh, 10 per cent of local rice varieties in 10 years in north-eastern states and 12-73 per cent in past 15-20 years in Tripura was reported. The study advocated for an appropriate national policy for biodiversity conservation which is in tandem with economic and social development policies.

Marketing of farm produce is a key activity in the agricultural value chain. Trade in agricultural commodities, both within and outside the border is rapidly gaining importance, especially with the onset of World Trade

Organization (WTO) regime and various related developments. The Centre has recognised the importance of this prime area in time and initiated various studies on marketing and trade aspects of horticulture, livestock, fisheries, fertilisers and so on.

- Adoption of food safety practices for milk production at farm level was observed to have significant positive relationship with herd size (0.93%) and milk price (0.3%). The effect of dairy cooperatives on the compliance of food safety measures is found to be positive. Greater sensitisation, awareness creation and upgradation of skills of the farmers were needed for improved compliance with food safety measures at farm level.

- Analysis of marketing models of horticulture and fisheries in the WTO regime has revealed that a farmer is getting only one rupee out of every Rs. 3.50 paid by the consumer and the retailer is getting Rs. 0.75. The study also concluded that new models in fish retailing and private market models such as Reliance and Subhiksha are better than their traditional counterparts in terms of operating hours, price advantage to consumers, hygiene and consumer acceptance.

- A study on growth, imbalances and subsidies in fertilisers shows that a decline in fertiliser use in India from 18.07 million tonnes to 16.79 million tonnes during 1999-00 to 2003-04, has caused slowdown in agricultural growth in India. Investments are needed to expand the fertiliser production capacity as dependence on imported fertiliser has exceeded 35 per cent of fertilisers used in the country. Fertiliser subsidy per hectare of net cultivated area ranges from Rs. 393 in Rajasthan to Rs. 3167 in Punjab. The study concluded that complete withdrawal of subsidies on fertilisers is likely to decrease foodgrain production by close to nine per cent.

- A study to identify the determinants of export performance of livestock products revealed that India's livestock export will increase by 0.21 per cent as a result of 1 per cent increase in the Gross Domestic Product (GDP) of the destination countries. GDP per capita of destination countries had negative influence on the export of dairy products from India. With one per cent increase in distance between India and the importing countries, India tends to decrease exports of dairy products, meat products and eggs by 0.74 per cent, 0.90 per cent and 0.28 per cent respectively. Trade policy index was found significant only for the aggregate exports of livestock products. The study concluded that strengthening of export supply capacity domestically holds the key for enhancing export of livestock products.

- Integration of milk markets ensures consistent supplies to the consumers. Five major milk markets viz. Chennai, Delhi, Kanpur, Kolkata and Mumbai are co-integrated with long run equilibrium relationship. Chennai, Delhi and Kanpur are weakly exogenous to the system, implying the sensitibility of these markets to the policy shocks in the milk market.

Share of fisheries sector in agriculture has been growing rapidly. The Centre has undertaken some studies on this important sector including supply, demand, trade and price integration.

- Fish production in India has increased. It tripled from 2.44 million tonnes in 1980 to about 6.87 million tonnes in 2008. The studies revealed that domestic demand for fish under the baseline scenario is likely to grow at an annual rate of 2.5 per cent between 2000 and 2020. Regarding production, fresh fish output growth is projected slightly above three per cent. The highest growth of export is projected for shrimp (4.73%).

- An analysis of spatial price integration and price transmission unveiled the complicated price transmission mechanism between various fish markets in the country and suggested necessity of price integration between the markets to address the supply side constraints.

- Case studies on efficiency of marketing of different fish species concluded that information about marketing entrepreneurship of the trader and innovations in packing have ensured the trading of fish at best possible price. However, a study on fish and fishery products export highlighted that 47 cases of imports were refused by USA in 2007-08 due to lack of hygienic practices in packaging and processing.

Considering the importance of emerging institutions in Indian agriculture, the Centre has conducted studies on institutional arrangements like contract farming, linkage of infrastructure with agricultural development, linkage of research with extension, farmers and markets, credit, insurance and institutions for fish marketing.

- A study of agricultural supply chain in case of potato revealed that information flow among processors, retailers and consumers was satisfactory but very weak among the public R&D, extension system, producers and processors. This is because of lack of clearly defined areas of cooperation between them. It was also revealed that net returns of contract farmers were 19-24 per cent higher than that of the non-contract farmers.

- The analysis of linkages between infrastructure and agricultural development indicates that transport, power, irrigation and research infrastructure affect the agricultural productivity in a significant manner. The cost benefit analysis of alternative infrastructure highlighted that the cost of providing and/or maintaining these infrastructures is high but benefits are multiple in nature and have multiplier effect including spillover benefits of other economic and social infrastructures.

- Case studies like rural bio-resource complex and banana fibre extractor highlighted the importance of appropriate linkages among research-extension-farmer-markets.

- A study on implications of debt waiver and debt relief scheme revealed that the : (i) social harmony between beneficiary and non-beneficiary farmers was not affected; (ii) due incentives are required for non-defaulters; (iii) crop loan recovery dropped; (iv) increasing tendency towards institutional loans was observed; and (v) one-time settlement scheme was not a success.

- Study of the Rs. 5000/- credit incentive scheme of Government of Andhra Pradesh revealed that non-defaulters are not happy and felt that there should not be so much discrimination while benefits are being provided by the government to farmers.

- A study on agricultural insurance revealed that weather-based crop insurance scheme is a unique product to provide insurance protection against losses in crop yield resulting from adverse weather perils. Weather-based insurance policy has been sold to 5.39 lakh farmers in India till date. Important features of this scheme are : (i) low and flexible premium rates; (ii) minimising moral hazard; (iii) quicker settlement of claims; (iv) requirement of small administrative set-up; (v) moderate and affordable; and (vi) transparent and easily verifiable.

- A study on fish marketing in India documented successful marketing models to draw lessons to provide enabling environment for upscaling and replication in similar socio-politico-economic settings.

Slow growth in agriculture during the past few years has led to a crisis in Indian agriculture. Accelerating the growth in agriculture is a major challenge before researchers and policymakers. The Centre has conducted several studies to analyse the growth performance of agriculture and livestock sector, global food and financial crises, trends in public and private investments, rural employment etc.

- The main factors of escalation of food prices at the global level are : (i) increase in price of crude oil; (ii) supplies not keeping pace with demand; and (iii) diversion of grain for liquid biofuel. Long term trend analysis indicated high and rising prices in future over base period 2005 price. To deal with the harsh reality of high food prices and its effects on poverty, due attention is required towards agriculture sector.

- India's per capita income grew at an annual rate of 3.1 per cent during 1980-81 to 1991-92 and 3.8 per cent during 1992-93 to 2004-05. Study on growth performance of states, and convergence during this period revealed a clear evidence of rising regional disparities in India after initiation of economic reforms programme in 1991. The study concluded that in a dynamics scenario, income growth accelerated in middle income states, decelerated in most rich states and neither accelerated nor decelerated in poor states during 1980-81 to 2004-05. It was observed that in the poor states (Bihar, Orissa, Uttar Pradesh and Madhya Pradesh), employment pressure on agriculture continues to be very high, indicating the presence of disguised or under employment. The disguised unemployed rural populations have to be moved into other enterprises but they do not have necessary skills to be absorbed in current industries where limited jobs exist. Building secondary agro-industries in rural areas and creating job for the local people is the only way to address this burgeoning problem.

- The implications of underlying trends in public and private investment on output growth were studied, and it revealed that decline in public investment did not cause any adverse impact on private investments.

- An analysis of various patterns, trends and successes achieved in diversification towards horticulture since 1970-71 at national and state level, revealed that higher returns relative to other crop groups is the main underlying factor for the diversification towards horticulture. During 1980-81 to 2005-06, share of fruits and vegetables in total cropped area of the country increased from 2.8 to 4.9 per cent and in crops, output increased from 15.95 per cent to 25.61 per cent. There is some slowdown in productivity growth of all crop groups after 2000-01 but the change is negative for fruits and vegetables. The decline in productivity of fruits and vegetables needs to be addressed.

- A study on factors affecting the growth of livestock sector shows that its growth can be accelerated by improving feed and quality and composition of livestock, veterinary facilities, output marketing and institutional interventions. In order to achieve targeted growth rate of six per cent in livestock output, progress in livestock infrastructure, institutional efforts and availability of livestock feed is required to be accelerated by 50 per cent.

The economic backwardness of the North-East India is a national concern. More particularly, agricultural productivity is low and risky in North-Eastern Region. Therefore, it is important to identify future sources of growth in North-East India. It was concluded that the region needs to diversify agricultural activities and respond to changing structure of the economy.

The NCAP website available at http://www.ncap.res.in has been redesigned and regularly updated. Regular monitoring of our website users indicated that policy briefs, workshop proceedings and policy papers were the most referred publications during the year. The NCAP publications are now available in the PDF format and can be downloaded.

The Agricultural Research Information System (ARIS) facility at the Centre has been equipped with 2 MBPS leased line from Education and Research Network (ERNET) to strengthen the existing e-mail and internet facilities to NCAP staff. The Centre has its independent mail server which is being used to its potential.

As part of the dissemination of research output, policy advocacy and communication, the Centre and its staff has published five policy briefs, 32 journal articles, 25 book chapters/popular articles, and 6 research reports working papers during the current year. The Centre's staff has been involved in a number of professional and policy interactions and projects. Ten workshops and several meetings at NCAP and outside are organised during the year. The Centre maintains close linkages with 41 national and 12 international organisations and involved in agricultural research, development and policy. Collaborative research project, seminars, workshops, publications and participation in policymaking bodies are the usual modes of policy interface which help improve the outreach activities of NCAP. These activities made greater impact and wider visibility of the Centre during the year.

I. PROFILE OF NCAP

The National Centre for Agricultural Economics and Policy Research (NCAP) was established to strengthen agricultural economics and policy research in the National Agricultural Research System (NARS) of the country. The Centre acts as 'eyes and ears' of ICAR and undertakes credible research to actively participate in policy dialogue and decision making in the country. The Centre serves as the nodal agency of the ICAR in monitoring and interpreting the research implications of changes in ground realities and macroeconomic environment of the country as well as international developments in the agricultural sector.

Location

The Centre is centrally located in the historic Pusa campus in New Delhi. It has in its close vicinity several institutes of ICAR and Council of Scientific and Industrial Research (CSIR) like Indian Agricultural Research Institute (IARI), Indian Agricultural Statistics Research Institute (IASRI), National Physical Laboratory (NPL), Institute of Hotel Management, etc. The Centre is very close to the National Agricultural Science Centre (NASC) Complex which houses National Academy of Agricultural Sciences (NAAS), regional offices of 10 Consultative Group on International Agricultural Research (CGIAR) centres and offices of many professional societies. The Centre thus, has locational advantage in terms of multi-disciplinary studies, inter-institutional interactions and research linkages, library facilities, etc.

Vision

Leveraging innovations for attaining efficient, inclusive and eco-friendly agricultural growth through agricultural economics and policy research.

Mission

To strengthen agricultural economics and policy research for providing economically-viable, socially-acceptable and environmentally-feasible policy options for science-led agricultural growth.

Mandate

The mandate of the Centre includes:

(1) To conduct policy-oriented research in network mode on :

  (i) technology generation, diffusion and impact assessment;

  (ii) sustainable agricultural production systems;

  (iii) interaction between technology and other policy instruments like incentives, investments, institutions, trade, etc; and

  (iv) agricultural growth and modelling with focus on the role of technology.

(2) To strengthen agricultural economics and policy research in the NARS

(3) To enhance participation of ICAR in agricultural policy debates and decisions through policy-oriented research and professional interactions.

Research Activities

Research activities of NCAP are broadly covered under five major themes: (i) technology policy, (ii)sustainable agricultural systems, (iii) markets and trade, (iv) institutional change, and (v) agricultural growth and modeling. The significant study areas of the Centre include research investment, resource allocation for research, WTO and trade in agriculture, private sector participation in agricultural extension, food policy, monitoring and evaluation of agricultural research and Organisation & Management (O&M) reforms, impact assessment and institutional aspects of food systems, viz. livestock, fishery, and horticulture.

As part of policy advocacy, the Centre organises workshops where issues of major policy interests are discussed by the policymakers, academicians, corporate leaders, etc. The Centre also organises lectures of distinguished scholars and policymakers for a deeper understanding in the area of agricultural development and policy changes. Training and capacity building in frontier areas of agricultural economic research are the priorities of the Centre.

The Centre maintains close linkages with several national and international organisations involved in agricultural research, development and policy. Collaborative research projects, seminars, workshops, publications and participations in policymaking bodies are the usual modes of policy interface which help improve the outreach of the Centre. The Centre regularly brings out publications like policy papers, policy briefs, working papers, conference proceedings, and PME notes. These serve as the main agents for dissemination of its research findings. During the short span of existence, the Centre has established a track record of impressive research studies. The Centre endeavours to develop a synergy between socio-economic and biological sciences, and provides economic inputs to specific areas of agricultural research.

Management

A high-powered Research Advisory Committee (RAC) comprising eminent professionals, mostly from outside the ICAR system, guides the Centre on its research policies. Prof. Y.K. Alagh, the former Minister of State for Power and Science & Technology, Government of India, was the first Chairman of RAC. Dr P.V. Shenoi, former Special Secretary, Department of Agriculture and Cooperation, Government of India, is the Chairman of present RAC constituted jointly for NCAP and Indian Agricultural Statistics Research Institute (IASRI). The RAC provides guidance to the Centre in planning research thrusts and strategies. Initiatives in human resource development, approaches towards improving policy dialogues and evaluation are some other areas in which Centre receives guidance from the RAC.

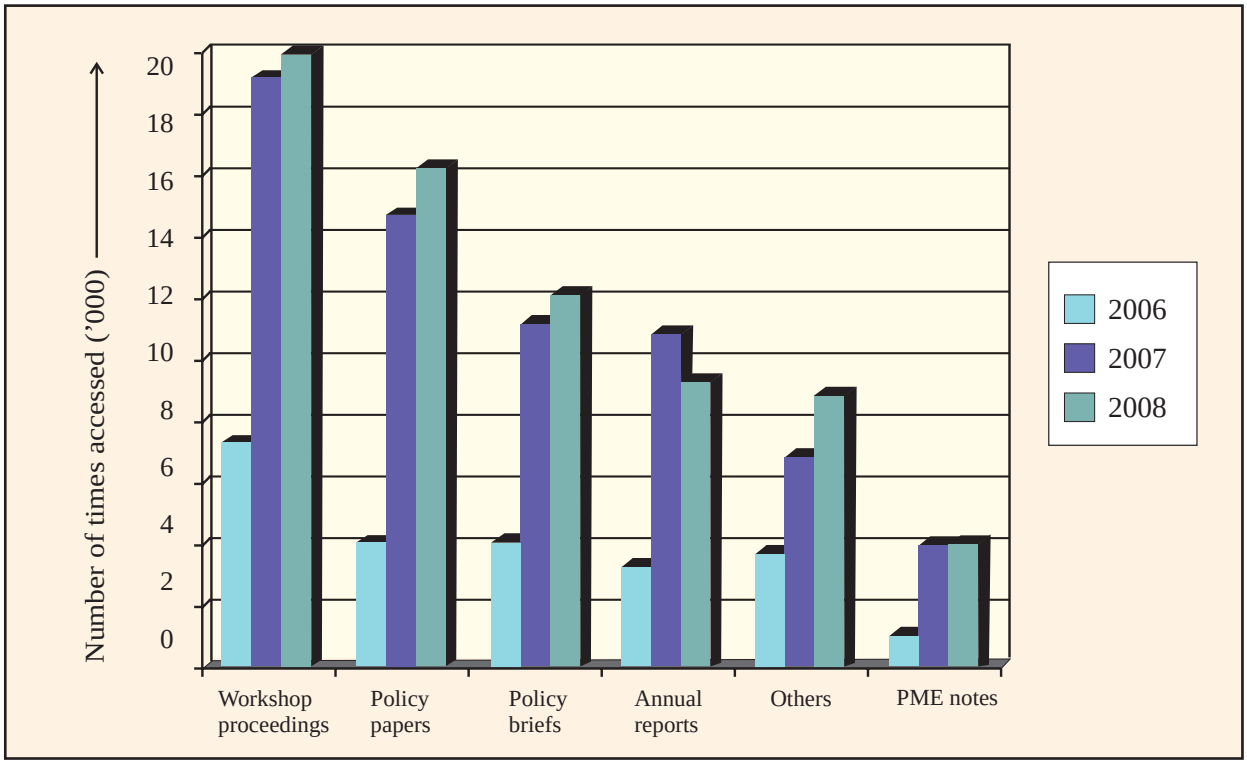
The functioning of the Centre is supervised by the Institute Management Committee (IMC) which is constituted and mandated by the ICAR. A number of internal committees, such as Institute Research Council (IRC), Budget Committee, Academic Planning & Policy Committee, Scientists' Evaluation and Development Committee, Purchase Committee, PME/NAIP Site Committee, Official Language Committee, Library Committee, Publication Committee, Consultancy Processing Cell, IPR Cell, Grievance Cell, and Women's Cell are operating at the Centre for decentralisation of management. The Joint Staff Council of the Centre promotes healthy interaction and congenial work environment.

Infrastructural Facilities

NCAP Website

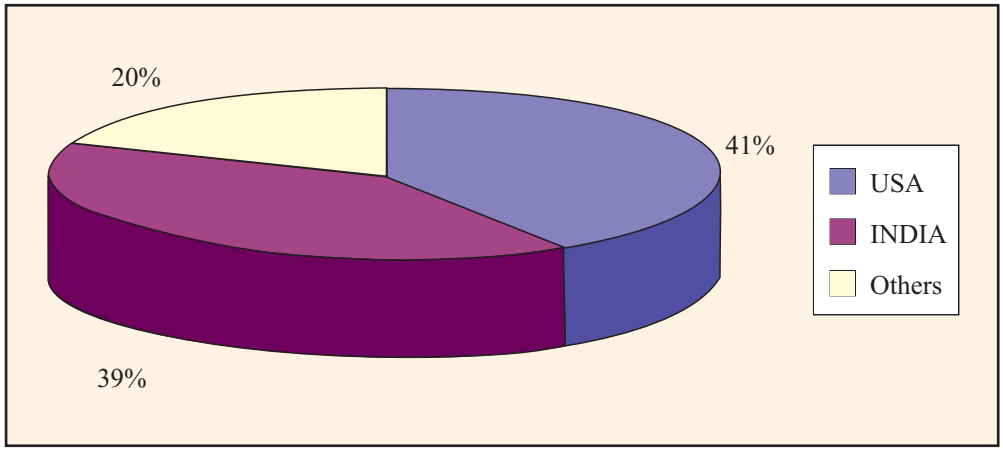
The NCAP website (http://www.ncap.res.in) has been providing latest information about activities of the Centre, particularly about its staff, infrastructure, research projects, publications and linkages. The Centre's website is hosted through ERNET, New Delhi and is being updated at regular intervals. Most of the NCAP activities are showcased on the Centre's website. All NCAP publications like policy papers, policy briefs, working papers, PME notes, workshop proceedings, etc. have been uploaded on the website and are available in the form of PDF files. Data on access to NCAP publications have revealed increasing popularity of the publications in the last three years (Figure 1). Among the publications, workshop proceedings, policy papers and policy briefs were the most referred one. These observations reveal wider acceptance and visibility of the Centre across the world. NCAP website was regularly updated in terms of data as well as coding in the year 2008-09. There have been more than 100 major updates during the year. Constant and regular efforts were made in terms of programming of website as well as correspondence with many other website administrators at national as well as international level to maintain the appearance of the website among top 5 while using the relevant keywords.

Figure 1: Access to NCAP publications: 2006, 2007 and 2008



During the year, traffic to NCAP website increased significantly. Data revealed that the visitors from USA are more than visitors from India during the year 2008. About 80 per cent of the visitors who accessed NCAP website were from India (39%) and USA (41%). Centre's website was also accessed in China (6.2%), Australia (4.7%), United Kingdom (1.3%) and other countries (7.8%). Overall, the website was accessed by users of 147 countries as compared to 144 countries in the previous year (Figure 2). Also there has been considerable increase in some other important performance parameters of the NCAP website like total number of hits, total number of pages viewed, total number of visitors, total number of files downloaded, average number of hits per day and access to NCAP publications.

Figure 2: Visitors to NCAP website from different countries in 2008

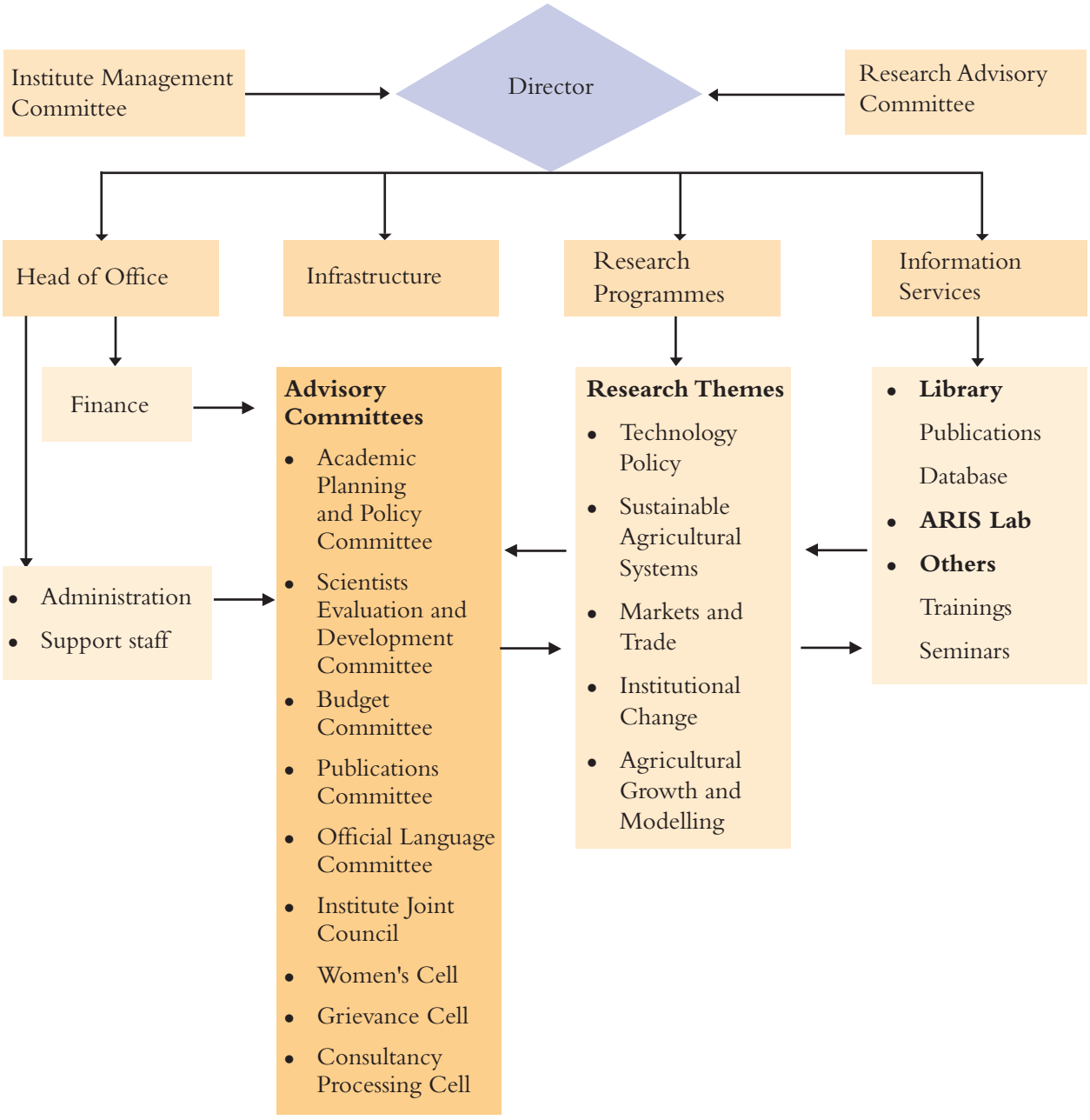


Agricultural Research Information System Lab

ARIS Lab is equipped with high speed network having Nortel switches, Linux mail server, Windows NT Server, centralised Trend Micro anti-virus server and Fortigate firewall. Linux e-mail server caters to the needs of 100 node points including the users within the ARIS, library and other common places. Many new node points were added for the benefit of research staff. Consequently, leased line speed was increased to 2 MBPS from 512 KBPS during the year. Fortigate firewall and Trendmicro anti-virus server were upgraded. New version of SPSS software (SPSS 16.0) was acquired during this year. The server was secured from hacking by unauthorised agents and attacks from viruses using Trend Micro anti-virus system and firewall.

About 33 digitised forms catering to the day-to-day requirements like leave application, tour advance, LTC advance, store indent, RPF forms, TA advance etc. are available on the intranet and are preferred extensively than the printed forms. The workload of the administration has been lessened by such computerisation of forms. Two in-house computer application related trainings were organised by the ARIS lab for the benefit of employees of the Centre. One of the trainings dealt with capacity building in the use of Hindi language in MS-Office. Hindi software experts from Microsoft trained the employees for using Hindi on computers. The other training was on exposure to Geographic Information System (GIS) package. Lectures were delivered by GIS experts from NIIT GIS. Both the trainings received overwhelming response.

Figure 3: Organogram of NCAP



Budget

The expenditure of NCAP for the year 2008-09 is presented in Table 1 and its staff position in Table 2.

Table 1: Plan and non-plan expenditure during 2008-09

(in lakh Rs.)

Head of Account	Plan	Non-Plan	Total
Pay and allowances	—	190.0	190.00
Pension/Retirement benefits	—	21.32	21.32
Overtime allowance (OTA)	—	0.20	0.20
Travelling expenses	8.98	0.94	9.92
Works	8.11	—	8.11
Other charges including equipment	161.24	10.70	171.94
Human resource development (HRD)	1.63	—	1.63
Sub-Total	**179.96**	**223.16**	**403.12**
National Agricultural Innovation Project	—	—	46.67
National Professor Project	—	—	21.20
National Fellow Project	—	—	2.15
Other projects	—	—	44.23
Grand Total	**179.96**	**223.16**	**517.37**

Staff Position

Table 2: Staff position during 2008-09

Designation	Number
Director	1
ICAR National Professor	1
National Fellow	1*
Principal Scientists	7**
Senior Scientists	10#
Scientist (Sr. Scale)	1
Scientist	1
Technical Officer (T-6)	1
Technical Officers (T-5)	3
Driver (T-3)	1
Assistant Administrative Officer	1
Assistant Finance and Accounts Officer	1
Assistant	1
Stenographer	1
Junior Stenographer	1***
Upper Division Clerk	1
Lower Division Clerks	2
Supporting Staff Gr. I	2

* includes one on deputation to ICRISAT, Hyderabad
** includes one ICAR National Professor, and one National Fellow.
*** includes one on deputation to DMR, New Delhi.
# includes one on deputation to ANGRAU, Hyderabad.

II. RESEARCH ACHIEVEMENTS

Technology Policy

Impact of new agricultural technologies

Sant Kumar

Improved technologies have increased productivity of various crops and species. Some ill-effects of these technologies like environmental degradation and poverty are also brought about. Donors who are critical of the past agricultural research strategies/technologies seek accountability of investments towards these broader goals. Therefore, a study was conducted to find out both positive and negative aspects of improved technologies.

Analysis has revealed that at all-India level, nearly 19.8 per cent gains in wheat yields were contributed by improved technologies during 1999-00 to 2004-05. Zone-wise yield gain analysis showed that technological improvement contributed maximum in north-west plains zone (7.6 of 7.6%), followed by north-eastern plains zone (28.9 of 33.1%) and central zone (14.8 of 22.2%). Further, improved variety in timely sown conditions contributed 23.1 per cent to India's wheat production during the same period. Of this, technological change shared 26 per cent and higher input quantities adversely affected the production (-2.9%).

The intensive rice-wheat system in Indo-Gangetic Plains (IGP) has created a lot of management problems including degradation of natural resources like soil and water. A study on Resource Conservative Technologies (RCTs) like zero-tillage, bed planting and irrigation in Punjab, Haryana, Rajasthan, Uttar Pradesh and Bihar has revealed that nearly half of the RCT adopters in the region belonged to small category. Among adopters, above 70 per cent were using tube well for irrigation and rest 30 per cent by canal. Further, the use of zero-tillage technology in cultivation of wheat, potentially saves water and diesel, thereby reducing CO_2 emission. These result in reduction in cost and addition in net returns. SRI is another method of conserving scarce resources, which is considered appropriate under the circumstance. This technology has potential for yield improvement and water saving.

In north-west Himalayan region, diversification towards vegetables resulted in considerable increase in annual income (Rs. 8.6 lakh/ha and Rs. 14.5 lakh/ha) during 2005-06 and 2006-07, respectively. At the same time, area vacated from food crop did not reduce total food production because of the adoption of high-yielding varieties that gave 26 per cent higher yield than the local varieties.

Pen culture of fish has potential in improving livelihood of farmers. This technology in the *mauns* (floodplain lakes) in Bihar augmented fish production and created opportunities for employment and income generation. The maximum fish harvest was 5,047 kg/ha with a total input cost of Rs.164,080. The gross and net returns were estimated at Rs. 227,510/ha and Rs. 63,430/ha, respectively. The average B:C ratio was 1.39.

Impact of potato research in India

Sant Kumar

Potato accounted for nearly 43 per cent of total production of all roots and tubers at global level during triennium ending (TE) 2007. India ranked third in global potato production (8%), after China (22%), and Russian Federation (12%) in TE 2007.

Potato production in India has increased significantly during the past two-and-a-half decades. About two-fold increase in area (0.74 to 1.4 million ha) brought two-and-a-half fold increase in production. The significant increase in both area and production of potato reflects the contribution of potato research and development (R&D) in the country.

So far, 42 potato varieties being grown in various parts of the country have been developed. Of these, seven potato varieties viz. (i) Kufri jyoti, (ii) Kufri chandramukhi, (iii) Kufri sindhuri, (iv) Kufri badshah, (v) Kufri bahar, (vi) Kufri lalima, and (vii) Kufri lauvkar are very popular. Chipsona 1, Chipsona 2 and Chipsona 3 are popular for processing purposes. Some of the potato varieties are being commercially cultivated in foreign countries — Kufri Jyoti in Sri Lanka and Nepal; Kufri Sindhuri and Kufri Lalima in Bangladesh; and Kufri Chandramukhi in Afghanistan.

In 2007, potato shared 0.73 per cent of gross cropped area (GCA) while wheat covered 14 per cent area. In monetary terms, potato generated Rs. 6095 crore, and wheat Rs. 43167 crore (at 1999-00 prices), accounting for 1.4 per cent and 10.2 per cent of total value of production (VOP) from crop sector, respectively.

Potato cultivation is confined mainly in Uttar Pradesh, West Bengal and Bihar, which accounted for 72 per cent of area and nearly 80 per cent of production in TE 2007. At all-india level, potato production during TE 2007 was 23 million tonnes, which came from 1.4 million ha with yield level of 17 tonnes/ha. The potato output growth (5%) was higher than wheat (3.5%) in 1990s, which has decelerated to 0.2 per cent and 1.0 per cent, respectively in 2001-06. The negative output growth was mainly due to fall in yields as a result of unfavorable weather.

Analysis of the output supply response illustrates that potato price and research efforts have helped in promoting potato production as the long-run elasticities for potato price and research expenditures are 0.68 and 0.98, respectively. Hence, each one per cent increase in research expenditure on potato would increase the supply of potato production by about one per cent. Among potato growing states, Uttar Pradesh contributes maximum production (43%) of all-India. Regression model shows that short-run price elasticity of supply for potato is 0.21, which is inelastic. The long-run price elasticity of supply for potato is estimated at 0.27. Thus, each one per cent increase in the price of potato causes the supply of potato to increase by about one-fourth. The short-run, cross-price elasticity of potato production with respect to wheat is -0.364. The long-run, cross-price elasticity is -0.48. Estimation of long-run elasticity of research expenditure is 0.72. This shows that one per cent increase in research expenditure in the long-run would increase potato production by about 0.72 per cent.

Performance of potato production in India

India produced about 26 million tonnes of potato in 2007-08. The potato production has increased significantly in past two-and-a-half decades, from about 9 million tonnes in TE 1981 to 23 million tonnes in TE 2008 (Figure 4). Both yield increase and area expansion have contributed to potato production during the above mentioned period. The potato yield increased from 12 t/ha in TE 1981 to 17 t/ha in TE 2007, while area almost doubled from 0.74 million ha to 1.4 million ha. Besides, potato production spread to non-traditional states like Haryana, Gujarat, Karnataka and Punjab. The increase in yield was possible due to the use of modern inputs, particularly of improved variety seeds, fertilisers, irrigation and pesticides.

However, growth in potato production declined during 1990s over 1980s, and even became negative recently (2001-06). In fact, during the later period, considerable decline in area and yield growth

contributed to negative growth in production. How to improve growth in both area and yield is a real concern.

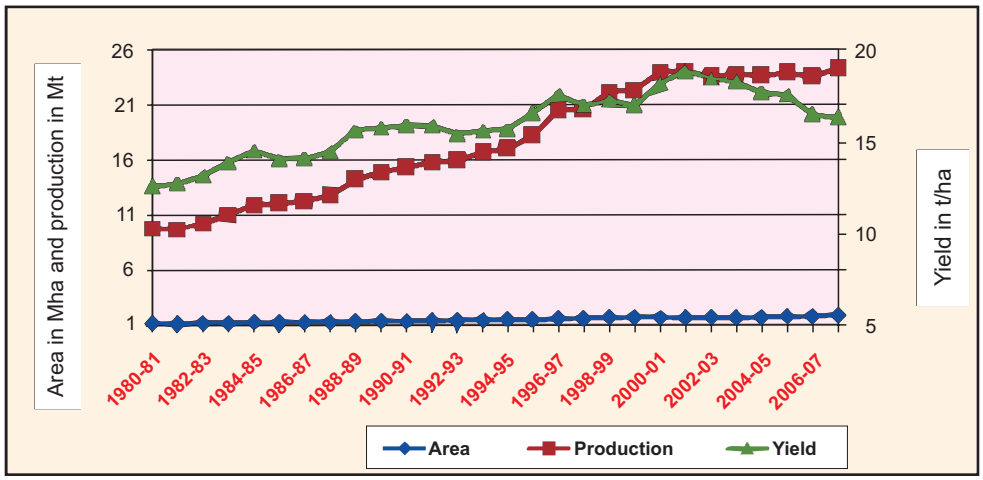
Potato is cultivated mainly in six states of India, viz. Uttar Pradesh, West Bengal, Bihar, Punjab, Madhya Pradesh and Karnataka. During TE 2006-07, these six states together accounted for about 86 per cent of area and nearly 90 per cent production of potato in the country (Table 3). Besides, potato is also grown in some pockets of Assam, Gujarat and Haryana, but their area and production shares fluctuate widely.

Table 3: Area, production and yield of potato in major states of India, TE 2006-07

States	Per cent share		Average yield (t/ha)
	Area	Production	
Assam	3.4	1.3	6.7
Bihar	12.9	6.8	8.7
Karnataka	4.7	2.1	7.5
Madhya Pradesh	4.0	3.1	12.8
Punjab	5.2	5.5	17.7
Uttar Pradesh	33.3	43.8	21.8
West Bengal	25.8	28.2	18.1
All-India	**100.0**	**100.0**	**16.6**

In TE 2006-07, Uttar Pradesh contributed about 44 per cent to total production in the country, followed by West Bengal (28%), Bihar (7%), and Punjab (5.5%). These four states together accounted for above 84 per cent of total potato production. The states of Bihar and Karnataka though occupied about 18 per cent of the total area, their share in production was only 9 per cent. The average yields of potato in these two states were half of the country average. Potato yield in Uttar Pradesh and West Bengal is more than double of Bihar and Karnataka. By increasing potato yield in Bihar alone to the level of all-India average, nearly 14 million tonnes of potato can be added to total production. This mainly requires development efforts. The other factors limiting to potato yield in Bihar are lack of access to quality seeds, un-assured irrigation, untimely availability of fertilisers, low seed replacement rate, etc.

Figure 4: Progress in area, production and yield of potato in India



The potato production growth during 1990s was positive at all-india level and across states (Table 4). During 1990s, production increased at a much higher rate (10-12 per cent) in Punjab and Madhya Pradesh than other states (4-7 per cent). Also, growth in area mainly contributed to increased production in all the states.

Recently (2001-06), the growth in production has become negative across states and at all-India level. This has been due to negative growth in yield. In Uttar Pradesh and West Bengal, which contribute 72 per cent to total potato production in the country, growth in yield has been negative (-1.1 per cent and -1.6 per cent, respectively) during 2001-06. The decline in yield has been much higher in Karnataka (-11.4 per cent). The negative growth in yield has been due to injudicious use of nutrients, uncertain irrigation facilities, poor seed replacement, and wide fluctuations in temperature causing diseases and frost during tuber setting.

Table 4: Annual compound growth rate of potato production in major states of India (%)

States	1991-00			2001-06		
	Area	Production	Yield	Area	Production	Yield
Assam	3.4	6.6	3.1	-1.3	-5.3	-4.1
Bihar	1.3	1.0	3.8	0.8	-0.3	-1.1
Karnataka	4.7	3.8	-0.8	13.7	0.8	-11.4
Madhya Pradesh	9.7	12.6	2.7	-1.6	-2.9	-1.4
Punjab	11.6	10.6	-0.9	0.2	-0.5	-0.7
Uttar Pradesh	2.5	4.2	1.6	1.7	0.6	-1.1
West Bengal	5.2	5.9	0.7	1.3	-0.3	-1.6
All-India	**3.6**	**4.9**	**1.3**	**-0.9**	**-0.2**	**-1.1**

IPM in vegetable cultivation and its impact on farm women

Usha Ahuja

Survey of 160 farm families of a cluster of three villages of Sonepat district of Haryana state has been done by collecting information on different farming components related to farm women through well-structured and pre-tested schedules, group discussions and Participatory Rural Appraisal (PRA). Results of the study revealed that magnitude of human labour use is higher in vegetable cultivation as compared to other crops and female participation rate is more than double (67.37%) than that of male participation. Weeding and harvesting are the major activities in which more than 80 per cent female labour is used. Sowing and marketing are the male dominating activities. Vegetable cultivation is more profitable as compared to other crops, as it is giving three-fold net returns as compared to other traditional crops. On an average, IPM in vegetable cultivation increases yield (12%) and reduces cost (16-20%). Preliminary results of impact of IPM on women farmers can be seen in terms of increased income & employment, and food & nutritional security.

Total factor productivity in wheat producing states of India

Sant Kumar and Sonia Chauhan

Productivity growth in agriculture improves food production as area expansion is limited. The growth of TFP in wheat production across major states has been computed using the Divisia-Tornquist index and applying farmlevel data collected from the reports of the Commission for Agricultural Costs

and Prices (CACP) and relate for 1981-2006. Results revealed that input index has increased at about one per cent in Haryana, Madhya Pradesh and Rajasthan and negligible in Punjab and Uttar Pradesh during 1981-2006 (Table 5). With the increase in input and technological change, the output increased between 3 and 4 per cent across major states during 1980s, and between 1 and 2 per cent during 1990s. During 2001-06, output increase was negative in Haryana, Punjab and Uttar Pradesh while it increased by 3.7 per cent in Madhya Pradesh and 2.6 per cent in Rajasthan. Overall output growth in wheat production was 1-2 per cent in studied states during 1981-2006. The higher output growth in wheat during 1980s can be attributed to investment in R&D, adoption of better crop production practices, assured irrigation, market prices and favourable policy environment. The policy reforms during 1990s like de-control of fertiliser prices and a few other policy reforms have adversely affected the overall agricultural performance. In the context of unfavourable policies, farmers have been trying to be cost-effective and ignoring the ill-effects of existing farming practices. The recent trend of negligible or negative growth in production of many crops across regions including wheat production can be viewed in this regard.

Table 5: Annual growth in total factor productivity in major wheat producing states, 1981-2006 (%)

States/sources of growth	1981-90	1991-00	2001-06	1981-06
Haryana				
Output growth	4.2	0.8	-0.3	2.2
Input growth	0.3	0.7	0.7	0.9
TFP growth	3.9	0.2	-1.0	1.3
Madhya Pradesh				
Output growth	2.9	1.6	3.7	2.1
Input growth	2.0	0.5	1.5	0.9
TFP growth	0.9	1.1	2.1	1.3
Punjab				
Output growth	3.0	1.2	-0.6	1.2
Input growth	0.7	-0.2	0.1	0.1
TFP growth	2.3	1.4	-0.7	1.1
Rajasthan				
Output growth	2.8	1.7	2.6	1.9
Input growth	0.3	3.7	-0.1	1.4
TFP growth	2.5	-1.9	2.7	0.5
Uttar Pradesh				
Output growth	2.6	2.3	-0.9	1.3
Input growth	0.2	0.2	0.8	0.2
TFP growth	2.4	2.1	-1.7	1.1

Analysis has revealed that the growth in overall TFP index was above one per cent across states during 1981-06. The TFP growth during 1980s was four per cent in Haryana and about two per cent in

other states, except Madhya Pradesh. This trend diluted in 1990s and even became negative in major states during 2001-06. This dismal performance is a cause of concern and needs attention. Moreover, the TFP led growth in wheat is necessary to meet the challenges of food security and ensure overall growth in agriculture.

Technical efficiency in milk production: Status and determinants

Anjani Kumar

India is the largest milk producer in the world with an annual production of more than 100 million tonnes. However, milk productivity in India is very low and there is a tremendous scope for improvement. Higher productivity can either come from adoption of new technologies or increase in the production efficiency. It is well established that the improvements in efficiency are more cost-effective than introducing new technology as the producers are not efficient in the use of existing technology. An understanding of farm level efficiencies in milk production and their determinants would provide the clue for making this sector competitive and viable. It will also help in identifying the policy options for enhancing the efficiency and competitiveness of the smallholder dairy producers. Therefore, a study was undertaken to: (i) measure farm specific technical efficiency in milk production; (ii) measure the effects of factors determining efficiency; and (iii) suggest options for increasing farm level efficiency as a means to increase competitiveness of dairy producers, especially smallholders. This study is based on the primary data collected in year 2007 at the farmlevel in three states, namely Bihar, Punjab and Uttar Pradesh. These states were selected to capture the geographic and institutional diversity of milk production and marketing.

The frequency distribution of farm specific technical efficiency scores is depicted in Table 6. These indicate wide variations in the level of technical efficiency across farms. About 10 per cent farms operate below a technical efficiency level of 0.5 indicating scope to double the milk production, while 11 per cent operate within a range of 0.5 to 0.6. The percentages of dairy farms operate within a technical efficiency range of 0.6 to 0.7 and 0.8 to 0.9 are 23 and 19 per cent, respectively. Only 0.4 per cent farms show technical efficiency of more than 0.9. The model range however, lies between 0.7 and 0.8. The distribution of farms as per the level of technical efficiency depicted considerable variations across the categories of farmers. For instance, only about three per cent of the big farmers operate at less than technical efficiency level of 0.5, while 16 per cent of marginal farmers are operating below 0.5.

Table 6: Distribution of dairy farms by level of technical efficiency (%)

Technical efficiency status	Landless	Marginal	Small	Medium	Large	Overall
<0.50	9.5	16.1	9.7	3.8	2.6	9.8
0.5 to 0.6	13.5	13.0	7.8	6.6	12.8	10.8
0.6 to 0.7	24.3	20.8	19.4	26.4	28.2	23.1
0.7 to 0.8	37.8	33.3	38.8	41.5	35.9	36.9
0.8 to 0.9	14.9	16.1	24.3	21.7	19.2	19.0
>0.90	0.0	0.5	0.0	0.0	1.3	0.4

Potential for improvement in technical efficiency

Productivity enhancement in milk production by improving TE is one of the most effective ways to improve competitiveness. An attempt has been made to explore the possibilities for milk productivity enhancement through improvement in technical efficiencies of the dairy farmers with the existing resources and technology. The average potential of increasing milk production through technical efficiency improvement across different categories of farmers is presented in Table 7. The average potential for improvement in TE in milk production is 25 per cent if the average farmer in the study area could achieve the TE level of its most efficient counterpart. This implies that the average dairy farmers could enhance milk production by 25 per cent with the existing level of technology and resources. The potential for improvement in milk productivity varies from 22 per cent for medium categories to 28 per cent for marginal farmers.

Table 7: Average technical efficiencies, actual and potential yield and scope of productivity improvement

Class	Number of farms	Technical efficiency			Average potential to increase efficiency (%)
		Mean	Minimum	Maximum	
Landless	74	0.68	0.30	0.88	26.7
Marginal	192	0.67	0.23	0.92	28.1
Small	103	0.71	0.31	0.89	23.8
Medium	106	0.72	0.37	0.88	22.3
Large	78	0.71	0.37	0.93	23.1
All	**553**	**0.69**	**0.23**	**0.93**	**25.3**

Ways for improving technical efficiency

A number of technological and farm specific features could be responsible for the inefficiency. Improvement in technical efficiency in milk production requires adequate and quality veterinary services, augmentation of feed and fodder resources at the farms, integration with formal marketing system and scaling up of the dairy enterprise. The technical efficiency has shown a scale-biasness against small farms, which suggests that smallholders need special attention in terms of technological policy and institutional intervention. Milk production is less efficient with smaller herd size, which is indicative of equity efficiency trade-off in the Indian dairy sector. The findings suggest that encouraging milk production by smallholders may lead to declining efficiency in milk production, though it may promote equity in the rural economy. It also suggests that increasing herd size will tend to raise the efficiency in milk production. The government's efforts to improve the technical efficiency of the dairy farmers should be diverted more towards smaller farms as they operate at lower technical efficiency than the large farmers and therefore, present a relatively greater scale for improvement.

Female participation in agriculture

Usha Ahuja

To assess the female participation in agriculture and other allied sectors, National Sample Survey Organisation (NSSO) data was used at three different time points (1983, 1993 and 2004). It has

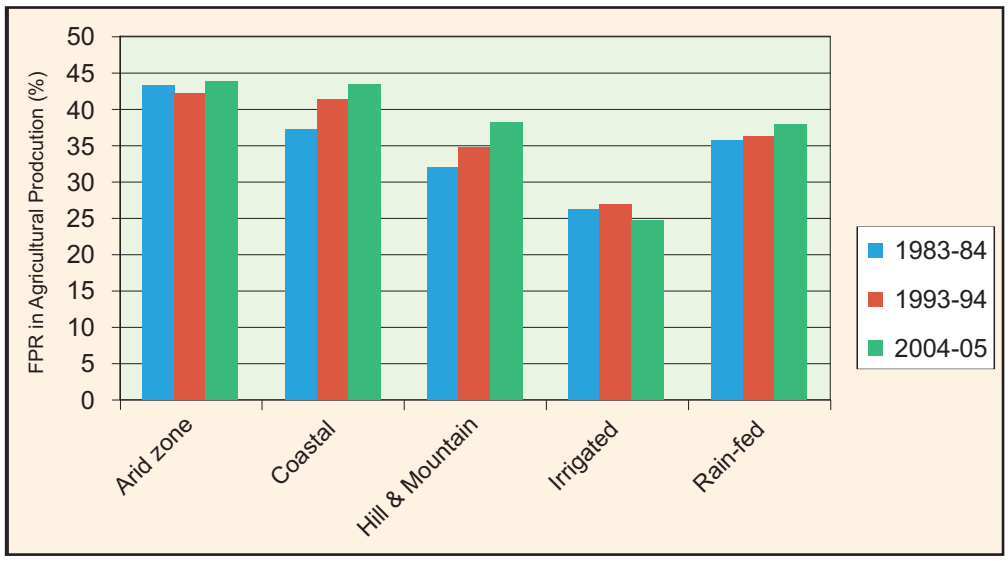
been observed that over the period, female participation in all the agricultural sectors has increased, barring fishing which has marginally decreased over the time. The maximum increase has been found in livestock production and agricultural sector (12%) followed by forestry (11.31%) plantation (1.3%) and agricultural production (1.13%) (Table 8). The results reveal that although female contribution is significant in all the agricultural sectors yet livestock production is the most promising sector for them. This calls for higher research investment in this sector that would provide better opportunities to women in terms of income and employment.

Table 8: Female participation rate in different agricultural sectors over the period 1983-84 to 2004-05 (%)

Agricultural/Allied Sectors	1983-84	1993-94	2004-05
Agricultural production	37.58	39.12	38.75
Plantations	34.16	32.62	35.46
Livestock production	64.94	70.47	76.94
Agricultural Services	26.74	40.94	38.74
Forestry/logging etc.	41.11	38.21	52.42
Fishing	18.10	13.00	16.12

To examine the spatial and temporal changes of female participation in agriculture, their participation rate in agricultural production for different agro–eco zones were computed (Figure 5). The results show that there are significant spatial variations in female participation in agricultural production, ranging from 25 per cent in irrigated to 44 per cent in arid zone, but over the time, not much variation has been observed as from 1983-84 to 2004-05. The maximum increase in female participation rate has been noticed in coastal and hill region (6.15 and 6.10%) followed by rain-fed and arid zones. Negative female participation rate (FPR) has been seen in irrigated zone. It is evident from the results that rural women of less prosperous regions are participating more in agriculture as compared to prosperous regions.

Figure 5: Female participation rate in agricultural production for different agro-ecozones over the period 1983-84 to 2004-05



Sustainable Agricultural Systems

Combating desertification: The agriculture-environment nexus in India

P. S. Birthal, S. S. Raju and P. K. Joshi

Desertification in dry lands can emerge as an important threat to agricultural production, and hence, to the livelihood of the rural people for whom agricultural and allied activities comprise the main source of income and employment. In this study, an attempt has been made to look at the process of desertification in terms of its indicators, causes and consequences based on the information obtained through focus group discussions conducted in 2007 in 40 villages in Mahboobnagar and Rangareddy districts of Andhra Pradesh, and in 38 villages in Bundi and Udaipur districts of Rajasthan.

Farmers perceive that the problem of land and water degradation is becoming serious in all the districts. The groundwater table has receded considerably, leading to drying of wells in most of the districts; animal biodiversity has declined as a result of encroachment on forests; and grazing lands have deteriorated in quantity as well as quality. Soil and water erosion problems too have increased. In Rajasthan, wind erosion is a serious threat. Water erosion is becoming a serious problem in Andhra Pradesh and Rajasthan. These problems however, are location specific and vary widely across states and districts depending on the management efforts.

Increasing human population, overgrazing, deforestation, changing rainfall pattern, and inappropriate use of agrochemicals are perceived to be the major causes of desertification in all the sample districts. Farmers in Andhra Pradesh also blame subsidies on irrigation and electricity for excess withdrawal of groundwater. In most villages, there is a lack of collective action to manage common property land and water resources. On private agricultural lands, in most villages, only a small proportion of households follow good practices in land and water management.

Impact of desertification on food production, livelihood strategies and human development indicators was also examined. In most of the sample districts, cereal-based farming system remains the most important livelihood strategy, followed by livestock- based systems. However, in view of sub-division of landholdings into tiny pieces, the livelihood strategy is undergoing a change towards cash crops and non-farm employment opportunities. Further, despite deterioration of land and water resources, the food production has increased in all the districts, and so does its entitlement. This can be attributed to increasing use of chemical fertilisers, irrigation and pesticides, which counteract the effect of desertification at least in the short-run, letting aside their longterm deleterious effects on the sustainability of agricultural systems.

Economic and ecological benefits of System of Rice Intensification

B C Barah

Being the important ingredient of food basket of the common people, the declining productivity of rice and per capita availability is a policy concern. SRI is a relevant option, which increases production, reduces yield gap and ensures the household food security for the vulnerable section of small and marginal farmers. To quantify the benefits of SRI and compare its performances with

that of conventional practice of rice cultivation, a detailed survey was conducted among the 58 carefully selected SRI farmers in four districts of Tamil Nadu representing distinctive features of irrigation system. As the average farm size of over 90 per cent farmers in Tamil Nadu is less than 1.4 ha, therefore, producing more food from less land and other inputs for their livelihood has become a necessity. As a pre-requisite for the promotion of SRI practice, the farmers' motivation is gauged in a perception survey, which revealed that most of the farmers were aware of SRI method of cultivation and they have perfected the major principles. The series of field demonstrations and supply of subsidised equipment facilitated the adoption. Estimates of various indicators of success clearly demonstrated that the innovative practice has several socio-economic as well as bio-physical benefits, viz., increase in productivity, input saving and conservation of precious water resources. The results show that the return to SRI is high ranging from Rs.14875 per ha to Rs. 17629 across the districts as compared to corresponding figure of Rs.9263 to Rs.14564 under conventional practices. Higher return is attributed to increase in production as well as substantial reduction in cost of cultivation. The most impressive is the savings in water (22-39%) and seed (92%) contributing to distinctive B:C ratio of SRI. The organic supplementation due to compost, green manure and weed incorporation, enhanced soil microbial activities and aeration, use of solar energy and time saving due to early transplantation, are some of the uncommon advantages of SRI. The gains due to women labour in specialised operations such as transplanting, harvesting and weedings indicate gender equity. In addition, SRI provides opportunity for employment of the idle family labour in rabi season. The novelty is that SRI research outcome is inexpensive as the innovation is farmer invented and invariant to any variety and need not be new and modern input-intensive technology. The estimates of technical efficiency using Data Envelopment Analysis Program (DEAP) also clearly show that SRI is more efficient (both in technical efficiency and economic efficiency). Therefore, appropriate strategy for upscaling the adoption is a *sine-qua-non* to achieve national as well as household food security. The successful models of SRI promotion have emerged, which need to be integrated for generalising the practice. In the changing scenario, given the general acceptance of the practice and willingness to accept, the needed preparedness for implementation of the policy to scale up the adoption will go a long way.

Conceptualisation for valuation of biodiversity and its implication

K. K. Datta

Genetic variation in crops and livestock has been altered over the centuries as a consequence of human interventions. Technological breakthroughs along with widespread adoption of high yielding varieties of crops led to mono-culture practices and hence, the loss of biodiversity has become prominent. The magnitude of genetic erosion of crop diversity is alarmingly high at the national level. Studies indicated that in Andhra Pradesh, 95 per cent of the local landraces of rice have disappeared. In north-eastern states, there has been a loss of 10 per cent of local rice varieties over a period of 10 years. In Tripura, rate of loss in the past 15-20 years varied from 12 per cent to 73 per cent. The basic policy dilemma of on-farm conservation stems from good properties of crop genetic resources. Conceptually, the highest B:C ratio of conserving genetic resources on farm is higher than *ex-situ* conservation.

The study advocated for an appropriate national policy for biodiversity conservation, which is in tandem with its economic and social development policies.

Markets and Trade

Determinants for compliance with food safety measures at farm level

Anjani Kumar

The increase in consumer demand for greater food safety, combined with the complex nature of food safety hazards, has triggered the need for an integrated approach of ensuring food safety throughout the entire food production chain i.e. from farm to fork. This approach emphasises the primary responsibility for food safety of all participants in the product supply chain. Simultaneously, individual chain participants are increasingly looking for assurances of the safety of products supplied by the preceding chain participants. These trends place-greater attention to compliance with food safety measures on the farm as being one of the important stages affecting the level of food safety of products consumed at the end of the chain. Therefore, a study was undertaken to: (i) assess the status of compliance with food safety measures at farm level; (ii) estimate the cost of compliance with food safety measures; (iii) identify the determinants for compliance with food safety measures; and (iv) examine the relationship between compliance and producer price of milk.

The study has shown the status of compliance with food safety measures at the farm level for dairy chain. The compliance with food safety measures at dairy farm level has not been found encouraging and lot of efforts are needed to bridge this gap. The drivers for ensuring greater compliance with food safety measures have been identified. These include age, education, association with formal market institutions, scale of business, producer price etc. The age of the head of the household has a small but positive influence on the status of compliance with food safety measures. Age reflects the maturity of the head of household to take a rational decision and thus, might have influenced the decision of the household for better compliance with the food safety measures. Education, which is supposed to increase awareness and skills, has even higher influence on the adoption of food safety practices. The adoption of food safety practices was observed to have a significant positive relationship with the herd size. In fact, with a unit increase in the herd size, the adoption of food safety measures is expected to increase by 0.93 per cent. This is understandable because the larger herd size indicates the commercialisation status of the farm as well as it also helps in efficient utilisation of resources because of economies of scale.

It is noted that the higher producer price motivates the farmers for better compliance with food safety measures. With a unit increase in the price of milk, the compliance status is expected to increase by 0.3 per cent. The type of buyer also influences the compliance with food safety measures. The formal buyers (like dairy cooperatives, private dairy, etc.) as compared to informal buyers (like milk vendors, shopkeepers, etc.) affect the compliance with food safety measures positively. The association with dairy cooperatives also enhances the prospects of higher compliance with food safety measures.

It is clearly evident from the findings above that market response in terms of better prices of the produce can help achieve greater compliance with food safety measures and thus, can improve the quality and safety of the produce. The greater sensitisation, awareness creation and upgradation of skills of the farmers would further result in improved compliance with food safety measures at the farm level. Greater vertical integration in milk marketing would be also helpful in ensuring better compliance with food safety measures at the farm level.

Organised retail marketing in agriculture during WTO regime

M. B. Dastagiri, B. Ganesh Kumar and P. Shinoj

The super market revolution has been underway in developing countries. Retail revolution is visible for agricultural commodities in India. The Indian retail market is estimated at US$ 350 billion. But organised retail is estimated at only US$ 8 billion. This share is expected to increase with the entry of a number of corporates into the segment. The entry of several companies into the agriculture sector has facilitated easy and fast marketing channels for different agricultural commodities. This study analyses the status, growth, marketing models and future plans of public and private food retail markets in agriculture in general, and horticulture and fisheries in particular during WTO regime and suggests policy measures for growth of retail markets in agriculture.

In India during the WTO regime, a number of new liberalised public markets opened up. The main functions of farmers' markets are empowering the farmers to participate effectively in the open market to get a remunerative price for their produce and to avoid the exploitation of both the farmers and the consumers by the middlemen.

Horticulture development is currently constrained by poor marketing arrangements. As per the survey conducted in 2001, the farmer is getting only one rupee out of every Rs. 3.50 paid by the consumer and the retailer is getting Rs. 0.75. The study concludes that the marketing model adopted by private markets particularly Reliance and Subhiksha is more efficient than markets like Rythu bazaar. It is because the marketing agency directly goes to farmer's fields and collects fruits and vegetables.

It was found that the new models emerging in the fish retail marketing sector are far better than their traditional counterparts in terms of operating hours, price advantage to the consumers, variety of fish offered, hygiene and other services like cleaning and dressing. They are also superior in terms of consumer acceptance. Therefore, there is an immediate need to replicate such models on a much larger scale to cover not only the cities but also the interior villages in the country.

The study suggests that it is necessary to amend outdated laws restricting the establishment of markets to allow cooperatives and private entrepreneurs to set up modern markets. New marketing models should be adopted to enhance the distributional efficiency of the marketing system.

Fertiliser growth, imbalances and subsidies: Trends and implications

Ramesh Chand and L. M. Pandey

Imbalance in fertiliser use, accompanied by serious slowdown after 1991-92, and growth and structure of fertiliser subsidies are the major concerns of fertiliser sector in the country. Empirical evidence revealed that imbalance in the use of N, P and K has persisted for a long time at country level as well as in different states. Total fertiliser use in India declined from 18.49 million tonne to 16.32 million tonne during 1999-00 to 2003-04, and it has been one of the factors for slowdown in agricultural growth during this period. Fertiliser production in India remained almost stagnant for a decade now. This can have adverse effect on fertiliser use in the country as dependence on import has already exceeded 35 per cent of fertiliser used in the country (Table 9). Moreover, imports are now costlier than domestic production net of subsidies. There is a need to expand fertiliser production capacity in the country by encouraging investments and improving efficiency in this sector.

Table 9: Domestic production and import of fertilisers ('000 tonnes), 1990-91 to 2007-08

Year	N		P		K	NPK		Import share (%) in total consumption
	Production	Import	Production	Import	Import	Production	Import	
1990-91	6993	412	2051	1016	1326	9044	2754	23.3
1999-00	10873	856	3448	1534	1774	14321	4164	22.5
2000-01	10943	164	3734	437	1594	14677	2194	13.0
2001-02	10690	283	3837	494	1697	14527	2474	14.6
2002-03	10508	135	3908	228	1568	14415	1932	11.8
2003-04	10557	205	3627	372	1553	14183	2129	13.1
2004-05	11305	413	4038	307	2058	15343	2779	15.3
2005-06	11333	1390	4203	1145	2764	15536	5299	25.4
2006-07	11525	2704	4440	1373	2076	15965	6153	27.8
2007-08	10903	3708	3714	1391	2668	14617	7767	34.7

Prices of all the three major nutrients relative to price index of crop sector followed a big decline during 1983-84 to 1990-91. There was no significant decline in real prices of fertiliser after this. Subsidies on fertiliser has shown very steep increase in the recent years but this has not helped in raising domestic production of fertiliser. Among states, fertiliser subsidy per hectare of net cultivated area varies in the range of Rs. 393 in Rajasthan to Rs. 3167 in Punjab. Fertiliser subsidy as per cent of value of crop output shows that Punjab and Haryana receive highest benefit from fertiliser subsidy closely followed by Andhra Pradesh.

Effect of fertiliser subsidy on food security was assessed by estimating the impact of reduction in subsidy on foograin production (Table 10). It was noted that complete withdrawal of subsidies on fertiliser is likely to decrease foodgrain production by close to 9 per cent.

Table 10: Impact of removal of fertiliser subsidy on foodgrain production

Particulars	Dimension
Elasticity of foodgrains with respect to fertiliser	0.2056
Elasticity of fertiliser use with respect to real price of fertiliser	-0.6159
Elasticity of foodgrain production with respect to real price of fertiliser	-0.1266
Weighted price of NPK, 2004-05 (Rs./kg NPK)	12.5
Fertiliser subsidy in 2004-05 (Rs. crore)	15879
Fertiliser use, 2004-05 (thousand tonnes)	18398
Subsidy (per kg NPK)	8.63
Increase in fertiliser price due to removal of subsidy (%)	69.04
Impact of removal of fertiliser subsidy on foodgrain output (%)	-8.74

Determinants of export performance of livestock products

Anjani Kumar

There is a growing and diverse empirical literature on the determinants of export performance. This literature includes cost or price competitiveness analyses through the use of real effective exchange rates, revealed comparative advantage studies, shift share analysis of the composition of exports and econometric estimates of export supply and demand functions. The export of a commodity is influenced by a number of demand and supply-side factors. The gravity model has been used to assess the influence of different demand and supply-side factors in exports of livestock products from India.

The livestock GDP or production of the livestock commodities, which indicates the higher availability of domestic surplus, was observed to play a significant role in increasing the export of livestock products (Table 11). The effect of domestic production was observed to have significant positive influence on the export of dairy and meat products, while its effect on export of eggs was not significant. The GDP of the importing countries had a significant positive influence on the overall exports of livestock products from India. This implies that India tended to export more livestock products to larger economies. India's export will increase by 0.21 per cent as a result of one per cent increase in the GDP of the destination countries.

For dairy products and eggs, India has the propensity to increase export of dairy products and eggs by 0.32 per cent and 0.28 per cent, respectively with one per cent increase in the GDP of the destination countries. However, its effect on exports of meat products was negative, implying that the importing countries tend to import less of meat products with increase in the size of their economy. The bigger economies tend to be self-reliant in the case of meat products. The co-efficient of GDP per capita of destination countries, which characterises the levels of development and consumption, was also positive and significant for overall-india's livestock exports, and meat and eggs exports. With one per cent increase in the GDP per capita in the destination countries, India tends to enhance livestock exports by 0.22 per cent, while its exports of meat and eggs would be increased by 0.32 per cent and 0.28 per cent respectively. The GDP per capita of destination countries had negative influence on the export of dairy products from India. The distance variable was significant and had the negative sign in all cases, indicating that India could be inclined to export livestock products more to its neighbouring countries. Fortunately, India's neighbouring countries are deficit in most of the livestock products which offers opportunities for expanding export of livestock commodities. Further, with the one per cent increase in distance between India and the importing countries, India tends to decrease exports of dairy products, meat products and eggs by 0.74 per cent, 0.90 per cent and 0.28 per cent, respectively. It seems that the effect of distance variable is less on the export of eggs. The ratio of international and domestic price did not influence the export of livestock products, implying other factors are more important in influencing the export of livestock commodities from India.

The trade policy index, which represents the openness of the country or the foreign market access by considering tariff, non-tariff and other administrative policies of the countries, is significant only for the aggregate exports of livestock products. For export of individual commodities, its effect is not significant, though it has the expected signs for each product. These results indicate that strengthening of export supply capacity domestically, holds the key for enhancing export of livestock products, rather than expanding world market. The generation of adequate exportable surplus accompanied

with demand creation for specific products would enable India to tap the benefit of expanding global livestock trade.

Table 11: Gravity model results of Indian livestock exports

Explanatory variables	Total livestock products	Dairy products	Meat products	Eggs
GDP livestock (India)	2.482*** (3.67)	-	-	-
Production (million tonne)	-	3.644*** (3.74)	2.225*** (3.34)	0.564 (1.06)
Producers price ratio	-	0.050 (0.22)	-	0.306 (1.31)
Importer GDP per capita (US$)	0.224*** (3.28)	-0.183* (-1.82)	0.348*** (4.01)	0.166* (1.79)
Importer GDP (US$)	0.205*** (4.27)	0.322*** (4.56)	-0.142*** (-2.47)	0.275*** (3.99)
India GDP per capita (US$)	-0.575 (-0.47)	2.862** (2.18)	2.106 (1.55)	1.261 (0.90)
Trade policy index (no.)	-0.006*** (-2.68)	-0.003 (-0.95)	-0.003 (-1.10)	-0.001 (-0.26)
Distance (km)	-1.186*** (-11.46)	-0.742*** (-6.76)	-0.898*** (-7.36)	-0.282** (-2.39)
Constant	-16.060** (-2.25)	-30.041*** (-3.77)	-9.327 (-1.20)	-12.123 (-1.52)
Log likelihood	-1601	-446	-1263	-502
Wald χ^2	281	85	97	61
Number of observations	764	247	578	275

Note: *** significant at 1 per cent level; ** significant at 5 per cent level; * significant at 10 per cent level.

Integration of food market in India: A study of milk market

P. S. Birthal and Shiv Kumar

Integration of food market is crucial to ensure consistent food supplies to consumers, to enhance livelihood of farmers, and to stimulate agricultural growth. Agri-food marketing policy in India has undergone a sea change in recent years and the country has witnessed a revolutionary change in information and communication technologies, and improvements in infrastructure. These measures are expected to lead to a convergence among agri-food markets. This study examines whether milk prices in selected markets are co-integrated and analyses short-run and long-run equilibrium relationships of milk prices in different markets.

The study concludes that wholesale prices of all five major milk markets, viz. Chennai, Delhi, Kanpur, Kolkata and Mumbai are co-integrated with one long-run equilibrium relationship. Chennai, Delhi and Kanpur milk markets are weakly exogenous markets and there is likelihood that prices in these markets will not change much in response to short-run deviations from long-run relationship, implying that these markets are more stable and less prone to external shocks in the short-run. Wholesale milk prices in Kolkata and Mumbai markets are sensitive to changes in prices in all other markets. More

over, the long-run equilibrium in Indian milk markets if disturbed by any exogenous shocks would primarily be reinstated by corrective measures in Mumbai and Kolkata markets.

The policy implications would be that the markets which are more stable in price series, i.e. less susceptible to exogenous shocks, should work on their own, without much interference by government. The power of market per se will take away market imperfections. The markets, viz. Chennai, Delhi and Kanpur are exogenous to the system. It means these markets have effect on the system and system has not affected these markets. If government wants to give policy shocks to milk market of the country, then the government should first implement the policy via exogenous markets.

Supply, demand and trade of fish in India

Praduman Kumar and B. Ganesh Kumar

The fish production in India has increased rapidly, nearly tripling from 2.44 million tonnes in 1980 to about 6.87 million tonnes in 2008. Domestic demand for fish in India is growing rapidly. Fish availability, higher economic growth, rising population, shift in dietary pattern, tastes and preferences are the driving forces for rapid growth in domestic fish demand and trade. The expansion of demand to match supply has to be a priority concern in the light of resource degradation, weak public support and investment, and potential worsening inequities in the global trade. Will past trends in supply, demand and exports of fish be sustained in the future? Can the additional demand from rising population and per capita income be met by fish supplies? Which types of fish offer the most promising opportunities for growth in production, consumption and trade?

For the purpose of analysis, fish species were classified as Indian Major Carps (IMC), Other Freshwater Fish (OFWF), Shrimps, Pelagic Low Value (PLV), Pelagic High Value (PHV), Demersal Low Value (DLV), Demersal High Value (DHV) and Molluscs.

The income elasticities vary substantially across fish species by income group. But at the aggregate level for all the households, income elasticities range with narrow difference for 1.61 for Shrimp/Prawn to 1.66 for Molluscs. Income elasticities for all the fish groups consistently fall with an increase in per capita expenditure (income) level of the household above the poverty line. None of the groups under study became an inferior good at the highest income quartile. This suggests that despite a rapid increase in aggregate per capita income in the projected period, fish consumption is not likely to turn an inferior good in India. The results revealed that when total income increases, people tend to spend more on fish, and relatively less on other types of meat.

While analysing the inland fish supply, it was found that the supply of IMC will increase significantly with time. The results revealed that the input demand and fish supply are sensitive to their own prices. This suggests that Indian fish producer respond to price changes in an effective manner. Price instruments along with technological policy are likely to be quite effective in fish supply. The increase in supply will make the fish available to the consumers at a cheaper price, which will increase the fish consumption in their food basket. Domestic demand for fish under the baseline scenario is likely to grow at an annual rate of 2.5 per cent between 2000 and 2020. Highest growth in demand is projected for IMC (3.98 %), followed by OFWF (3.96 %), PLV and DLV (2.0 % each). Between 2000 and 2020, consumer demand for Shrimp would decline at an annual rate of -1.97 per cent, followed by DHV (-1.43 %) and Molluscs (-1.14 %).

Fish production by production environment is projected for two decades using year 2000 as the base year. Total fresh fish output growth is projected slightly above three per cent. The aquaculture output

is expected to expand with higher growth of about four per cent per annum as compared to capture output which is likely to grow at slower rate of about two per cent per annum (Table 12). Thus, aquaculture would expand faster than the capture.

Shrimp, PHV, DHV and Molluscs are the major species of fish, which are being exported from India. The highest growth of export is projected for shrimp (4.73%), followed by PHV (4.2%), DHV (3.1%) and Molluscs (3.02 %) (Table 13). The price of exported fish would also increase at the annual growth rate of 4.2 to 10.3 per cent per annum at constant prices.

Table 12: Changes in fish supply by production environment by 2020

Production environment	Production ('000 tonnes)		Change in production		% share in total	
	2000	2020	Quantity ('000 tonnes)	Per cent	2000	2020
Aquaculture	2849.5	6215.2	3365.8	71.4	52.0	60.9
Capture	2632.1	3982.6	1350.5	28.6	48.0	39.1
Total	**5481.6**	**10197.8**	**4716.3**	**100.0**	**100.0**	**100.0**

Table 13: Changes in fish supply by species groups by 2020

Species group	Production ('000 tonnes)		Change in production (%)	% share in total	
	2000	2020		2000	2020
IMC	1418.3	3087.8	35.4	25.9	30.3
OFWF	1047.3	2267.1	25.9	19.1	22.2
Shrimp	639.7	1323.7	14.5	11.7	13.0
PLV	374.1	553.8	3.8	6.8	5.4
PHV	931.4	1379.9	9.5	17.0	13.5
DHV	367.7	541.8	3.7	6.7	5.3
DLV	216.2	321.4	2.2	3.9	3.2
Molluscs	486.9	722.5	5.0	8.9	7.1
Total	**5481.6**	**10197.8**	**100.0**	**100.0**	**100.0**

Spatial price integration and price transmission among major fish markets in India

B. Ganesh Kumar, P. Shinoj, R. Sathiadhas and K. K. Datta

The domestic fish marketing system in India has long been neglected due to various reasons, which in turn has taken a toll on its efficiency, over a period of time. In the context of new global economic order, the efficiency of markets is a subject which deserves primary attention. An efficient marketing system is one where there is perfect market integration and full price transmission, with prices adjusting instantaneously to any changes from within or outside the system. Such a system would enable the producers, middlemen and consumers in the marketing chain to derive maximum gains. The study attempted to analyse the degree of spatial market integration and price transmission between the major coastal markets in India using monthly retail price data on important marine fish

species. The study used monthly price data for a 10 year period from January 1998 to December 2007 of the selected fish species from important coastal markets of the country like Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu and West Bengal. A linear regression cum co-integration framework was used for quantifying the degree of price transmission between various markets. The speed of adjustment in the short-term price fluctuations was captured by using an Error Correction Model (ECM) as suggested by Engle and Granger (1987). The direction of causality was ascertained using Granger Causality Test and was confirmed using the Schwarz Information Criteria (SIC) from the respective regression equations.

The results suggested that the degree of integration and rate of price transmission differed among markets. The highest integration has been observed in mackerel, perhaps because of its affordability by all income classes, resulting in a wide consumer base. The price changes in mackerel market in Kerala have been found to be transmitted almost in entirety to Tamil Nadu, in spite of having short-term divergences. Prices in the Orissa and Andhra Pradesh markets have been found moving synchronously with high rate of price permeability, but with direction of price transmission contrary to the expected lines. The monopsonistic ability of Orissa market has been assumed to be the causative factor. Similar to that of mackerel, a high-level of price integration between the Kerala and Tamil Nadu markets has been observed in sardine also. The sardine prices of Karnataka and Gujarat markets have also been found to be moving together closely, as this species is the major raw material for their dry fish industry. The dictating power of Orissa market over the Andhra Pradesh market has been confirmed in sardine also, but with a lesser degree of price transmission. An over-reaction of price changes has been depicted between the Kerala-Tamil Nadu and Gujarat-Tamil Nadu market pairs in the case of pomfret, supposedly due to its preferential and premium priced status. In both these cases, the elasticity of price transmission has been recorded more than once. Shrimp markets in West Bengal and Orissa have been found to be integrated with the existence of long-run price equilibrium. In the same token, Tamil Nadu and Karnataka prices have also been found moving in tandem. In spite of being large producers, the Kerala, Maharashtra and Andhra Pradesh shrimp markets have not been found integrated with any other domestic market, possibly because of their larger market share outside the country.

The study unveiled the complicated price transmission mechanism between various fish markets in the country and gives an important message of the necessity of price integration between the markets as a remedy to address the supply side constraints existing in these markets. It also throws light on the lack of integration between important markets of major marine fish species and appeals to devise strategies to bring about greater integration between these markets, so that both the fishermen and the fish eating community in the country are benefitted.

The changing dynamics of India's fish and fishery products exports

B. Ganesh Kumar, P. Shinoj and K. K. Datta

Fish export, mainly that of marine products, has been contributing a substantial source of foreign exchange to India's exchequer and hence, accorded utmost priority. The study attempted to analyse the various factors and determinants of marine exports from India with special reference to the implications of quality and safety regulations on the exports. From Table 14, it is evident that, frozen shrimp and fin fish are the largest exported items, the primary destinations being European Union, Japan and USA. The supreme status of Japan being the largest Indian seafood market has got largely eroded over the last decade. It has also been observed that, India's export basket has got diversified and

is showing a dent towards low value exports routed to South-East Asian and Middle East countries at the expense of premium priced shrimp which used to find markets in Japan.

Tabe 14: Commodity-wise performance of marine products exports from India

(Quantity in tonnes, value in Rs. crores)

Commodity	Export				Share (%)			
	1995-96		2006-07		1995-96		2006-07	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Frozen shrimp	95724	2356.8	137397	4506.0	32.3	67.3	22.4	53.9
Frozen fin fish	100093	372.2	270751	1452.8	33.8	10.6	44.2	17.4
Frozen squid	45025	319.5	55701	797.3	15.2	9.1	9.1	9.5
Frozen cuttle fish	33845	260.8	47252	568.3	11.4	7.5	7.7	6.8
Dried items	7415	44.2	24293	183.1	2.5	1.3	4.0	2.2
Live items	1756	31.3	2478	64.0	0.6	0.9	0.4	0.8
Chilled items	2773	26.0	7200	117.3	0.9	0.7	1.2	1.4
Others	9646	89.9	67571	674.3	3.3	2.6	11.0	8.1
Total	**296277**	**3501.11**	**612641**	**8363.53**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Marine Products Export Development Authority, Cochin

The Sanitary and Phytosanitary Agreement along with agreement on Technical Barriers to Trade have been acting as strong non-tariff barriers to marine exports from developing countries. There have been innumerable instances of Indian fishery consignments being rejected by USA, EU and Japan. It was observed that, 47 cases of import refusals were registered against India by USA during the period 2007-08. Most of the rejections were due to microbial and filth contamination of the exported lots. This highlights the poor emphasis given to sanitary issues before exporting. The inadequate infrastructural, processing, packaging and grading facilities, and lack of proper attention towards hygienic practices are being reflected through these frequent incidents of export rejection/refusals. Therefore, an increasing need for compliance to Sanitary and Phytosanitary System measures has been realised for which conscious efforts and investment in raising our compliance standards are inevitable.

Efficiency of marketing the Indian Major Carps in India

B. Ganesh Kumar, K. K. Datta and G. Vidya Sagar Reddy

The IMC namely, *Catla catla*, *Labeo rohita* and *Cirrhinus mrigala* form the predominant group among carps cultured in the country. Nearly 80 per cent of the 2.2 million tonnes of cultural fish produced in India are composed of IMC. Compared to the achievements in production of IMC, the marketing system of IMC is very poor and highly inefficient in India. However, an exception to the general IMC marketing scenario in the country is the cultured carp marketing system of Kolleru Lake Area (KLA) in the state of Andhra Pradesh. It is the predominant centre for carp culture in India and is also known as the 'Carp Pocket of India', mainly due to the highly efficient fish marketing system prevalent in the area. A study was conducted on the KLA fish marketing industry and the marketing of IMC in other major aquaculture states such as West Bengal and Orissa and marine states such as Maharashtra and Tamil Nadu in terms of market structure, conduct and performance. The marketing channels, market intermediaries, price spread and marketing efficiency were also studied.

The cost of production for catla and rohu was found to be Rs. 34.32 and the farm gate price received by farmers for IMC at Kolleru varied from Rs. 40 to Rs. 42 depending on the size of fish (Table 15). Traders buy fish from farmers through the services of brokers and transport fish to distant markets (Figure 6). The marketing costs of traders to transport fish to Howrah market, Bhubaneswar market and Assam were 6 Rs./kg, 10.99 Rs./kg and 13.91 Rs./kg respectively. The comparison of market channels for several fish markets revealed that the price spread for IMC from Kolleru was highest for Maharashtra and lowest for Tamil Nadu. Consequently, fishermen's share in consumer's price was highest for Tamil Nadu at 61.54 per cent and lowest for Maharashtra at 47.06 per cent. Similarly, the marketing efficiency was highest for Tamil Nadu marketing channel at 2.60 and least for Maharashtra marketing channel at 1.89. The study also revealed that retail price of KLA carps was lower than that of locally cultured carps in various areas, reflecting the efficiency of the marketing channel in providing cheap fish transported over large distances and through a large number of intermediaries.

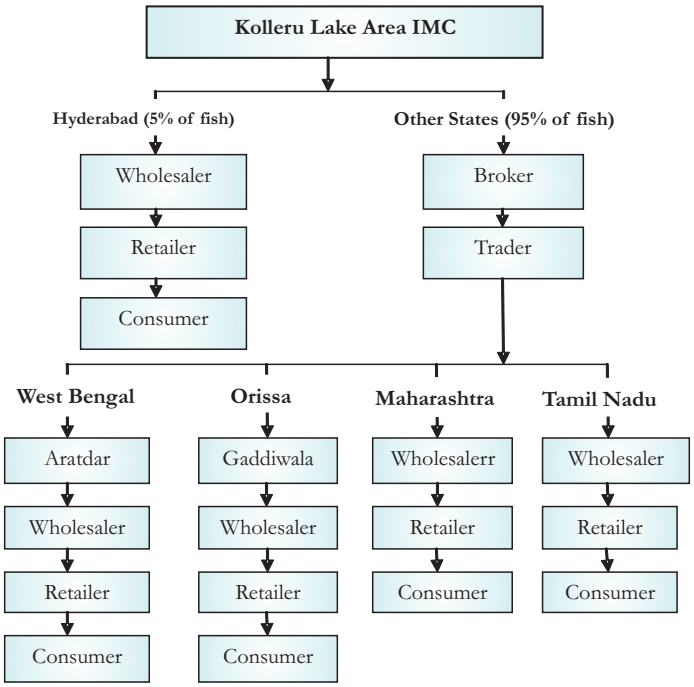
The study revealed that the marketing system of KLA carps is highly efficient in sharing the benefits with aqua farmers while providing quality fish to consumers at reasonable prices. The primary reason for the success of fish farming at KLA is the efficient marketing system that enables the producers to fix the pond-site price, as they have access to information on prices at wholesale market of various fish consuming cities across the country. Knowledge of cost of culture as well as wholesale prices gives the farmer a better bargaining position while fixing fish prices. The second reason for successful marketing is the entrepreneurship of the trader. The traders arrange for uninterrupted supply of ice and labourers thereby ensuring that fish is iced without any time lag after harvest, leading to better keeping quality of fish. Innovations in packing with the use of thermocol boxes and vehicles lined with thermocol sheets enable transportation of larger quantities of fish to longer distances with minimum spoilage. Such practices ensure that fish is traded at the best possible price. It is evident that with scientific culture practices, information on prices and availability of requisite infrastructure, fish marketing can be an efficient system in India. The salient features of the carp marketing system of KLA could be adopted at other fish culture systems in the country.

Table 15: Cost of production of IMC in Kolleru lake area

Item	Cost (Rs./kg)
Pond Lease	7.50
Feed	21.00
Harvest	0.20
Gear	0.16
Seed	2.00
Feed Bags & Poles	0.50
Watch & Ward	0.16
Electricity	0.20
Chemicals & Fertilisers	1.50
Sanitisers	1.00
Agent's Commission	0.10
Total cost	34.32

Source: Primary Survey, 2008

Figure 6: Marketing system of IMC cultured in Kolleru lake area



Marine fish marketing system in India

B. Ganesh Kumar, R. Suresh, P. S. Ananthan and Shyam S. Salim

The marine capture fisheries sector of India is faced with issues of sustainability with production from the sector reaching a plateau in recent years. The sector which witnessed growth rate of 5.12 per cent in the 1950s grew by only 2.19 per cent in the 1990s. Presently, India boasts of marine fish production of 2.85 million tonnes. The issues in the marine fisheries sector include excess coastal fishing fleet capacity and over-exploitation, unregulated open access fisheries, discards at capture/ indiscriminate capture, and downgrading of juveniles and sub adults, environmental degradation, biodiversity loss and ineffective regulatory measures, increased fishing costs and decreased profitability, poor infrastructure and linkages for domestic marking, under-utilisation of oceanic and deep sea resources and emerging inter and intra-sectoral conflicts. Hence, a paradigm shift from increasing marine fish production to increasing profitability and sustaining the marine fishery resources through management interventions would need to be focused upon. Having an efficient domestic marketing system is one of the techniques for increasing profitability of the marine fisheries sector. The market structure, conduct and performance of marine fish markets in the country were studied. The marketing channels, market intermediaries, price spread and marketing efficiency were also studied.

The main market intermediaries in marine fish marketing were the auctioneer, wholesaler, retailer and vendor. The marketing costs of auctioneer ranged from 0.22 to 1.00 Rs./kg. For wholesalers, the marketing costs ranged from 0.52 to 6.16 Rs./kg. The marketing costs for retailers ranged from 2.28 to 11.50 Rs./kg. For vendors, the marketing cost ranged from 1.70 to 5.00 Rs./kg. A comparison of marketing channels for seer fish (Table 16) and sardine (Table 17) revealed that fishermen's share of consumer's price varies with the margins charged by the market intermediaries. For seer fish, fishermen's share was highest (86.40%) for the Tuticorin channel where the wholesaler charged the lowest margin (5.20%). Conversely, fishermen's share was lowest (66.55%) in Kanyakumari where the retailer charged the highest margin (20.96%). Similar result was seen for sardine marketing channels. It

was also found that fishermen received higher share of consumer's price for high valued species like seer fish when compared to low valued species like sardine. The marketing efficiency for high valued species ranged from 2.99 to 7.35, and for low valued species ranged from 1.94 to 2.77.

Table 16: Price spread for seer fish and fishermen share of consumer price at various fish markets in India

(Rs./kg)

Particulars	Cochin	Mumbai	Kanyakumari	Tuticorin
Prices received by fisherman	123.75	130.00	173.00	216.00
	(68.75)	(72.22)	(69.20)	(86.40)
Auctioneer's fee	13.75	10.00	14.00	12.50
	(7.64)	(5.56)	(5.60)	(5.00)
Wholesaler's purchase price	-	140.00	187.00	228.50
		(77.78)	(74.80)	(91.40)
Costs incurred	-	6.50	21.00	8.50
		(3.61)	(8.40)	(3.40)
Margin	-	13.50	42.00	13.00
		(7.50)	(16.80)	(5.20)
Retailer's purchase price	137.50	160.00	_	_
	(76.39)	(88.89)		
Costs incurred	4.45	3.00	_	_
	(2.47)	(1.67)		
Margin	38.05	17.00	_	_
	(21.14)	(9.44)		
Price paid by consumer	**180.00**	**180.00**	**250.00**	**250.00**
	(100.00)	**(100.00)**	**(100.00)**	**(100.00)**

Note: Figures in bracket indicate per cent to price paid by consumer

Table 17: Price spread for sardine and fisherman's share of consumer price at various fish markets

(Rs./kg)

Particulars	Kanyakumari	Cochin	Tuticorin
Prices received by fisherman	17.50	13.50	17.00
	(61.40)	(54.00)	(48.57)
Auctioneer's fee	2.50	1.50	1.00
	(8.77)	(6.00)	(2.86)
Retailer's purchase price	20.00	15.00	_
	(70.17)	(60.00)	
Costs incurred	2.50	4.45	_
	(8.77)	(17.80)	
Margin	6.00	5.55	_
	(21.05)	(22.20)	
Vendor's purchase price	_	_	18.00
			(51.43)
Costs incurred	_	_	2.50
			(7.14)
Margin	_	_	14.50
			(41.43)
Price paid by consumer	**28.50**	**25.00**	**35.00**
	(100.00)	**(100.00)**	**(100.00)**

Note: Figures in bracket indicates per cent to price paid by consumer

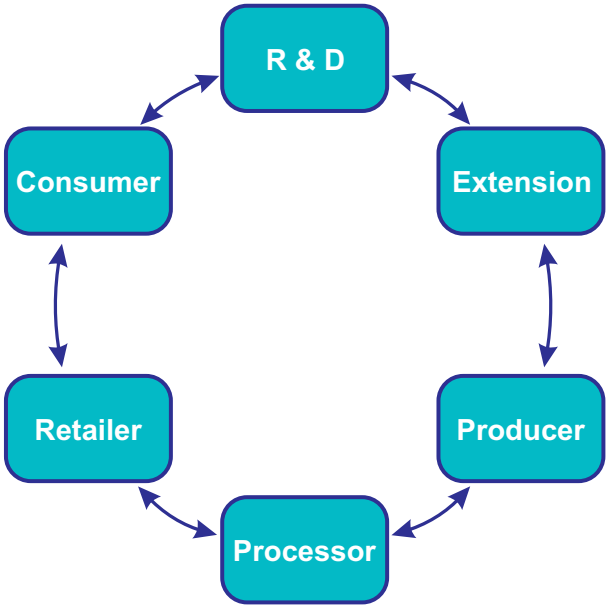
Institutional Change

Institutional innovations in agricultural supply chain

Harbir Singh

Growing consumer demand for quality and food safety is necessitating an increase in vertical coordination in food markets and agri-food supply chains. The private sector has been more proactive in responding to these changes, and it has come up with innovative institutional arrangements which address not only the supply side constraints but also other market imperfections such as information asymmetry. Increasing coordination in agricultural supply chains creates opportunities as well challenges for various stakeholders (R&D, farmers, traders, processors, etc). In this study, information flow and impact of institutional innovations in agricultural supply chains were analysed in respect of potato crop, which is one of the important food crops with multiple uses.

Figure 7: Information flow in traditional agricultural supply chain



Information flow

Under perfect competition, information should quickly disseminate among different stakeholders leading to establishment of effective linkages (Figure 7). However, it was observed that though information flow among processors, retailers and consumers in potato supply chain was somewhat satisfactory, it was very weak among public R&D, extension system, producers and processors.

Interactions with public R&D revealed that till date, the private sector's interest was only in accessing early maturing processing varieties from public R&D and procurement of raw material from farmers at cheaper rates. One of the important reasons for inadequate information sharing and weak linkages between public and private sector was that there were no clearly defined areas of cooperation between the two, and the public sector also lacked proper institutional arrangements to work with the private sector. Even when the desired institutional arrangements are in place, public sector takes too long to respond to private initiatives. This is one of the major factors which hinders information flow and faster development of public-private cooperation. Therefore, there is a need to work out an operational model for responding quickly to the private sector initiatives.

Institutional innovations and impact

To overcome the weaknesses in potato supply chain, private sector has come up with some models of institutional innovations which seem to result in a win-win situation for all the stakeholders. Two such models were studied specifically for their impact on farm households. Under PepsiCo model, the firm provides agricultural technology (potato seed) along with a package of practices to its potato contract growers with the help of its core research team and field staff. The firm closely monitors the performance of crop in the field and at the time of harvest, procures the entire pre-agreed quantum of the harvested produce at the pre-agreed price at farm gates. Duration of such contracts is generally one year. In some cases, the company adopts flexible rate contracts wherein farmers get assured 'base price' and the rest is determined by market forces (e.g. paddy contracts). Under Merino model, the firm has a two-year contract with its potato growers. The firm's agronomy team provides farmers with seed of desired variety at pre-agreed rates alongwith technical know-how for soil testing, land preparation, fertiliser application, irrigation schedule, disease/pest control, harvesting and post-harvest operations. There is a clear understanding on quality criteria, and the firm buy-backs the produce at agreed price.

These institutional innovations have various direct and indirect impacts on farm households. Interestingly, potato yields on contract farms were lower (about 13 per cent in Merino model and about 30 per cent in PepsiCo model) than that of the non-contract growers (Table 18). This was on account of early harvest necessitated by keeping the tuber size medium which is required to meet the processing standards (chips-grade potato).

Table 18: Yield, prices, costs and returns on sample households

Item	Contract (PepsiCo)	Non-contract (Open market)	Contract (Merino)	Non-contract (Open market)
Yield (qtl./ha.)	270.17 (-30.54)	352.68	283.09 (-13.43)	321.10
Price received (Rs./qtl.)	480.00 (+22.08)	374.00	450.00 (+11.11)	405.00
Transport & handling costs (Rs./qtl.)	13.13 (-25.00)	10.00	9.22 (-74.60)	16.10
Net returns (Rs./ha)				
Sold to firm	30287.20	N/A	37364.70	N/A
Sold in open market	6484.08	32112.5	1019.12	30990.4
Total returns (Rs./ha)	36771.28 (+14.51)	32112.5	38383.82 (+23.85)	30990.4

Note: Figures in parentheses are per cent difference. N/A= not applicable

Source: NCAP farm survey

Since contract farmers got higher price than those selling in the open market, their net returns were about 14-24 per cent higher than that of the non-contract farmers. In addition to direct tangible benefits, these institutional innovations have many spillover effects for the betterment of the farming community. Most notable spillover effect of innovation on potato supply chain was higher investment by the sample households (52%) in farm assets as a result of higher realisation from contract production. This is reinforced by the fact that about 45 per cent farmers expanded area under potato cultivation after they found it profitable.

Different types of institutional arrangements in potato supply chain have resulted not only in higher realisations for the farmers but also such arrangements have other positive spillover effects on the farmers participating in the supply chain. However, full potential of such innovations could be harnessed

only by ensuring effective coordination, speedy communication and mutually beneficial collaboration among different stakeholders in potato supply chain. These would be crucial for development of efficient agricultural supply chain and integrated agri-food market, benefitting all the stakeholders in agricultural supply chain.

Infrastructure development for agricultural growth and poverty alleviation

Smita Sirohi

The Pro-Poor Infrastructure Index (PPII), constructed by using Modified Principal Component Analysis, taking recent available data (2001-08) on the indicators that are specifically relevant from the perspective of physical infrastructural facilities for enhancing the income of the rural poor from agricultural and allied activities, shows that the PPII was below the all-India average of 2.43 in half of the 26 states considered in the study. The exercise brought out the specific areas of deficiency in infrastructure provisioning in each state as highlighted by the shaded boxes (Table 19).

A simple analysis of the relationship between incidence of rural poverty (2004-05) and PPII brings out that in 14 out of 26 states, where the PPII is close to or above the all-India average, the rural poverty ratio is below the national average. In seven states with poor infrastructure (Jharkhand, Bihar, Orissa, Madhya Pradesh, Chhattisgarh, Uttar Pradesh and Uttarakhand), rural poverty is high (Figure 8).

The zero-order correlation matrix between rural Head Count Ratio (HCR) and availability of various pro-poor infrastructure facilities points towards the importance of roads connectivity, surfaced roads, household electrification, irrigation, agricultural extension and veterinary infrastructure in rural poverty alleviation.

The analyses of the linkages between infrastructure and agricultural development indicates that transport, power, irrigation and research infrastructure are four critical components which affect the agricultural productivity in a significant manner (Table 19). The regression with the lagged explanatory variables gave a better fit as the impact of infrastructure is often realised with time lag. Thus, given the strong positive linkages between infrastructure and agricultural development on one hand, and inverse relationship between agricultural growth and rural poverty on the other, there is a clear case for promoting the development of pro-poor infrastructural facilities (Table 20).

Prioritisation of the investment needs in infrastructure, such as reliable power supply and road network lie at the foundation of comprehensive rural infrastructure provisioning. In the rain-fed areas, irrigation is among the top three infrastructures that have to be developed. Improvements in information and communication technology (ICT) infrastructure have the potential to change social and economic patterns of rural India and enable the poorer to improve their lives. Once roads and ICT provide connectivity to rural masses, the development of modern marketing facilities for transportation of fresh produce to urban consumers in India and abroad can improve the agricultural sector's productivity and raise standard of living of millions of Indians living in villages. Integrating the agro-sector with the world economy will pull many village folk out of poverty and provide them productive employment. Good economic infrastructure for allied agricultural activities such as animal and social infrastructure—education and health will play a catalytic role in realising this dream.

The role of government and private sector must change with the levels and nature of infrastructure development. For the development of infrastructure facilities like electrification, cold chain, communication and information technology, where corporate investments are forthcoming, the government's role should be largely that of a regulator and it should finance infrastructure only to a limited extent. Public or private entity should make use of financial instruments for investing in infrastructure and also carry out the operational responsibility. In this development stage, the investments for infrastructure creation should come from the public/private entity but the O&M cost must be borne by the users who also have a voice and grievance redressal for assured supply and

service quality. In case of other infrastructure such as rural roads, where inflow of private finances may be low, the government should continue to be the regulator, promoter, financer and implementer, but the onus of operation needs to be placed on the private entity. The aim of different stakeholders in infrastructure provisioning and usage should be to ultimately reach a development stage where the government is only the regulator and provider of viability gap financing, whereas users are well-organised into a representative body which finances O&M and operates the infrastructure facility. The private entity is the builder and major financer.

The action plan for pro-poor infrastructure development needs to be built on two thrust areas, one, creating an enabling environment so that private sector takes up the major responsibility of financing capital costs of the infrastructure and second, carrying out institutional reforms for adding the fourth "P" representing people to the public-private partnership (PPP) models.

Table 19: Pro-poor infrastructure index and areas of policy focus to improve infrastructure for rural poor

Level of PPI index	States	PPI index	Road connect-ivity	Surfaced roads	Household electri-fication	Irrigation	Institu-tional credit	Wholesale and rural markets	Agricul-tural extension	Veterinary institu-tions
LOW	Jharkhand	1.23								
	Assam	1.40								
	Orissa	1.61								
	Meghalaya	1.64								
	Uttarakhand	1.87								
	Rajasthan	1.88								
	Madhya Pradesh	1.91								
	Bihar	1.93								
	Chhattisgarh	2.06								
	Tripura	2.19								
	Uttar Pradesh	2.31								
	Himachal Pradesh	2.32								
	Jammu & Kashmir	2.37								
	India	**2.43**	**69.53**	**57.82**	**43.5**	**48.03**	**17.42**	**4.61**	**15.91**	**10.88**
HIGH	Manipur	2.52								
	West Bengal	2.60								
	Nagaland	2.68								
	Sikkim	2.71								
	Karnataka	2.81								
	Gujarat	2.87								
	Mizoram	2.93								
	Tamil Nadu	3.08								
	Maharashtra	3.10								
	Andhra Pradesh	3.39								
	Punjab	4.39								
	Haryana	4.50								
	Kerala	5.30								

Note: PPI: Pro-Poor Infrastructure Index. Grey boxes denote low level of availability (below all-India average)
Road connectivity: % of connected habitations; Surfaced Road: % of surfaced roads in total road length; Household Electrification: Percentage of rural households with access to electricity; Irrigation: % of gross irrigated area to gross cropped area on marginal and small holdings; Institutional Credit: % of marginal and small holdings accessing credit from institutional sources; Wholesale and rural markets: No. of wholesale and rural markets per 10 villages; Agricultural Extension: % of small and marginal farmers accessing agricultural extension services; Veterinary Institutions: No. of veterinary institutions per lakh livestock population.

Figure 8: Linkages between infrastructure availability and rural poverty

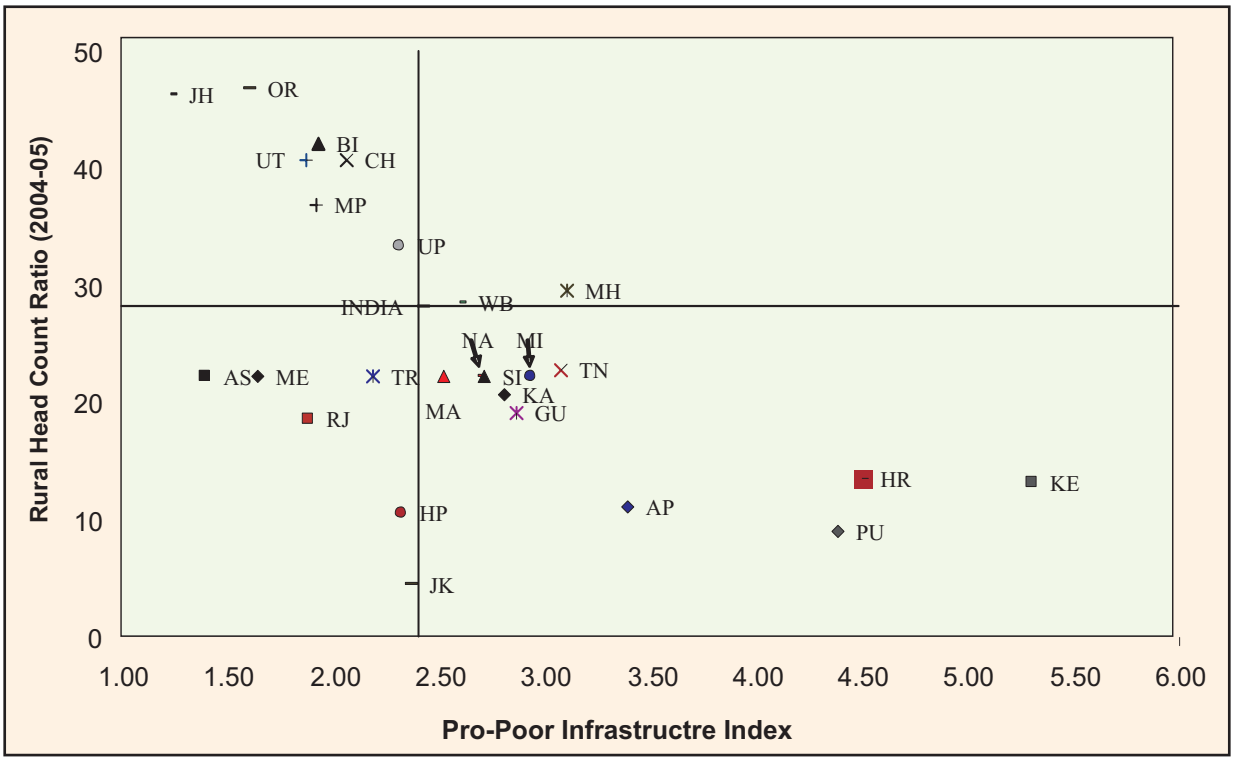


Table 20: Linkages between agricultural development and infrastructure

Dependent Variable: Average Agricultural Productivity (Rs./ha)	
	Model 1 n= 68
EQ1	2235.01 + 23.91 ROAD** + 149.12 IRRIGATION* + 0.468 RESEARCH*
	(13.03) (42.41) (0.16)
	R2 = 42.73%
EQ2	-206.99 + 95.63 POWER* + 93.52 IRRIGATION** + 0.450 RESEARCH**
	(26.16) (46.33) (0.091)
	R2 = 48.46%
	Model 2 (10 year lagged explanatory variables) n= 51
EQ1	1254.76 + 34.30 ROAD* + 126.12 IRRIGATION* + 2.32 RESEARCH*
	(8.68) (28.81) (0.29)
	R2 = 71.81%
EQ2	1751.83 + 55.40 POWER**+ 91.73 IRRIGATION* + 2.22 RESEARCH*
	(26.22) (35.23) (5.82)
	R2 = 69.08%

Note: 1) Figures in parenthesis White's Heteroscedasticity consistent standard errors.
2) *, ** significant at 1 and 5 per cent level of significance, respectively.

Innovations in linking farmers with research-extension-markets

P. Adhiguru

During the green revolution era, research-extension-farmers-markets-consumers are viewed under linear framework. During post-green revolution, globalisation and economic liberalisation on the one hand, and climate change and declining resources on the other have affected this linear paradigm and there is weakness among research-extension linkages. Farmers need to know the answers to questions like what price and what form to sell their produce. The increasing demands of farmers in terms of technology and information necessitate stronger research-extension linkages.

One of the prime concerns is isolated functioning of research and extension agencies and the difficulties in nurturing and promoting PPP (FAO-NMTPF, 2008). Technology delivery system requires an immediate re-look. Technology development and delivery need to be in continuum and should be interactive. The research system has to forge linkages with the public extension system at all levels (ICAR, 2008).

In the early years, research and extension systems were driving agriculture by means of production targets. Now, market forces are driving agriculture by means of consumer preference in terms of variety, quality including bio-safety. But, extension system does not have information on market demand. The extension system is unable to direct production. Research and extension institutions are functioning in vertical silos. There are some negative structural changes in extension institutions like decline in manpower. As a result, these institutions have become functionally less effective and unable to meet emerging information demands of farmers.

Realising the importance, formal research and extension mechanisms have been developed at different levels linking different stakeholders. Apart from these mechanisms, there are innovations coming up both in public and private sectors for encouraging research-extension-farmers linkages. Here, some selected illustrative cases are presented to highlight the importance of emerging innovations in improving linkages.

Rural bio-resource complex

University of Agricultural Sciences (UAS), Bangalore is implementing Rural Bio-resource Complex project since April 2005 in Tubagere Hobli district of Karnataka covering 8340 families spread over 75 villages. To improve information flow to farmers, eight junior scientists were recruited and each

Figure 9: Model for sustainable development of Biofuel

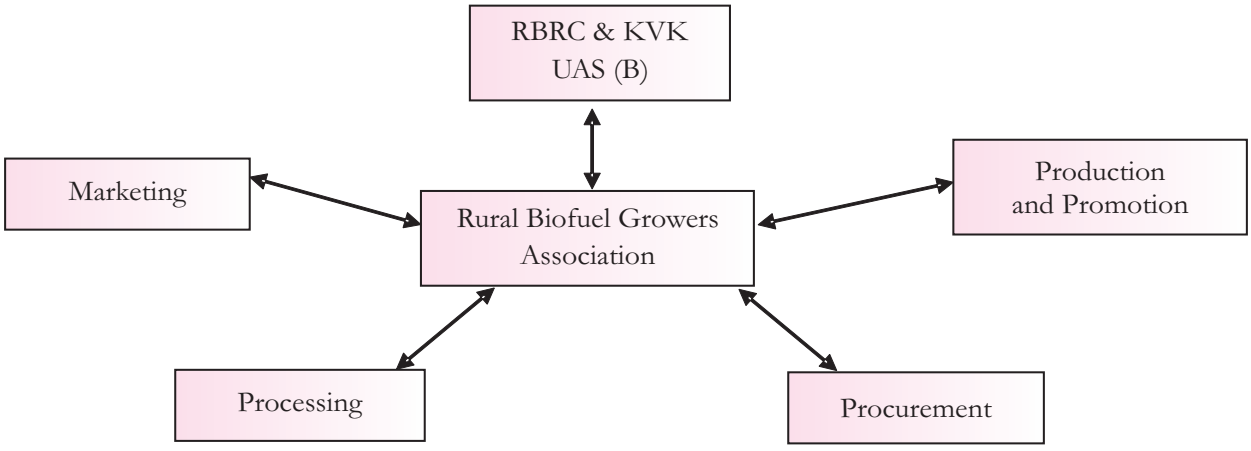


Figure 10: Biofuel processing plant

of them worked with 1500 to 2000 families, need based training programmes, established one Village Resource Centre (VRC) at the project area and an expert centre at UAS. In all, 13 agencies are collaborating with the project representing three research organisations, six development departments, three commodity boards and one financial institution. Rural Biofuel Growers Association has been formed and promotion of Pongamia as biofuel has been attempted.

The model ensures timely availability of seedlings, assured price, minimum overhead charges on procurement of biofuel seeds and sale arrangement locally with existing facility, assured income, employment generation and environment friendly energy. It is to be noted that the price of Pongamia seeds was Rs. 5/kg during 2004-05 and later it was sold at Rs. 15/kg (2007-08). The model evolved is replicable under similar situation across the countries with suitable refinement.

Banana fibre extractor

The manual fibre extraction process from banana stem is a cumbersome process. An expert person can hardly produce a maximum quantity of 500 to 600 grams of dry fibre in eight hours. Based on the need assessment by KVK-CTRI, Rajahmundry developed user friendly "Banana Fibre Extractor". For manufacturing, dissemination and imparting training, linkages have been established with industries, DRDA, KVK-CTRI, Non-Governmental Organisations (NGOs) and Self-Help Groups (SHGs). The extractor helps in reducing drudgery and increases fibre production so times compared to 25 kg of fibre production/day against 500 grams through manual operation. The machine helps banana cultivators to get an additional income of Rs. 2500/per acre @ Rs. 5/per plant with an average of 500 plants in an acre. In North-East Region alone, more than 60 machines are under operation.

The cases presented here indicate that establishing innovative and appropriate linkages among research-extension-farmers-markets will facilitate the research and extension system in the process of identification of technological needs of the farmers, evolving and refining appropriate technologies while the farmers would benefit in terms of increased access to technologies, easy access to markets, increased income generation. Thus, it strengthens sustainable backward and forward linkages because needs and functions of respective stakeholders are appropriately matched.

Farmers' perception on Agriculture Debt Waiver and Debt Relief Scheme 2008

Rajni Jain and S. S. Raju

Agriculture Debt Waiver and Debt Relief Scheme 2008 (ADWDRS) was announced in budget speech of the finance minister in the year 2008. Under this scheme, the GoI provided a debt relief to the tune of about Rs. 71,000 crore to small and marginal farmers. The main aim was to provide fresh loans to farmers who have become defaulters to the banks due to reasons beyond their control so that they could restart their farming or economic activity. To study the implications of the scheme on farmers, a survey was conducted in the villages of Mahendergarh, Hisar and Karnal districts of Haryana during the period of October to December, 2008. Farm household level data was collected using a specially designed and pre-tested schedule to study the opinion of the farmers on the sheme. The response of the beneficiary and non-beneficiary farmers from the selected districts of Haryana regarding effects and their perception on the scheme are summarised in Table 21.

Table 21: Perceptions of the selected farmers in the state of Haryana on Agriculture Debt Waiver and Debt Relief Scheme 2008

Response	Beneficiary (%)	Non-Beneficiary (%)
Non-institutional loans should be waived off	97	97
Planned to repay before announcement	87	-
Encouraging people towards defaulting	38	99
Decreasing tendency towards non-institutional loans	4	20
Availed similar facilities in the past	1	2
Needed incentives for non-defaulters	100	100
Effects on social harmony of the village	1	0
Socio-economic changes in the family	4	0

It was observed that ADWDRS did not affect the social harmony in the village and provided benefit to farmers who are not having sufficient income. Beneficiary farmers (87%) reported that they had planned to repay the loan before the announcement of the scheme. Mere four per cent of the beneficiary farmers and 20 per cent of the non-beneficiary farmers opined that there will be decreasing tendency towards non-institutional loans. The reason is that formal lending institutions would be now more cautious in processing the loan applications for defaulters. Both the categories of farmers felt that the scheme should not be discriminatory and incentives should have been provided to the non-defaulters also.

Officials of the financial institutions in different villages informed that crop loan recovery per cent in the state had dropped. This was attributed to the misconceptions among farmers about the scheme and therefore, reluctance among them to repay the loan thereafter. The farmers did not fully understand the scope of the scheme and thought that all of them, irrespective of the cut-off period, were entitled to the benefit of the waiver. Officials of the financial institutions felt that there is a need of a long-term solution than a short-term patch up to revive agriculture. Penalising the people who paid off their debts even though they suffered difficulties will not provide solutions. The bankers' experience showed that waiver scheme encouraged borrowers to presume that they can sooner or later get away without repaying loans. It reinforces the culture of willful default, which has resulted in huge overdues and defaults in all segments of organised financial institutions. One Time Settlement Scheme (OTS) was not a success because no farmer has that kind of liquidity to meet the payment commitments in order to get the 25 per cent amount waiver.

Credit incentive scheme of Government of Andhra Pradesh

S S Raju and Rajni Jain

On a review of ADWDRS 2008, Government of Andhra Pradesh observed that about 56.41 lakh agricultural loan accounts and an amount of Rs. 9384 crore, in the state got benefit under the scheme. However, an estimated 38 lakh farmers, who availed crop loans, were deprived of any benefit under the scheme, as they had already repaid the loans by the date of announcement of GoI. It has, therefore, been decided by the Government of Andhra Pradesh to provide an 'incentive' to the farmers who have repaid their 'crop loans' in time under the Rythu Protsahaka Utsavaalu (19–30 November, 2008). The incentive was extended through credit advice to farmers crop loan account as per the following terms and conditions:

a) Only crop loan borrowers were eligible for the incentive.

b) All farmers who availed crop loans from Kharif 2004 onwards and repaid on or before 29/2/2008 and not covered under ADWDRS 2008 were eligible under the scheme.

c) In respect of multiple loans or joint loans, where benefits have accrued under the GoI scheme, the farmer(s) become ineligible under the state incentive scheme.

d) The farmers will get reimbursement of the actual amount repaid to the bank or Rs.5000/- which ever is less.

Finance Department of Andhra Pradesh initially arranged the required funds of Rs. 1600 crore to implement the credit incentive scheme. Further a proposal was also submitted to Government of Andhra Pradesh for additional requirement from 22 banks of Rs. 221.51 crore. Thus, the total amount increased to Rs. 1821.51 crore, covering 37.31 lakh farmers by this scheme.

The villages of Cheeryal, Narsampally and Yadagiripally of Keesara mandal of Rangareddi district of Andhra Pradesh were selected to better understand the perception of the beneficiary farmers of the Rs.5000/- Credit Incentive Scheme of Government of Andhra Pradesh 2008 and its implications. In the village, mainly paddy and grapes in kharif, and paddy and vegetables in rabi are grown. The villages are irrigated by wells.

Some of the observations as noticed from the farmers and officials are as follows:

1. Some of the beneficiary farmers of ADWDRS 2008 were also not very excited after their waiving of loans as they did not get any cash in their hand. They have already decided not to repay the loan because of their financial conditions and other personal reasons.

2. Beneficiary farmers of Rs.5000/- Credit Incentive Scheme of Government of Andhra Pradesh informed that they have been repaying the loan regularly as per the due date. They strongly feel that there should not be any discrimination between the regular payees and defaulter farmers. The scheme is not found appealing to many customers, especially good customers. Regular payees are not happy with this incentive of Rs.5000/- as defaulters are getting more benefit out of the GoI scheme.

3. It was felt by *Adarshu Rythulu* that there is need of a long-term solution than a short-term patch up to revive agriculture. On being asked "What should have actually been done to benefit the farmers?", the suggestion was provided as follows:

"..... timely institutional credit to small and marginal farmers to crops, need to be strengthened and improved. Introduce complete interest subsidy for those timely repaying loans, instead of debt waiver schemes involving huge funds, which could be better utilised for improving irrigation, for providing quality electricity, warehousing, cold storage, marketing facilities and subsidy on agricultural inputs and implements. Crop insurance will also go a long way in bringing relief to the farming community"

4. It was only a poll gimmick and mere re-adjustment of finances. Some proportion of the farmers have taken loans from non-institutional sources. The scheme would provide no respite to this category of the indebted farmers and landless persons.

5. The overall crop loan recovery (per cent) in the state dropped. This was attributed to the misconceptions among farmers about the scheme and therefore, reluctance among them to repay the loan thereafter. The farmers did not fully understand the scope of the schemes and thought that in future also were entitled to the benefit of the waiver.

6. The bankers' experience shows that waiver scheme encouraged borrowers to presume that they can sooner or later get away without repaying loans. It reinforces the culture of willful default, which has resulted in huge overdues and defaults in all segments of organised financial institutions. There are also rumours and promises from the opposition parties regarding waiving off loans in subsequent years also. A wrong message regarding non-payment of agricultural loans has been spreading in the farming community.

7. It has become difficult for the bankers to do the recovery as everybody, irrespective of its category as farmer or non-farmer, is hoping for some scheme to be announced for waiving of the loans.

8. The health of the banks is deteriorating rather than improving as a result of the scheme.

Weather-Based Crop Insurance Scheme

S. S. Raju and Ramesh Chand

During the year 2003-04, the private sector came out with some insurance products in agriculture, based on weather parameters. The insurance losses due to vagaries of weather, i.e. excess or deficit rainfall, aberrations in sunshine, temperature and humidity, etc. could be covered on the basis of weather index. One such product, namely Rainfall Insurance was developed by ICICI-Lombard General Insurance Company. This move was followed by IFFCO-Tokyo General Insurance Company and by public sector Agricultural Insurance Company (AIC) of India Ltd. Under the scheme, coverage for deviation in the rainfall index is extended and compensations for economic losses due to less or more than normal rainfall are paid.

Weather Based Crop Insurance Scheme (WBCIS) is a unique weather-based insurance product designed to provide insurance protection against losses in crop yield resulting from adverse weather incidences. It operates on the concept of area approach i.e., for the purpose of compensation, a reference unit area is being linked to a reference weather station on the basis of which weather data and claims can be processed. It has the advantage to settle the claims within the shortest possible time. In order to effectively use weather insurance as an important risk mitigation tool, the density of weather stations has to be increased while streamlining and automating the network. The government required to support the product on the same lines as traditional crop insurance.

Together, the above mentioned companies have been able to sell weather insurance policies to about 5.39 lakh farmers across India since their inception in 2003-04 till 2007-08. Though, weather insurance coverage was limited, it holds lessons for future programmes. Important distinguishing features of weather insurance scheme and yield insurance scheme are presented in Table 22.

Table 22: Comparison of yield and weather insurance

Parameter	Yield insurance	Weather insurance
Scope of insurance cover	Covers yield shortfall	Covers anticipated shortfall in yield due to adverse weather parameters
Scope of perils covered	All natural and non-preventable perils	Rainfall, minimum and maximum temperature, soil moisture, relative humidity, sunlight, day length etc.
Target group	All farmers growing insured crops	Farmers, agricultural labourers, non-cultivators, shopkeepers and agro-processing unit
Crops	All crops for which past yield data is available	All crops for which correlation is established between yield and weather parameters
Scheme approach	Homogeneous area approach (Taluk / block/ mandal)	Homogeneous area approach (Jurisdiction of rain gauge)
Scope for introduction of insurance	Can be introduced for all crops with yield data	Can be introduced successfully for crops with good sensitivity to weather parameters
Premium rates	High	Relatively lower and flexible
Sum insured	Loan amount/150% of value of production	Flexible. Can range from input cost to value of production
Control on adverse selection/ moral hazard	Relatively less control	Almost complete control
Time taken for settlement of claims	May range from 6-9 months from occurrence of loss	Within two weeks from close of indemnity period
Administrative set-up	Relatively large	Relatively small
Transaction cost	High	Moderate and affordable
Transparency	Not transparent	Transparent and easily verifiable

Assessment of risk and insurance products for agriculture

B C Barah

Agricultural sector has become more vulnerable to a number of external shocks including climatic aberrations. The vagaries of nature and other sources of risk and uncertainty increased the vulnerability of the small and marginal farmers particularly. These externalities adversely affected sustainability and food security of the farming community. Hence, notwithstanding positive changes, the Indian agriculture at present is on the crossroad. The silent but sure sign of distress among the farmers emerged as a major symptom of agrarian crisis too. More crucially, over the time, changes in risk at disaggregate level has assumed more importance and of policy imperative. Therefore, effective strategy is a sine-qua-non for mitigating the impact and managing risk of rural livelihood. In this connection, following broad objectives need to be carried out in the project:

- To assess agricultural risk
- To develop typology for identified production systems to estimate farmers' risk profile and its mapping
- To develop farmer-friendly insurance products
- To suggest institutional framework and policy interventions for scaling up of the insurance products for wider reach to the beneficiaries
- To develop a prototype On-line Decision Support System for upscaling, effective knowledge delivery and generalised applicability of the insurance products.

Appropriate database is generated both from secondary sources and primary surveys. The strategy to characterise various production systems is to assess the magnitude of risk and to link it to the insurance products. Delineating and mapping of hot spot as well as bright spot of agriculturally risky regions is essential for the development of insurance products for various crops across the districts.

Innovative institutions in fish marketing in India

B. Ganesh Kumar, T. Ravisankar, R. Suresh and K. K. Datta

The system of fish marketing in India has traditionally been very unorganised and unregulated, which is the prime cause of inefficiency in the whole process. This perennial problem has been overcome by the concerted attempts of fishermen group as well as government agencies in some pockets of our country. An attempt has been made to document and understand the processes of these kinds of innovative marketing models and to draw lessons from the success stories to upscale and replicate in similar socio-politico-economic scenario in other parts of the country.

Marketing by self-help groups

During the last two decades, a large number of SHGs have emerged in the country. One such group, named The Thenkumari Self Help Group was organised in 2003 with 15 members and is involved in fish marketing at Chennai. In addition to daily fish marketing, the SHG undertook a pilot project to supply fresh seafood to a key customer (Taj Coromandal, a premier five star hotel) at Chennai on a contract basis, prior to which, the members of the SHG were given training on issues such as quality, hygiene, delivery and cost management. This project has been a win-win situation for both hotel and SHG. It is a win-win arrangement, where the hotels get quality products directly from the SHGs and the SHGs sustain business.

Marketing by producers/producer associations

An innovative model of collective marketing of a shrimp farmers' association in Thambikottai village in Tiruvarur district of Tamil Nadu was documented. The Paminiaru Shrimp Farmers' Association was formed by the farmers in the year 2003, mainly to prevent and manage the disease outbreaks collectively in the cluster by enforcing better management practices. Collective disease management led to collective marketing. The association facilitates the marketing through a transparent competitive process. A stamped agreement is signed between the farmer and the buyer by which responsibility of making payment to the association is borne by the buyer. Since the formation of this Shrimp Farmers' Association, all the crops have been successful. The association attributes its triumph to inclusive membership, tangible deliverables, social cohesiveness and conviction of the farmers.

Marketing by state-run fisheries development corporations

The Tamil Nadu Fisheries Development Corporation Limited (TNFDC) has been involved in fresh fish marketing through its chain of retail shops for many years. It has started two modern fish retail

outlets called 'Neidhal' in Chennai city. The fish rates are kept little lower than the traditional fish retail markets. All modern amenities are available and fish dressing is done in front of consumers so as to keep the confidence of consumers in the whole process of marketing. The consumer can pick his choice of fish while buying since all the fishes are kept in the glass-top freezer. The objective of starting the modern retail outlets through state intervention was to source fish directly from fishermen and to sell to consumers at affordable rates in hygienic conditions.

Marketing by state-run fishermen cooperatives

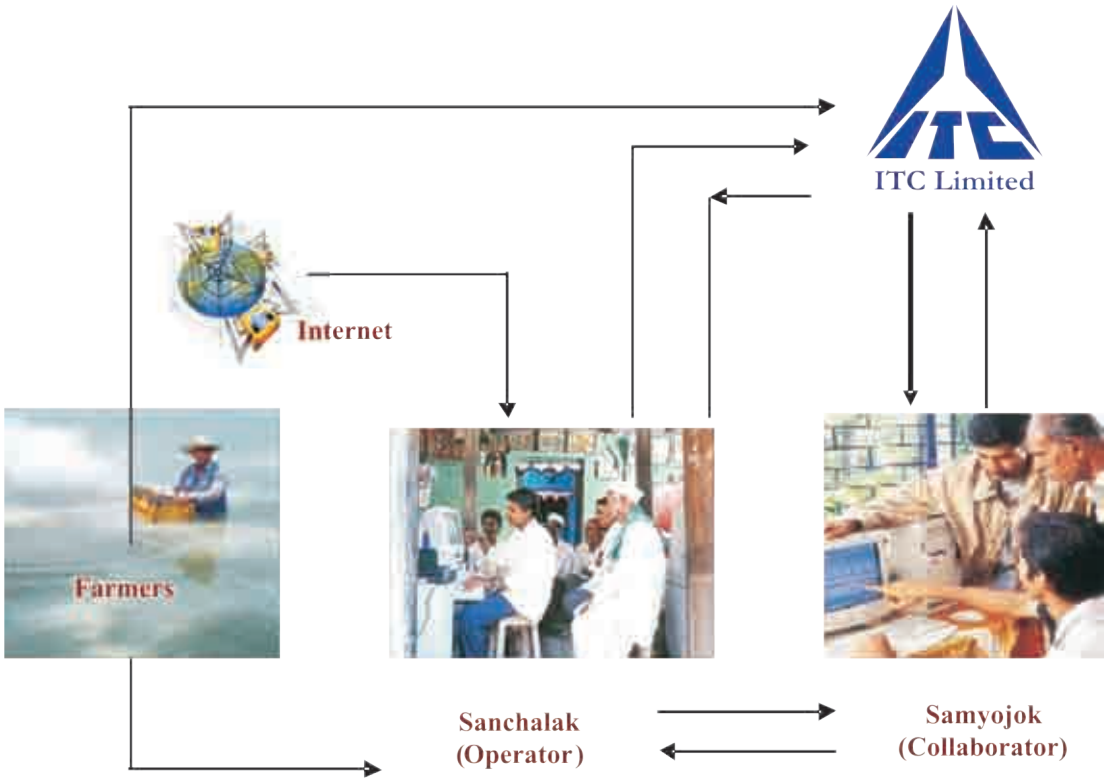
Matsyafed, the Kerala State Cooperative Federation for Fisheries Development Ltd. has taken a major initiative in 'organising the primary auction' at the landing centre (beach) itself. As the major exploitation of fisherman happens at the aution stage of marketing itself, Matsyafed has taken initiative to organise and interfere. It takes up the auction system in the fishing villages and the cooperatives have become the major force in setting up the beach level auction. Over a period of time, Matsyafed managed to turn it into a major activity in the coastal area and many societies have reached very high level of turnover in the beach level auction.

Marketing by private institutions

Aquachoupal

The Aquachoupal network, launched in 2001 in Andhra Pradesh, includes 55 kiosks reaching 10,000 shrimp farmers in over 300 villages. The model as depicted in Figure 11 is centred on a network

Figure 11: The Aquachoupal model in Andhra Pradesh



of Aquachoupals, information centres equipped with a computer connected to the internet, located in rural farming villages. It serves both as a social gathering place for exchange of information and an e-commerce hub. A local farmer acting as a Sanchalak (Prathinithi or Operator) runs the village Aquachoupal, and the computer is usually located in his home. ITC also incorporates a local commission agent, known as the Samyojak (collaborator), into the system as the provider of logistic support. The farmers can use the computer to access daily prices at the closing time in local markets, as well as to track global price trends, either directly or indirectly via. the Sanchalak. To initiate a sale, the Prathinithi inspects the produce and makes the benchmark price and gives the farmer a conditional quote. The farmer proceeds with his crop to the nearest ITC procurement hub (processing center) and sells it. The farmer then collects his payment in full at the payment counter.

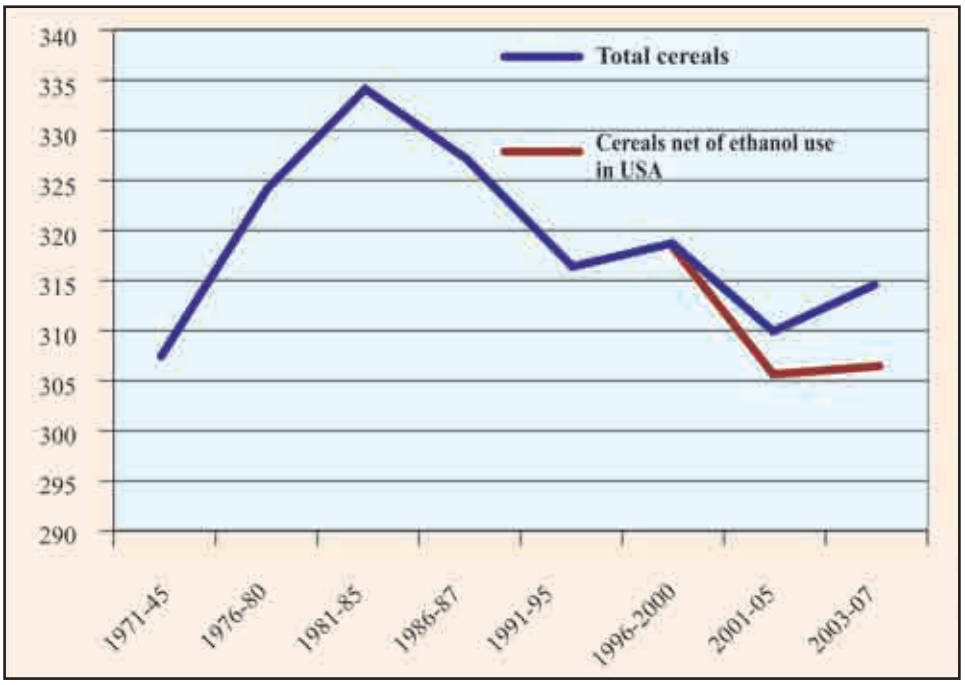
AGRICULTURAL GROWTH AND MODELING

Global food crisis: causes, severity and outlook

Ramesh Chand

Global food prices have witnessed unprecedented surge after mid 2007 which has caused worldwide concern. The main factors for escalation in food prices were categorized as a result of (a) increase in price of crude oil, (b) supplies did not keep pace with demand for many years, and (c) diversion of grain for liquid bio-fuel. Long term trend in global food production revealed that cereal production increased at a faster rate than population in the initial years of green revolution which led to sharp improvement in per capita availability of staple food. Since late 1980s growth rate in cereals turned out to be lower than the growth rate in population even though growth rate in population come down. Though there was some improvement in per capita availability of cereals during 2003-2007 but

Figure 12: Global cereal production per person, Kg/year



this increase was not available for use as food and feed, due to diversion of foodgrain for production of bio fuel (Figure 12). When total production is netted out for quantity of corn used for biofuel in USA then per capita production reduced to 307 kg which is lowest during any five years period since 1971. This shows that the shortage of staple food has been building for several years and it became quite large and serious in the recent years.

Shift in dietary pattern towards meat product particularly in China and population growth in India and in other countries contributed to surge in prices of staple food. Precautionary measures like export bans and rationing in various countries exacerbated the price increase. Global cereal harvest was forecasted and to increase by more than 3.8 per cent in 2008-09. Long term trends indicate high and rising prices in future over base period price of 2005. High food prices are seen as an opportunity in some quarters to improve income of farmers and to stimulate food production. Such increase in production, contingent upon high prices, would keep food out of reach of a large segment of population. Therefore, to deal with the harsh reality of high food prices and its effects on poverty, due attention is to be given to agriculture sector.

Economic growth and regional convergence or divergence tendencies

P. S. Birthal and Shiv Kumar

Growth performance of states and convergence

Convergence in economic development is the tendency of poor regions to grow faster and catch-up with rich regions. It occurs if cross-sectional dispersion in per capita income declines over time. The disparity in growth could be due to considerable heterogeneity in resource endowment, infrastructure, production structure, governance and socio-cultural development. The growing concern that the growth in per capita income is concentrated among a few rich states, and the poor states have lagged behind. Hence it becomes indispensable to decipher convergence and catch –up among Indian states during 1980/81 – 2004/05 from the prospective of development of India policy.

Income levels and growth

India's per capita income grew at an annual rate of 3.1 per cent during 1980/81—1991/92 and 3.8 per cent during 1992/93 to 2004/05. However, the robust growth observed at the national level is not universal, and there are considerable differences in both income levels and growth among states. Bihar, Orissa and Uttar Pradesh have continued to be at the lower end of income distribution, while Punjab, Haryana, Maharashtra and Gujarat remain among rich states. Furthermore, gap between poor and rich states has increased considerably over last 25 years. For instance, the ratio of per capita income of the poorest state Bihar to one of the richest states Punjab has increased to 3.5 in 2003/05 from 2.6 in 1980/82.

India initiated a major programme of economic reforms in July 1991. Income growth of poor states (Bihar, Orissa, Uttar Pradesh and Madhya Pradesh) has remained not only sluggish, 2–3 per cent a year, but also decelerated marginally during 1992/93–2004/05. Income growth of rich states, except Gujarat, also decelerated in the latter period, but continues to be higher than that of poor states. Deceleration in growth is significant in Punjab and Haryana, where growth has fallen below the national average. In contrast, middle income states experienced rapid income growth after initiation of the economic reforms process in 1991. West Bengal experienced robust growth of 5.6 per cent a year-

more than double the growth realised in pre-reform period. Likewise, income growth of Karnataka accelerated to 5.6 per cent after 1991/92 from 3.5 per cent since 1980/81. Kerala, Himachal Pradesh and Andhra Pradesh also experienced accelerated growth in their per capita incomes after 1991/92, closer to 5 per cent a year. Per capita income of Tamilnadu grew consistently at about 4 per cent a year throughout the last 25 years.

Convergence in per capita income

The general pattern is that the poor states have lagged behind and showed no tendency of acceleration or deceleration, the rich states faced a deceleration and the middle income states experienced robust yet accelerating growth in their per capita incomes. Has this pattern of income growth led to convergence or divergence among Indian states? Figure plots σ-convergence (standard deviation in logarithm) of per capita incomes of states for the period 1980/81—2004/05 revealed that it increased from 0.26 in 1980/81 to 0.40 in 2004/05 indicating a clear tendency of divergence in income levels across states. This tendency was stronger in the initial years of economic reforms; the standard deviation grew 2.6 per cent a year during 1991/92 to 1997/98 as against 1.3 per cent during 1980/81 to 1991/92 and 1.6 per cent during 1997/98 to 2004/05.

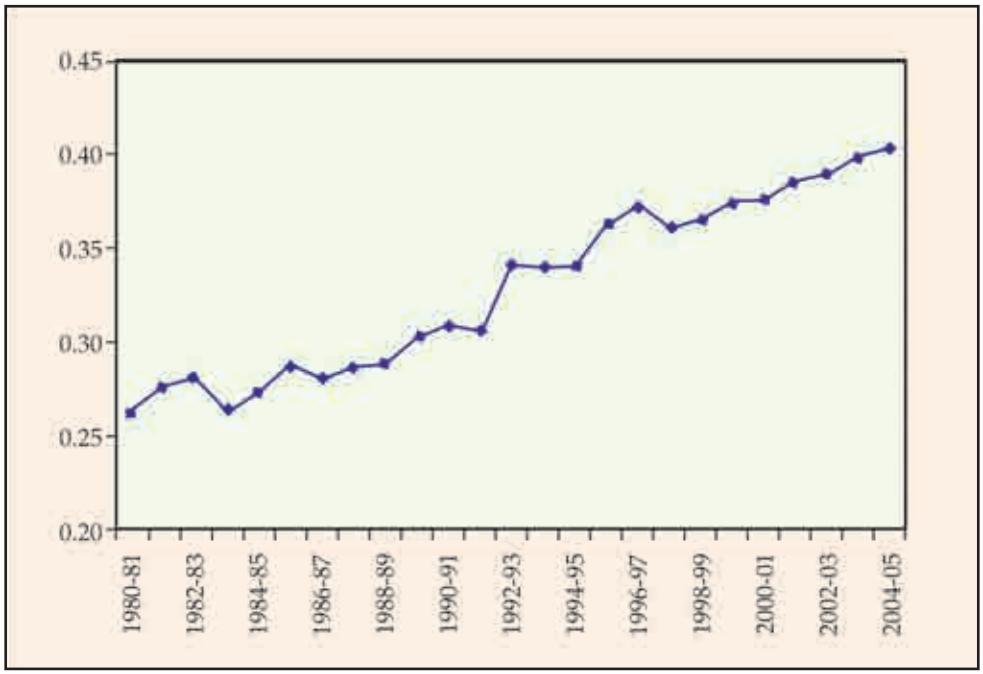
Punjab is taken as bench mark state because of its continued top rank in income hierarchy for most of the time during last 25 years. There is convergence in income levels across Indian states but convergence is not absolute. For convergence to occur there is need for measure that enable poor states to catch up with rich states. Lack of convergence in income levels can be explained by differences in physical infrastructure, human capital, technology, institutions, governance etc. across states. Availability of good quality public infrastructure is considered crucial to improving access to markets, to reducing transportation and transaction costs, to improving general quality of life and to stimulating private investment. Further, education is widely recognised as an important source of economic growth. By improving skills and capabilities to adopt new technologies, innovations and information, it enhances economic growth.

Differences in production structure can also explain the differences in both income levels and growth rates across states. Generally, the economies dominated by agriculture grow slowly, because of low labour productivity in agriculture. Production structure of a region is represented by: (i) share of agriculture in GDP, and (ii) proportion of workforce engaged in agricultural sector. In India, the share of agriculture in GDP declined considerably but not as much in the workforce. In the poor states, employment pressure on agriculture continues to be very high than in the rich states, indicating the presence of disguised or underemployment there. The barrier of low labour productivity in agriculture to economic growth can be overcome through growth-enhancing labour-intensive technologies at least in the short run.

Figure 13 revealed a clear evidence of rising regional disparities in India after initiation of economic reforms programmes in India in 1991, and more so in the initial years of reforms. The study concludes that in dynamics of technologies and the reality of agriculture in India during 1980/81–2004/05, income growth accelerated in middle income states, decelerated in most rich states and neither accelerated nor decelerated in poor states.

From policy perspective, disguised unemployment, which is associated with alleged underutilization of labour, is related to market failure, i.e the inability of factor markets to function in a way that allows

Figure 13: σ Convergence of per capita incomes of states



freely fluctuating prices to equate supply with demand. Such market failures are the outcome of basic aspects of the rural economies of India. According, there is a prima facie case for policy intervention to correct the resulting inefficiencies. Some family workers are disguisedly unemployed. Although they contribute little or nothing to production, they account for additional consumption. Therefore, it is possible to use the surplus workers in productive activities outside the agricultural sector. Total output in the economy is thus increased, consumption does not fall, and no inflation pressure arises because of a shortage of food outside the farm. The disguised unemployed rural population have to move into other industries, as they do not have the necessary skills to be absorbed in current industries where limited jobs exist. This indicates the importance of enhancing and augmenting human capital. Building secondary agricultural industries in rural areas and creating jobs for the local people is the only way to address this burgeoning problem.

Capital formation in Indian agriculture: National and state level analysis

Ramesh Chand

The study examined trends in national level public and private investments and state level public investments in agriculture and attempts to explore the factors that affect growth in various types of investments. It also analyses implications of underlying trends in public and private investments on output growth. Contrary to common belief, decline in public investments did not cause adverse impact on private investments. Total capital expenditure under agriculture and related heads shows sluggish growth between VIII and IX Five Year Plan. However, first three years of X Plan show some encouraging trends. The resource allocation for capital formation in agriculture during X Five Year Plan offers a ray of optimism to reverse the declining trend in public sector investments through allocation of more resources to agriculturally laggard region.

Progress and potential of horticulture in India

Ramesh Chand, S. S. Raju and L. M. Pandey

The study examined patterns, trends and successes of diversification towards horticulture since 1970-71 at national and state level. Productivity and progress of horticulture is compared with other major crop groups. Output of horticulture, both condiment and spices, and fruits and vegetables, increased at a much faster rate as compared to growth rate of total crops sector during all the decades since 1970-71. Second, the growth rate in horticulture group was higher than all other crop groups except cereals and oilseeds during 1980-81 to 1989-90. Horticulture production increased by about 2.9 per cent per year during 1970s when annual growth rate of total crop sector was 1.8 per cent (Table 23). There was some setback to growth rate of fruits and vegetables during 1980s; however, growth rate in condiment and spices accelerated to 4.7 per cent.

Table 23: All-India crop group-wise growth in production (%)

Crop group	1970-71 to 1979-80	1980-81 to 1989-90	1990-91 to 1999-00	1996-97 to 2005-06
Cereals	2.66	2.89	2.24	0.13
Pulses	-0.01	1.54	0.84	-0.20
Oilseeds	1.11	5.15	1.92	0.64
Sugarcane	2.26	2.19	2.74	3.67
Cotton	2.61	2.57	2.68	2.40
Horticulture	2.88	2.64	5.84	3.12
a. Condiments & Spices	2.90	4.71	4.97	4.25
b. Fruits & Vegetables	2.88	2.27	6.00	2.91
All Crops	**1.79**	**2.03**	**3.02**	**1.66**

The main factor underlying diversification in favour of fruits and vegetables has been higher returns relative to other crop groups, and the difference in productivity between horticulture and other crops has been widening during 1980-81 to 2000-01. During 1980-81 to 2005-06, share of fruits and vegetables in total cropped area of the country increased from 2.8 to 4.9 per cent and their share in crop output increased from 15.95 per cent to 25.61 per cent. There is some slowdown in productivity growth of all crop groups after 2000-01 but the change is negative for fruits and vegetables. The decline in productivity of fruits and vegetables needs to be addressed. Among states, Maharashtra maintained more than 5.5 per cent growth rate and Andhra Pradesh has seen acceleration in growth rate from 4 to about 5 per cent between 1990s and 2000s. Last six years show rapid progress in production of fruits and vegetables in Gujarat, Himachal Pradesh and Chhattisgarh, exceeding 10 per cent annual rate of increase. Growth rate turned out to be either negative or very low in Assam, Karnataka, Rajasthan, West Bengal and Uttarakhand.

Livestock sector composition and factors affecting its growth

Ramesh Chand and S. S. Raju

Supply side as well as demand side factors of livestock sector shows that the sector possesses large potential for growth. The period of 2000-01 to 2005-06 has shown some slowdown in growth rate of livestock output which is a matter of serious concern. Response of livestock sector output to various factors in terms of elasticity is presented in Table 24. It shows that livestock sector growth can be accelerated

by improving feeding, quality and composition of livestock, veterinary facilities, output marketing, and institutional interventions. The sector requires increased allocation of public resources and support to accelerate growth to achieve the targeted growth during the XI Five Year Plan. If the factors affecting livestock sector increase at the same rate as experienced during 1992-93 to 2004-05, then the output of livestock sector is likely to experience growth rate of 3.83 per cent (scenario I, Table 24). In order to achieve targeted growth rate of six per cent in livestock output, progress in livestock infrastructure, institutional efforts and availability of livestock feed is required to be accelerated by about 50 per cent.

Table 24: Achieving targeted growth during XI Plan for livestock output

Source of growth/ factor	Elasticity of output	Scenario I		Scenario II		Scenario III	
		Factor growth rate	Output growth rate	Factor growth rate	Output growth rate	Factor growth rate	Output growth rate
In-milk bovine, per cent	0.413	0.96	0.40	1.51	0.62	0.96	0.40
Artificial inseminations done (-3)	0.237	5.38	1.28	8.43	2.00	5.38	1.28
Veterinary institutions (-1)	0.074	2.20	0.16	3.44	0.26	4.40	0.33
Surfaced road length (-2)	0.108	2.51	0.27	3.93	0.42	5.02	0.54
Per capita income	0.213	4.40	0.93	6.89	1.46	7.50	1.59
Membership of dairy cooperatives	0.116	4.15	0.48	6.50	0.76	8.30	0.97
Fodder area	0.113	2.65	0.30	4.15	0.47	2.65	0.30
Total			**3.83**		**6.00**		**5.40**

Note: Figures in parentheses indicate lag period.

III. RESEARCH ON NORTH-EASTERN REGION

Future sources of growth in North-East India

B C Barah

Creating relevant database of agriculture in North-East region is a daunting task; however, an updated disaggregated time series data set is generated to facilitate analytical works. Agriculture is the mainstay in NER, but its productivity is low and risky. There is also substantial rural poverty. The perpetuation of traditional mode of agriculture is its main cause. The prospects of crop diversification in the region are very high, which is in existence since ages as traditional practice. But it has hardly made contribution to income enhancement as most of it is meant for home consumption. The region needs to diversify agricultural activity in the farming system mode (agriculture, fishery, livestock, poultry and agro-forestry) and respond to the need of changing structure of the economy. There is a need to develop marketing institution to integrate NER with other regions of the country. The reform induced cross-border trade is potentially a crucial driver of agricultural diversification in the region.

IV. POLICY INTERACTIONS

Dr. P. K. Joshi, Director

- Member of the Technical Expert Group on Marginal and Small Farmers (Chair: Dr. Arjun Sengupta), Government of India

Dr. Ramesh Chand, ICAR National Professor

- Member of the Expert Committee (Department of Food & Public Distribution, Ministry of Consumer Affairs, Food & Public Distribution) to examine various strategic options and to recommend measures to ensure adequate procurement of wheat during 2007-08

Dr. B. C. Barah, Principal Scientist

- Member, Project Formulation on Risk Management and Climate Change, PMO mission on rain-fed agriculture

V. AWARDS/RECOGNITIONS

Dr. P. K. Joshi, Director

- Trustee and Treasurer of the Trust for Advancement of Agricultural Sciences (TAAS), New Delhi
- Member, Quinquennial Review Team (QRT) of Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar for the period 2002-08
- Member, Institute Management Committee (IMC) of National Academy of Agricultural Research Management (NAARM), Hyderabad for the period 2008-2011
- Member of the Apex Committee on Technology Vision 2020 of the Technology Information Forecasting and Assessment Council, New Delhi
- Panelist, Future of Indian Agriculture: Technology and Institution, Institute of Economic Growth, New Delhi

Dr. Ramesh Chand, ICAR National Professor

- Member, Research Advisory Committee, Directorate of Wheat Research, Karnal
- Member, Editorial Board, Indian Journal of Agricultural Economics, Mumbai
- Member, QRT, Central Institute for Brackishwater Aquaculture, Chennai

Dr. B.C. Barah, Principal Scientist

- Joint Secretary, Agricultural Economics Review Association (AERA)
- Appointed Rapporteur, Annual Conference of the Indian Society of Agricultural Economics 2010

Dr. Suresh Pal, Principal Scientist

- NAAS Fellowship under the category of Social Sciences

Dr. Partap Singh Birthal, National Fellow

- Selected as Principal Scientist, ICRISAT for a period of three years w.e.f. 15 May, 2008

Dr. Smita Sirohi, Principal Scientist

- Best Paper Award (Social Sciences) instituted by Indian Dairy Association, New Delhi published in Indian Journal of Dairy Science during 2007-08

Dr. P. Adhiguru, Senior Scientist

- Young Scientist Award for the year 2008 by Indian Society of Extension Education, IARI, New Delhi

Dr. B. Ganesh Kumar, Senior Scientist

- D.T. Doshi Award for Best Oral Presentation, 16th Annual Conference of Agricultural Economics Research Association (India) held at Amity School of Agricultural and Rural Management, Lucknow, 21-22 November, 2008
- Best Poster Award for the research paper, 8th Indian Fisheries Forum, organised by Indian Fisheries Society and CIFRI, 22-26 November, 2008

Dr. S. S. Raju, Senior Scientist

- Member, Expert Group on Weather Insurance, Planning Commission, Government of India, New Delhi

Dr. Anjani Kumar, Senior Scientist

- Indo-US Norman E. Borlaug International Agricultural Science & Technology Fellowship in 2008

VI. PUBLICATIONS

(a) Policy Brief

Ganesh Kumar, B. and K. K. Datta, 2008. *Tackling Avian Influenza, an Emerging Transboundary Disease*. NCAP Policy Brief No. 26.

Nienke Beintema, P. Adhiguru and P. S. Birthal. 2008. *Public Agricultural Research Investments: India in a Global Context*. NCAP Policy Brief No. 27.

Chand, Ramesh. 2009. *Demand for Foodgrains During 11th Plan and Towards 2020*. NCAP Policy Brief No. 28.

Shinoj P. 2009. *India-ASEAN Trade in Agriculture: Retrospect and Prospect*. NCAP Policy Brief No. 29.

Wani, S. P, Kumpf Benjamin, T. K. Sreedevi and P. K. Joshi. 2009. *Integrated Watershed Management in India: Strategic Policy and Institutional Options*. Policy Brief No. AES-01, ICRISAT, Patancheru, Hyderabad.

(b) PME Notes

Sant Kumar. 2008. *Raising Wheat Production by Addressing Supply-Side Constraints in India*. PME Note No. 16.

Smita Sirohi. 2008. *Carbon Trading Mechanisms and Opportunities*. PME Note No. 17.

(c) Research Papers

Ahuja, Usha. 2008. Yield gap analysis and prioritization of constraints in the production of major dry land crops of Rajasthan, *Indian Journal of Agricultural Economics*, **63** (3):523.

Arora, A., S. Upadhyaya and Rajni Jain. 2009. Integrated approach of reduct and clustering for mining patterns from clusters, *Information Technology Journal*, **8** (2):173-180.

Ahuja, D.B., U.R. Ahuja, R.K. Kalyan, Y.K. Sharma, A. Dhandapani and P.C. Meena. 2009. Evaluation of different management strategies for Lipaphis seudobrasicae (Davis) on Brassica juncea. *International Journal of Pest Management*, **55** (1):11-18.

Barah, B.C., D. Narasimha Reddy and V. Ratna Reddy. 2008. Externality of groundwater development, emergence of water market and environmental sustainability: Policy imperatives for rainfed areas, *Indian Journal of Agricultural Economics*, **63** (3):518.

Birthal, Pratap Singh, P.K. Joshi, Sonia Chauhan and Harvinder Singh. 2008. Can horticulture revitalize agricultural growth? *Indian Journal of Agriculture Economics*, **63** (3): 310-321.

Birthal, Pratap S., Harvinder Singh and Shiv Kumar. 2009. Agriculture, Economic Growth and Regional Disparities in India, *Journal of International Development*, **21**, 1-13, published online in Wiley Inter Science.

Bhowmik, Pranajit and Smita Sirohi. 2008. Cost of milk production and returns from dairy in South Tripura, *Indian Journal of Dairy Science*, **61** (4):1-8.

Chand, Ramesh. 2008. The Global food crisis: causes, severity and outlook, *Economic and Political Weekly*, **43** (26-27):115-122.

Chand, Ramesh and S. S. Raju. 2007. Risk in Indian agriculture – A case of six major crops, *Agricultural Situation in India*, **64** (7):283-290.

Chand, Ramesh and S. S. Raju. 2008. Livestock sector composition and factors affecting its growth, *Indian Journal of Agricultural Economics*, **63** (2):198-210.

Chand, Ramesh and S. S. Raju. 2008. Instability in Andhra Pradesh agriculture – A disaggregate analysis, *Agricultural Economics Research Review*, **21** (2):283-288.

Chand, Ramesh, S. S. Raju and L. M. Pandey 2008. Progress and potential of horticulture in India, *Indian Journal of Agricultural Economics*, **63** (3): 299-309.

Chattopadhyay, Surajit, Rajni Jain and Goutami Chattopadhyay. 2009. Estimating potential evapotranspiration from limited weather data over Gangetic West Bengal, India: A neuro computing approach, *Meteorological Applications*, **16** (2):403-411.

Dastagiri, M. B. 2008. The seed laws of Asian countries under the WTO and IPR regime: A paradigm shift, *Outlook on Agriculture*, **37** (4): 297-301.

Dastagiri, M. B. 2008. Agricultural market reforms in the context of WTO trade regime in India, Afro-*Asian Journal of Rural Reconstruction*, **41** (2):25-43.

Datta, K. K. 2008. Environmental degradation and its correctives in agriculture sector (Rapporteur's Report), *Indian Journal of Agricultural Economics*, **63** (3): 557-564.

Datta, K. K. and Uttam Bhattacharya. 2008. Retrospection and Introspection of effect of climate change and their adaption strategies in Indian Agriculture, *Agricultural Situation in India*; **66** (2):55-61.

Ganesh Kumar B., P.K. Joshi, K.K. Datta and S.B. Singh. 2008. An assessment of economic losses due to Avian Flu in Manipur state, *Agricultural Economics Research Review*, **21** (1):37-47.

Ganesh Kumar B, K.K. Datta, P.K. Joshi, P.K. Katiha, R. Suresh, T. Ravisankar, K. Ravindranath and Muktha Menon. 2008. Domestic fish marketing in India – changing structure, conduct, performance and policies, *Agricultural Economics Research Review*, **21** (Conference No.): 345-354.

Ganesh Kumar B and R.V. Singh. 2008. Economics of milk production in cattle and buffalo farming in Andaman & Nicobar Islands – A comparative analysis, *Indian Journal of Dairy Science*, **61** (3): 1-7.

Jain, Rajni and Sonajharia Minz. 2008. Drawing conclusions from forest cover type data: the hybridized rough set model, *Journal of the Indian Society of Agricultural Statistics*, **62** (1): 75-84.

Jha, Dayanatha. 2008. Indigenous technology and agricultural research system, *Agricultural Economics Research Review*, **21** (1):1-4.

Kumar, Anjani and Dhiraj K. Singh. 2008. Livestock production systems in India: An appraisal across agro-ecological regions, *Indian Journal of Agricultural Economics*, **63** (4):577-97.

Kumar, Sarvesh and Smita Sirohi. 2008. Economic performance of emerging private sector in Indian dairy industry: evidence from farm level data, *Finance India*, **22** (2): 467-486.

Kumar, Sant. 2009. Potentialities to raise wheat output: Identification and prioritization of constraints, *Indian Journal of Agricultural Sciences*, **79** (1):47-51.

Pal, Suresh. 2008. Agricultural R&D policy and institutional reform: Learning from the experience of India and China, *Economic and Political Weekly*, **43** (26):145-155.

Raju, S. S. and Ramesh Chand. 2008. A study on the performance of national agricultural insurance scheme and suggestions to make it more effective, *Agricultural Economics Research Review*, **21** (1):11-19.

Shinoj, P and V C Mathur. 2008. Comparative advantage of India in agricultural exports vis-à-vis Asia: a post-reforms analysis, *Agricultural Economics Research Review,* **21** (1):60-66.

Shinoj, P, B.Ganesh Kumar, R. Sathiadhas, K.K. Datta, Muktha Menon and Shiv Kumar Singh. 2008. Spatial price integration and price transmission among major fish markets in India, *Agricultural Economics Research Review*, **21** (Conference No.): 327-335.

Singh, Harbir 2008. Institutional innovations in potato supply chain – a case study of potato, *Agricultural Economics Research Review*, **21** (Conference Number): 437.

Singh, Harbir, Prasoon Mathur and Suresh Pal. 2008. Indian seed system development: policy and institutional options, *Agricultural Economics Research Review*, **21** (1):20-29.

Upadhyaya, Shuchita, Alka Arora and Rajni Jain. 2008. Deriving cluster knowledge using rough set theory, *Journal of Theoretical and Applied Information Technology*, **4** (8):688-696.

(d) Book Chapters/Workshop Proceedings/Popular Articles

Ayyappan, S., A. Gopalakrishnan and B. Ganesh Kumar (2009). Species diversification in aquaculture and domestic fish marketing in India. In: *MPEDA Souvenir 2009* released on the occasion of Indaqua 2009 held at Bhubaneswar during 21-23 January 2009. pp:13-22.

Barah, B C. 2009. System of rice intensification: A pro-poor option for household food-security and resource conservation., In: *Proceedings of National Seminar on SRI: Upscaling Strategies* held at TNAU, Coimbatore during 1-3 December.

Chand, Ramesh. 2009. Marketing and Policy Framework for Oilseeds. In: *Souvenir, National Symposium on "Vegetable Oils Scenario: Approaches to meet the Growing Demands" by Indian Society of Oilseeds Research* held at Directorate of Oilseeds Research, Hyderabad.

Chand, Ramesh. 2009. Capital formation in Indian agriculture: National and state level analysis. In: *Agrarian crisis in India*. Eds: D. Narsimha Reddy and Srijit Mishra, , Oxford University Press, New Delhi.

Chand, Ramesh. 2009. Farm income in India: The context of development and institution. In: *Agricultural development, rural institutions and economic policy: essays for A Vaidyanathan*, Eds: Gopal K. Kadekodi and Brinda Viswanathan, Oxford University Press, New Delhi.

Chand, Ramesh. 2009. Maintaining good growth is a challenge, *The Financial Express*, 17 February.

Chand, Ramesh. 2008. Prospects of achieving a 4 per cent growth in agriculture during eleventh plan, NAAS news. *National Academy of Agricultural Sciences*, New Delhi. July–September, 8(3).

Chand, Ramesh. 2008. Is India heading towards a food crisis? *Face off, Economic Times*, April 2, 2008.

Chand, Ramesh. 2008. Is food inflation a cause for concern, *Face off, Economic Times*, December 3, 2008.

Chand, Ramesh. 2008. India's agricultural challenges and their implications for growth of its economy. In: *Economic Integration in Asia and India*. Eds: Masahisa Fujita. Palgrave MacMillan, New York, 145-171.

Chand, Ramesh. 2008. Domestic policy measures and challenges in Indian agriculture, In: *Reforming Indian Agriculture: Essays in Honour of G. K. Chadha*, Eds: Shankar Kumar Bhaumik, Sage Publications, New Delhi, 42-66.

Chand, Ramesh, S.S. Raju and L.M. Pandey. 2008. Growth crisis in Agriculture- Severity and options at national and state level. In: *India's Economic Development since 1947*. Eds: Uma Kapila, Academic Foundation, New Delhi, pp.404-421.

Chandre Gowda, M.J., P. Chandra Sekhara and P. Adhiguru. (eds.). Technical papers, *National Seminar on Agriculture Extension*, Ministry of Agriculture, Govt. of India, NASC Complex, 27-28 February.

Giridhar, K and S.S. Raju. 2008. Assessment of livestock feed resources availability. In: *Manual for winter school on harnessing microbial diversity for use in animal nutrition*, NIANP, Bangalore. 4-24 November, 100-105.

Jain, Rajni. 2008. Classification using decision trees. In: Reference *manual for a training programme under CAS on data mining in agriculture*, Indian Agricultural Statistics Research Institute, New Delhi. 4-24 November, 186-190.

Jain, Rajni. 2008. Rough set theory. In: Reference *manual for a training programme under CAS on data mining in agriculture*, Indian Agricultural Statistics Research Institute, New Delhi. 4-24 November, 258-267.

Jain, Rajni and Vandana Kalra. 2009. Variable precision rough set based decision tree model. In: *Proceedings of the 3rd national conference on computing for nation development*. Eds: M. N Hoda , Bharti Vidyapeeth's Institute of Computer Applications and Management, New Delhi, pp. 673-678.

Jain, Rajni, Rachna Sethi, Alka Arora and S.S. Raju. 2009. Heuristic knowledge discovery using genetic algorithm and rough set theory. In: *Advances in data management*. Eds: Jayanthi Ranjan, Poonam Garg, N.S. Chaudhari, Madan Gupta , Macmillan Publishers India Ltd., pp. 157-166.

Joshi, P.K., A.K. Jha, S.P. Wani and T.K. Sreedevi. 2009. Scaling-out community watershed management for multiple benefit in rainfed areas. In: *Rainfed agriculture: Unlocking the potential*. Eds: Suhas P Wani, John Rockstrom and Theib Oweis , UK: CABI International.

Joshi, P.K., Sant Kumar, Suresh Pal and N K Pandey. 2008. Impact of Potato Research in India. In: *Abstracts of Global Potato Conference 2008*, Eds: Gopal, J., Debasis Pattanayak, Dinesh Kumar, PM Govindakrishnan, and Brajesh Singh, Indian Potato Association (Shimla) and Central Potato Research Institute, Shimla.

Painuli, D.K. and Ahuja, Usha Rani. 2009. Farmers' Perception on Tillage and Residue Management in Arid Zone of Rajasthan – A Diagnostic Survey. In: *Proceedings of 4th World Congress on Conservation Agriculture*, February 4-7, 2009 p 31.

Singh, Harbir, 2008. Institutional innovations in agricultural supply chain of potato, *ICAR News* (October-December 2008), 14 (4): 13.

Sirohi, Smita. 2008. Agricultural infrastructure in India: current situation, challenges and potential for expansion. In: *Food for policy – reforming agriculture*. Eds: Mittal, S and A. Mukherjee, Cambridge University Press India Pvt Ltd: 131-168.

Sirohi, Smita, P. Hazra, and K.B. Vedamurthy, K. B. 2008. Tapping Asian Markets for Exports of Indian Dairy Products. In: *Proceedings of National Seminar on 'Emerging Opportunities for Commercialization in Dairying*' held at N.D.R.I., Karnal, November 6-7.

Sirohi, Smita and K.B. Vedamurthy. 2008. Rural Road and Power Financing: Achilles' Heel of Infrastructure Development. In: *Convention Journal of Convention on 'Creating World Class Infrastructure-Policy Imperatives*', organized by Lucknow Management Association, at Lucknow on 22nd November.

(e) Research Reports/ Working Papers

Birthal, P. S., P. K. Joshi and P. Kumar. 2008. Review of buffer stock policy. Report submitted to the Ministry of Food and Consume Affairs, Government of India, New Delhi.

Kumar, Anjani. 2009. Sector Paper on Livestock Sector in India. Prepared for Developing a National Medium Term Priority Framework for India by FAO.

Kumar, Anjani, 2008. Rural Employment Diversification in Eastern India: Trends and Determinants. *Working Paper* 11, NCAP, New Delhi.

Raju, S. S. and Ramesh Chand. 2008. Agricultural insurance in India: problems and prospects. *Working Paper* No. 8, NCAP, New Delhi.

Rao, Parthasarthy P., P.K. Joshi, Shravan Kumar and K. Ganguly. 2008. *Agricultural diversification in Andhra Pradesh, India: Patterns, determinants and implications*. Published jointly with the International Food Policy Research Institute, Research Report No. 2. *International Crops Research Institute* for the Semi-Arid Tropics, Patancheru, Andhra Pradesh, India.

Singh, Harbir, 2008. Supply Chain and Institutional Change in Agriculture – A case study of potato, *Research Report*, NCAP, New Delhi.

(f) TV Talks

Ramesh Chand. 2009. Participated in discussions on *NREGA and agriculture during UPA regime*, CNBC TV 18, 17 February.

P. K. Joshi. 2008. *Food production and food security*. Charcha Main, DD News Channel, 24 May.

P. K. Joshi. 2008. *Loan waiving scheme*. Charcha Main. DD News Channel, 26 May.

P. K. Joshi. 2008. *Rome convention: global food security*. DD News Channel, Late Edition, 3 June.

P. K. Josh., 2008. *Agricultural production and food security*. Monday Evening Live Show, DD1 Channel, 9 June.

P. K. Joshi. 2008. *Food security and Rome summit*. Lok Manch, Lok Sabha TV, 9 June 2008.

P. K.Joshi. 2008. *Early monsoon and agriculture*. DD News Channel, Late Edition, 17 June.

P. K.Joshi. 2008. Rain gain, Public Forum, Lok Sabha TV, 28 August.

P. K. Joshi. 2008. Food security: sansand se sarak tak (recorded), Lok Sabha TV, 28 August.

P. K. Joshi. 2008. Economic editors conference - Agricultural business desk, DD News, 26 November.

P. K. Joshi. 2009. Agriculture and Economy, DD News, Late Edition, 19 March.

(g) Presentations in Conferences/Workshops/Symposia

Chand, Ramesh. 2008. Global Food Crisis and Implications for India. Base paper presented at National Academy of Agricultural Sciences, New Delhi, 17 November.

Chand, Ramesh, 2008. Discussant for the paper on Impact of Trade Liberalization on Producers and Consumers : Case Study of Edible Oil in India presented in the *International Conference on 'How are the Poor Affected by Trade'* organized by United Nations Conference on Trade and Development, New Delhi on October 15.

Chand, Ramesh, 2008. SAARC Perspective/Vision 2020. Paper presented at the Special Session of the *Technical Committee on Agriculture and Rural Development (TCARD)*, NASC Complex, New Delhi, November 3.

Chand, Ramesh, 2008. Trade Policies to cope with Food Crisis and Long Term Food Supply Issues Paper presented in the *International Meeting on Asian Food Strategy for Sustainable Economic Growth*, organized by ERIA (Economics Research Institute for ASEAN and East Asia), Jakarta, Indonesia, 10 November.

Chand, Ramesh, 2008. An Overview of Indian Agriculture and WTO. Paper presented in training programme on Strengthening Skills on commercial and Economic Diplomacy Training Programme for civil servants and Executives, organized by CUTS International Jaipur, for Ministry of Commerce, Jaipur, July 16-19.

Chand, Ramesh, 2008. Driving Forces in Agriculture: Uncertainties and Opportunities in Hill Region. Paper presented in the *Workshop on Exploring Future of Indian Agriculture for Strategic Planning* at NCAP, New Delhi, September 1-2.

Chand, Ramesh, 2008. Current State of WTO Negotiations on Agreement of Agriculture: Implications for India. Paper presented on in the *Conference on 'The Future of Indian Agriculture: Technology and Institutions*' organized by Institute of Economic Growth, Delhi, September 23-24.

Chand, Ramesh, 2009. Panelist for *Roundtable on "Challenges to Global Food Security"* at ICD, Chandigarh, January 7.

Chand, Ramesh, 2009. Panelist for discussion on "Food Security in India" Seminar organized by CACP, at New Delhi, January 15.

Chand, Ramesh, 2009. Marketing and Policy Frame work for Oilseeds. Paper presented in the *National Symposium on 'Vegetable Oils Scenario: Approaches to meet the Growing Demands*' organized by Indian Society of Oilseeds Research, Directorate of Oilseeds Research, January 29-31.

Chand, Ramesh, 2009. Sectoral and Spatial Change in Agriculture-Rural Environment. Paper p resented keynote paper on in the *5th NEEC Conference* organized by Society of Extension education, Agra in collaboration with Zonal Coordination Unit – IV (ICAR), Kanpur and Chandra Sekhar Azad University of Agriculture and Technology, Kanpur, March 5.

Ganesh Kumar, B., K.K. Datta and P. K. Joshi. 2008. Growth of fisheries and aquaculture sector in India: Needed policy directions for future. Paper presented in the *World Aquaculture Conference* 2008 organized by World Aquaculture Society held at Busan, Korea, May19-23.

Ganesh Kumar, B. and K.K. Datta. 2008. Management of coastal eco-system : Policy options for conservation in India. Paper presented in the *National Symposium on Knowledge Systems for Ecosystem Management and Sustainable Development* organized by NIE, Jaipur & New Delhi and ICAR, New Delhi, August 26-27.

Ganesh Kumar, B. 2008. Domestic Marketing of Fish in India. Paper presented in the *Consultative Meeting on Domestic Fish Marketing* organized by and held at NFDB, Hyderabad, July 28.

Ganesh Kumar, B. 2008. Marketing of Fish and Fishery Products in India. Paper presented in the *Workshop on Role of Fisheries Cooperatives in Developing Domestic Fish Marketing* organized by NFDB, Hyderabad, September 29.

Ganesh Kumar, B. 2008. Marketing of Fish and Fishery Products in India: Needed Policies. Paper presented in the *National Symposium on Developing Domestic Fish Markets for self sustaining Aquaculture sector in India – Prospects, Problems & Policy Interventions* organized by and held at CIBA, Chennai, October 30.

Ganesh Kumar, B., K.K. Datta, P.K. Joshi, P.K. Katiha, R. Suresh, T. Ravisankar, K. Ravindranath and Muktha Menon. 2008. Domestic Fish Marketing in India – Changing Structure, Conduct, Performance and Policies. Paper presented in the 16th *Annual Conference of Agricultural Economics Research Association (India)* held at Amity Institute of Management, Lucknow, November 21-23.

Ganesh Kumar, B., K.K. Datta, P.K. Joshi, P.K. Katiha, R. Suresh, T. Ravisankar, K. Ravindranath and Muktha Menon. 2008. Contours and Dynamics of Domestic Fish Marketing in India: Suggestive Policy Interventions. Paper presented in the *8th Indian Fisheries Forum* organized by Inland Fisheries Society of India and CIFRI, Barrackpore held at Kolkata, pp:199-200, November 22-26..

Ganesh Kumar, B. 2008. Transboundary Animal Diseases in India – An Emerging Threat and Impending Response. Paper presented in the *National Seminar on Current Agrarian Issues: Response of Agricultural Information System*' organized by International Extension Forum, TNAU held at NCAP, New Delhi, December 5-6.

Ganesh Kumar, B. 2008. Domestic Fish Marketing in India – Status, Prospects and Policies. Paper presented in the *National Consultation Meeting with Directors of Fisheries Research & Development Organizations* organized by NFDB, Hyderabad, December 23-24.

Ganesh Kumar, B. 2009. Valuation of aquatic genetic biodiversity – Concepts and methods. Paper presented in the *National Consultation on 'Registration, Evaluation, Valuation and In-situ Conservation of Aquatic Genetic Resources*' held at NBFGR, Lucknow, March 20-21.

Jain, Rajni. 2008. Classifying technology savvy farmers using artificial intelligence based model. Paper presented in the *National seminar on current agrarian issues: response of agricultural information system*, organized by International Extension Forum, TNAU, Coimbatore at NCAP, New Delhi, December 5-6.

Jain, Rajni, Rachna Sethi, Alka Arora, S.S. Raju. 2009. Heuristic Knowledge Discovery using Genetic Algorithm and Rough Set Theory. Paper presented in the *International Conference on Data Management*, Institute of Management Technology, Ghaziabad, UP, February 10-11.

Jain, Rajni and Vandana Kalra. 2009. Variable Precision Rough Set based Decision Tree Model. Paper presented in the *3rd National Conference on Computing for Nation Development (India-Com 2009*), Institute of Computer Applications and Management, Delhi, February 26-27.

Joshi, P.K. and Anjani Kumar. 2008. The Social Science Information Repository (SSIR)-NCAP Experience in Developing Panel Data for Policy Research. Paper presented in the Scoping Meeting on '*Village-level Studies for Evidence-based Decision Making*' organized by ICRISAT, Patancheru, May 3-4.

Joshi, P K; Anjani Kumar and Shiv Kumar. 2009. Indian Approaches and Experience in Linking Farmers with Markets. Paper presented in Indo-*US Agricultural Knowledge Initiative Workshop on Linking Farmers and Agro-based SMEs with Markets* organized by ICAR, USDA, FICCI and NCAP, New Delhi, March 17-18.

Kumar, Anjani and P.K. Joshi. 2008. Indian Dairying Scenario: Prospects and Opportunities for Exports. Paper presented in the *Consultation Meeting on Operationalisation of SAARC Milk Grid* at Kolkata, September 17-18.

Kumar, Anjani; Iain A. Wright and Dhiraj K. Singh. 2008. Status and Cost of Compliance of Food Safety Measures in Milk Production at Farm-Level. Paper presented in the First *Annual Conference of the Indian Society of Agribusiness Management* organized by GKVK, UAS, Bangalore, September 25-27.

Kumar, Anjani. 2008. Potential of Livestock for Income and Employment Augmentation for Weaker Sections of the Society. Paper presented in the *Workshop on Cultural Perspectives on Sustainable Rural Livelihoods: Situation cultural Practices of Marginal Communities in India* organized by Deshkal Society in Collaboration with UNESCO and Friedrich Ebert Foundation, New Delhi, November 30 to December 1.

Kumar, Anjani. 2008. WTO Implications and Emerging Challenges for Export of Spices and Agriproducts. Paper presented in the *Workshop on Opportunities, Challenges and Solutions in Processing, Value Addition, Marketing and Export of Seed Spices* organized by ISSS, NRCSS, CIPET and NCAP, Jaipur, December 20-21.

Kumar, Anjani; P.K. Joshi and Dhiraj K. Singh. 2009. Integration of Smallholder Livestock Farmers in Changing Market Economy: Threats and Opportunities in *World Conference 2009 of Animal Nutrition Association* organized by ANA, ILRI, ICAR and IVRI, New Delhi, February 14-17.

Kumar, Anjani. 2009. Compliance with Food Safety Measures: Status, Determinants and Scope. Paper presented in the *Indo-US Agricultural Knowledge Initiative Workshop on Linking Farmers and Agro-based SMEs with Markets* organized by ICAR, USDA, FICCI and NCAP, New Delhi, March 17-18..

Kumar, Sant, P.K. Joshi, Suresh Pal and N.K. Pandey. 2008. Impact of Potato Research in India. Paper presented at the *Global Potato Conference* 2008, organized jointly by Indian Potato Association (Shimla), Central Potato Research Institute (Shimla), and Indian Council of Agricultural Research (ICAR) at New Delhi, December 9-12.

Nandeesha, M.C., M. Debnath and B. Ganesh Kumar. 2008. Policy support needed to ensure Fish for All in Tripura, India. Paper presented in the *World Aquaculture Conference* 2008 organized by World Aquaculture Society held at Busan, Korea, May 19-23.

Nandeesha, M.C., M. Debnath, M. Roy and B. Ganesh Kumar. 2008. Techno-Socio-Economic analysis of carp culture practices by the tribal and non-tribal farmers of Tripura state in India. Paper presented in the *World Aquaculture Conference 2008* organized by World Aquaculture Society held at Busan, Korea, May 19-23.

Prem Chand and Smita Sirohi. 2008. Sustainable livestock production index: development lessons from inter-zonal variations in drought prone Rajasthan. Paper presented in the *International Livestock and Dairy Expo*, Pragati Maidan, New Delhi, August 22-24.

Prem Chand and Smita Sirohi. 2008. Economic, Social and Ecological Dimensions of Sustainable Dairy Farming in India. Paper presented in the *14th Annual International Sustainable Development Research Conference*, India Habitat Centre, New Delhi, September 21-23.

Suresh R., M. Esakkias and B. Ganesh Kumar. 2008. Domestic Marketing of Marine Fishes Landed in Thoothukudi and Kanyakumari districts of Tamil Nadu – Present Status. Poster presented in the *8th Indian Fisheries Forum* organized by Inland Fisheries Society of India and CIFRI, Barrackpore held at Kolkata, pp: 207, November 22-26..

Raju, S S. 2008. Progress and Potential of Horticulture in India. Paper presented in the *68th Annual conference on 'Indian Society of Agricultural Economics*' at Andhra University, Visakhapatnam, November 28-30.

Raju, S S. 2008. Crop Insurance in India – Current issues and Policy options. Paper presented in the *National Seminar on 'Current Agrarian Issues : Responses of Agricultural Information System*' at NCAP, New Delhi, December 5-6.

Shinoj, P., B. Ganesh Kumar , R. Sathiadhas, K.K. Datta, Muktha Menon and Shiv Kumar Singh. 2008. Spatial price integration and price transmission among major fish markets in India. Paper presented in *16th Annual Conference of Agricultural Economics Research Association, Lucknow*, November 21-23.

Shinoj, P, B. Ganesh Kumar, R. Sathiadhas and K.K. Datta. 2009. Market Integration in Shrimp and Tuna among Major coastal markets of India. Poster presented at the *International symposium on 'Marine Ecosystems: Challenges and Opportunities*' organized by Marine Biological Association of India at Hotel Presidency, Cochin, February 9-12.

Sirohi Smita. 2008. CDM Potential of Dairy Sector in India. Paper presented in the *National Seminar on Clean Development Mechanism and Carbon trading Opportunities in Agriculture and Allied Sectors*, held at CRIDA, Hyderabad, May 8-9.

Sarvanakumar, V., D.K. Jain, and Smita Sirohi. 2008. Measuring the Technical Efficiency of Indian Dairy Firms. Paper presented in the *Asia-Pacific Productivity Conference*, held at Academia Sinica, Taiwan, July 17-19.

Sirohi, Smita. 2008. Tapping Asian Markets for Exports of Indian Dairy Products. Paper presented in the *National Seminar on Emerging Opportunities for Commercialization in Dairying* held at N.D.R.I., Karnal, November 6-7.

Sirohi, Smita. 2008. Financing and Governance Issues in Rural Infrastructure Development. Paper presented in the *Convention on Creating World Class Infrastructure- Policy Imperatives*, organized by Lucknow Management Association, Lucknow, November 22.

Sirohi, Smita. 2008. Infrastructure Development for Agricultural Growth and Poverty Alleviation. Paper presented in the Review *Workshop on Issues in India's Pro-poor Policy* held at NCAP, New Delhi, December 22.

Sirohi Smita. 2009. Vulnerability Index: Risk Assessment Tool. Paper presented in the *Launch Workshop of NAIP Project on Risk Assessment and Insurance Products for Agriculture*, held at NCAP, New Delhi, January 20-21.

VII. ONGOING RESEARCH PROJECTS

S. No.	Title of Research Projects	PI/CCPI
	Technology Policy	
1.	Productivity and impact of agricultural research	Suresh Pal
2.	Economics of agricultural biotechnology: Investment, regulations and impact	Suresh Pal
3.	Impact assessment of fisheries research in India	B. Ganesh Kumar
4.	Spatial and temporal changes in productivity and economics in crop sector	Sant Kumar
5.	Indian poultry sector in transition: Role of technology and institutions	B. Ganesh Kumar and K. K. Datta
6.	Assessing implications of IPM technology on farm woman	Usha Ahuja P. Adhiguru B. Ganesh Kumar K. K. Datta
7.	Economic impact of FMD and its control in the dairy and meat value chains of selected high potential regions of India: A pilot study	B. Ganesh Kumar Aniket Sangal M. R. Gajendragad G. Kathiravama M. P. Gupta
	Sustainable Agricultural Systems	
8.	System of rice intensification: A productivity enhancing and resource conserving practice	B. C. Barah Ratna Reddy and K. N. Selvaraj

	Markets and Trade	
9.	Upcoming of supermarkets in India: Implications for smallholders	Pratap S. Birthal P. Adhiguru and Shiv Kumar
10.	Exploring market opportunities for fisheries sector in India	B. Ganesh Kumar K. K. Datta and P. Shinoj
11.	Estimating marketing efficiency of horticultural commodities under different supply chains in India	M. B. Dastagiri B. Ganesh Kumar and K. K. Datta
12.	Emerging paradigm in trade implications on Indian agriculture and the way forward	Anjani Kumar P. Shinoj
	Institutional Change	
13.	Supply chain and institutional change in agriculture—A case study of potato	Harbir Singh
14.	Nature and extent of agricultural indebtedness in different states of India using data mining techniques	Rajni Jain S. S. Raju P. A. Lakshmi Prasanna
15.	Smallholders in Indian agriculture, past, present and future	P. A. Lakshmi Prasanna P. Adhiguru Rajni Jain Shiv Kumar
	Agricultural Growth and Modelling	
16.	Future sources of growth in agriculture in North-East India with reference to agricultural diversification in favour of high-value crop and livestock	B. C. Barah and Pratap S. Birthal
17.	Subsidies and investments in livestock sector	M. B. Dastagiri
	National Professor Project	
18.	Analyzing impact of agricultural policy, technology, institutions and trade on agricultural growth, farm income, sustainability and rural poverty	Ramesh Chand and S. S. Raju
	National Fellow Project	
19.	Returns to investment on livestock research and development: Implications for growth, equity and sustainability	Pratap S. Birthal
	National Agricultural Innovation Project	
20.	Visioning, policy analysis and gender (V-PAGe)	Suresh Pal
21.	Developing decision support system for agricultural commodity market outlook	Anjani Kumar Shiv Kumar P. Shinoj Rajni Jain
22.	Agricultural risk assessment and insurance products under basic and strategic research	B. C. Barah Smita Sirohi

VIII. CONSULTANCY PROJECTS

Name of Scientist	Institution to which consultancy was provided	Area of consultancy
P. K. Joshi	CGIAR	CGIAR Independent review and the change management initiatives
Ramesh Chand	FAO	Personal Service agreement to support FAO in presentation of National Medium Term Priority Framework in India
Suresh Pal	FAO	Review of research impact assessment studies of CGIAR Centres
Smita Sirohi	ISEC	Infrastructure development for Agriculture Growth
Anjani Kumar P. Shinoj	NAFED	Capacity building to enhance competiveness of Indian Agriculture and registration abroad
Anjani Kumar	FAO	Support to National Medium Term Priority Framework for livestock sector in India

IX. LINKAGES

The Centre maintains close linkages with several national and international organisations involved in agricultural research, development and policy. Collaborative research projects, seminars, workshops, publications and participations in policymaking bodies are the usual modes of policy interface which help improve the outreach activities of NCAP. Key partners of the Centre are listed below:

National

- IASRI, IARI, NAARM, DRWA, ICAR fisheries institutes, 18 PME Cells in ICAR institutes and State Agricultural Universities
- ISEC, CESS, IGIDR, IIM-A, ICRIER, NAFED, NFDB
- Ministry of Agriculture, Government of India

International

- CGIAR Centres
  ICRISAT, ILRI, IFPRI, ICRAF, CIMMYT, ICARDA, IRRI, IWMI
- UN Organisations
  FAO
  UN-CAPSA
- The World Bank
- SAARC Agriculture Centre

Corporate and agri-business sector

- YES Bank
- Agriwatch
- Agriculture Insurance Corporation

X. RESEARCH ADVISORY COMMITTEE

The Joint Research Advisory Committee (RAC) of NCAP and IASRI was constituted for a period of three years w.e.f. 29 January, 2007. The composition of RAC is as follows:

Dr. P.V. Shenoi, Chairman
Former Special Secretary (DAC)
Govt. of India
20-C, First Main Road
RMV Extension, Stage-II, Block - I
Bangalore – 560 094

Dr. S. M. Jharwal
Principal Advisor
Ministry of Agriculture
Govt. of India
Krishi Bhawan, New Delhi - 110 114

Dr. S. S. Acharya
Former Director
Institute for Development Studies (IDS)
8-B, Jhalana Institutional Area
D-95, Fist Floor, Krishna Marg
Bapu Nagar, Jaipur – 302 015 (Rajasthan)

Dr. Rajeev L. Karandikar
Executive Vice-President-Analystics
Cranes Software International Limited
4th Floor, Block I, Shankaranarayana Building
25, Mahatma Gandhi Road
Bangalore – 560 001

Dr. Rahul Mukherjee
Professor
Indian Institute Management (IIM)
Joka Diamond Harbour Road
P.O. Alipur, Kolkata – 700 027
(West Bengal)

Dr. V. K. Bhatia
Director
Indian Agricultural Statistics Research Institute (IASRI) Library Avenue
Pusa, New Delhi - 110 012

Dr. A. K. Nigam
Director
Institute of Applied Statistics & Development Studies (IASDS)
B-16/1, First Floor, Rajaji Puram
Lucknow - 226 017 (Uttar Pradesh)

Assistant Director General (ESM)
Indian Council of Agricultural Research (ICAR),Krishi Bhawan
New Delhi - 110 114

Dr. A. P. Gore
Professor
Department of Statistics
University of Pune
Ganeshkind, Pune - 411 007

Dr. P. K. Joshi
Director
National Centre for Economics and Policy Research (NCAP)
DPS Marg, Pusa
New Delhi - 110 012

Meeting of Research Advisory Committee

The 10th meeting of RAC of NCAP and 2nd meeting of the Joint RAC of NCAP and IASRI was held on 4 December, 2008 under the Chairmanship of Dr. P. V. Shenoi, former Special Secretary, Ministry of Agriculture and Co-operation, New Delhi.

XI. MANAGEMENT AND OTHER COMMITTEES

Members of Institute Management Committee (IMC)

Dr. P. K. Joshi Chairman & Director NCAP, Pusa New Delhi - 110 012	Sh. Shyam Sunder Research Officer Directorate of Economics & Statistics Govt. of Haryana 30, Bes Building, Sector - 17 Chandigarh
Dr. P. K. Aggarwal ICAR National Professor Division of Environmental Sciences Indian Agricultural Research Institute Pusa, New Delhi - 110 012	Dr. B. C. Barah Principal Scientist NCAP, Pusa New Delhi - 110 012
Dr. V. P. Arora Dean College of Agribusiness Management Govind Ballabh Pant University of Agriculture & Technology, Pantnagar, Udhamsingh Nagar - 263 145 (Uttarakhand)	Dr. K. K. Datta Principal Scientist NCAP, Pusa New Delhi - 110 012
Sh. R. K. Bishnoi Director Directorate of Economics & Statistics Govt. of Haryana 30, Bes Building, Sector - 17 Chandigarh	Sh. R. P. Chamola Finance & Accounts Officer National Bureau of Plant Genetic Resources (NBPGR) Pusa Campus, New Delhi - 110 012
Sh. Bir Singh Additional Director Directorate of Economics & Statistics Govt. of Haryana 30, Bes Building, Sector - 17 Chandigarh	Sh. Vinod Kumar Assistant Administrative Officer NCAP, Pusa New Delhi - 110 012

Meeting of the Institute Management Committee

The 21st meeting of the IMC, NCAP was held on 4 March, 2009. The committee appreciated the leadership role, research work and achievements of the Centre and suggested that NCAP should collaborate more with State Agricultural Universities to further promote the research activities. Considering the volume of work, the committee made very useful suggestion regarding improving the scientific strength of the centre.

Meetings of the Institute Research Council

Institute Research Council (IRC) of NCAP, is comprised of Director NCAP, scientific staff of the Centre and Assistant Director General (Economics, Statistics and Marketing) of ICAR. Director, NCAP is the Chairman of IRC. Eleven meetings of the IRC were held during 2008-09 (April-March). A total of 33 presentations (including 13 presentations on deputations to foreign visits), almost 3 presentations in each meeting, were made. During the IRC meetings, progress of the ongoing project activities was discussed and other new research proposal proposed. Presentations were also made at the IRC meetings to share the experiences and the outcome of the foreign deputations of the scientists.

Other Committees

A number of internal committees have been constituted for decentralised management of the Centre. These committees and their terms of reference are as follows:

Academic Planning and Policy Committee

- To strengthen internal planning, functioning and policy direction.

Scientists Evaluation and Development Committee

- To encourage critical participation and strengthen socially acceptable incentives and deterrent mechanism.

Internal Management Committee

- To regularly monitor the functioning of the Centre, and suggest ways to improve human resource productivity.

Budget Committee

- To plan, review and monitor the expenditure and income, including those for the sponsored projects of the Centre.
- To ensure compliance of proper procedures.

Purchase Committee

- To purchase materials and services according to the prescribed official procedures and in accordance with the Budget Committee guidelines/directions on utilisation of funds.

Publications Committee

- To plan, format and make recommendations regarding Centre's publications.
- To prepare guidelines and arrange internal and external reviewing of publications, and coordinate revisions.

- To help and advise younger faculty of the Centre on publication-related matters.
- To identify printers and suggest pricing, circulation norms, etc. for Centre's publications.

Consultancy Processing Cell

- To examine proposals related to consultancy with reference to guidelines of the Council issued from time to time and recommend appropriate action.

Computer Committee

- To plan and monitor computer facilities at the ARIS cell and its maintenance.
- To facilitate and monitor IT facilities (LAN, e-mail, Internet) at the Centre.

Women's Cell

- To recommend measures for the welfare of the women employees of the Centre.
- To make recommendations for expeditious relief and redressal of grievances, including those related to sexual harassment.

Grievance Cell

- To examine the grievances received and to suggest the follow-up action accordingly.

Official Language Committee

- To monitor the progress of work done in official language from time to time and suggest relevant measures for improvement.
- To organise Raj Bhasha Month/Fortnight/Week/Day as intimated by the Council from time to time.
- To report to the Council and other agencies on progress from time to time.
- To propose ways of increasing use of Raj Bhasha in the Centre.

PME Cell

- To plan, promote and monitor PME activities of the Centre.
- To report the progress to the PME activities.

IPR and Technology Commercialisation Committee

- To take up issues related to IPR of products developed for commercialisation.
- To develop conditions for commercialisation of products.
- To suggest ways for resource generation.

Staff Recreation Committee

- To plan indoor and outdoor recreational activities for the staff of the Centre.
- To organise recreational activities for the Centre's staff.

Workplace Committee

- To regularly monitor the working environment.
- To provide feedback on improving the working environment.

XII. PARTICIPATION IN SCIENTIFIC ACTIVITIES

Name of Scientist	Topic and date(s)	Place
P. Adhiguru	Brainstorming Session on Enhancing Efficiency of Extension for Sustainable Agriculture, 2-3 December, 2008	IARI, New Delhi
	National Medium Term Policy Framework on Stakeholder Consultation Workshop 8-12 December, 2008	FAO, New Delhi
Usha Ahuja	Review meeting on Exploring Marketing Opportunities for Fisheries Sector in India, 19 July, 2008	NCAP, New Delhi
	68th Annual conference of Indian Society of Agricultural Economics, 28-30 November, 2008	AU, Vishakhapatnam
	National Seminar on Current Agrarian Issues: Responses of Agricultural Information System, 5-6 December, 2008	NCAP, New Delhi
	Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008	NCAP, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi
	Launching workshop of the NAIP project on Developing a Decision Support System for Agricultural Commodity Market Outlook, 25-26 March, 2009	NCAP, New Delhi
B. C. Barah	Challenges before the 13th Finance Commission, Govt. of India, Foundation for Economics and Policy Research, 17 May, 2008	IHC, New Delhi
	WTO Negotiation on Doha Development in Agriculture, 22 May, 2008	IIFT, New Delhi
	Brainstorming Session on Technical Support Group of the NFSM, 23 May, 2008	ICAR, New Delhi
	NAAS Foundation Day, 4 June, 2008	NASC, New Delhi
	WTO issues, CODEX standards and Phyto-sanitary Measures: Implications for Agricultural Producers and Exports, 23-24 June, 2008	DNSCRI, Patna
	Risk Management in Agriculture, 26-27 June, 2008	RBI, Pune
	National Meet on Grameen Gyan Abhiyan, 3-5 October, 2008	MANAGE, Hyderabad
	First Executive Committee of the National Food Security Mission, 16 October, 2008	NASC, New Delhi
	Working Group on Climate Change and Risk Management, 20 November, 2008	ICAR, New Delhi
	16th Annual Conference of Agricultural Economics Research Association, 21-23 November, 2008	AIM, Lucknow
	3rd National Seminar on System of Rice Intensification, 1-3 December, 2008	TNAU, Coimbatore

	National Seminar on Current Agrarian Issues: Responses of Agricultural Information Systems, 5 December, 2008	NCAP, New Delhi
	PMO Mission 7: Climate Change and Sustainable Agriculture in India, 5 & 8 December, 2008	ICAR, New Delhi
	NREGA Convergence Initiatives and Role of System of Rice Intensification, 10 December, 2008	ICAR, New Delhi
	D. S. Tyagi Memorial Lecture by Dr. Abhijit Sen, 15 January, 2009	ICAR, New Delhi
	Training Programme on Sustainable Agricultural Development for Food Security, 16 January, 2009	IARI, New Delhi
	ICAR-IRRI Workplan (2009-2012) Meeting, 20 January, 2009	ICAR, New Delhi
	Meeting on Scaling Up of System of Rice Intensification-Future Directions, 3 February, 2009	ICRISAT, Hyderabad
	4th World Congress on Conservation of Agriculture, 4-7 February, 2009	NASC, New Delhi
Ramesh Chand	Workshop on Exploring Alternative Futures for Agricultural Knowledge, Science and Technology, 1 July, 2008	IHC, New Delhi
	Seminar on Global Food Crisis and its Implications for India, 14 July, 2008	University of Hyderabad, Hyderabad
	Workshop on Modern Open-Source Intermediaries in Agricultural Markets, 20 August, 2008	IFPRI, New Delhi
	Workshop on Writing of Winning Proposals under Component-2 of NAIP, 26-27 September, 2008	NAARM, Hyderabad
	International Symposium on "Energy and Food Strategy for Sustainable Economic Growth in East Asia", 5 December, 2008	ERIA-JETRO, Tokyo, Japan
M. B. Dastagiri	Seminar on Global Knowledge Economy: Assessing Research & Development Centre in Emerging Economies by Dr. Waltraut Ritter, 1 April, 2008	NISTADS, New Delhi
	Seminar on Expanding Frontiers of Global Trade Rules: The Political Economy Dynamics of the International Trading System, 9 May, 2008	NISTADS, New Delhi
	Seminar on Formulating Integrated Energy Policy: Importance of Technology, 15 July, 2008	NISTADS, New Delhi
	Review Meeting on Exploring Market Opportunities for Fisheries Sector in India, 19 July, 2008	NCAP, New Delhi
	Seminar on Export Potentials of Horticultural Products in the US and EU, 22 July, 2008	IHC, New Delhi
	Workshop on Global Hunger Index 2008, 14 October, 2008	IFPRI, New Delhi
	Brainstorming workshop on Global Food Crisis and Prices: Implications for India, 17 November, 2008	NASC, New Delhi
	Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008	NCAP, New Delhi

	10th International Seminar on Organised Retailing: Boon or Bane, 4-5 January, 2009	NASC, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi
Rajni Jain	First Partners Meet of NAIP Project on Risk Assessment and Insurance Products for Agriculture, 17 October, 2008	NCAP, New Delhi
	National Seminar on Current Agrarian Issues: Response of Agricultural Information System, 5-6 December, 2008	NCAP, New Delhi
	Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008	NASC, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	IMT, Ghaziabad
	2nd International Conference on Data Management, 10-11 February, 2009	NCAP, New Delhi
	Concluding Workshop of NFDB sponsored research study on Exploring Market Opportunities for Fisheries Sector in India, 11 February, 2009	ICAM, New Delhi
	3rd National Conference on Computing for Nation Development (India-Com 2009), 26-27 February, 2009	NCAP, New Delhi
	Launching Workshop of the NAIP Project on Developing a Decision Support System for Agricultural Commodity Market Outlook, 25 March, 2009	NCAP, New Delhi
P. K. Joshi	ICAR-ICRAF Collaborative Research Plan Workshop on Agro-forestry Science for Prosperity in India, 19-20 April, 2008	NASC, New Delhi
	Institute Management Committee Meeting of National Academy of Agricultural Research Management, 3 May, 2008	NAARM, Hyderabad
	Scoping Meeting on Village-level Studies for Evidence-based Decision Making, 3-4 May, 2008	ICRISAT, Patancheru
	Roundtable Discussion on Issues of Recent Rise in World Food Prices (Meeting with US Senator Mr. Robert Casey), 30 May, 2008	ICRIER, New Delhi
	Consultation Meeting on Operationalisation of SAARC Milk Grid, 17-18 September, 2008	ITC Sonar, Kolkata
Anjani Kumar	Consultation Meeting on Operationalisation of SAARC Milk Grid, 17-18 September, 2008	FAO, New Delhi
	National Medium Term Policy Framework on Stakeholder Consultation Workshop, 8-12 December, 2008	IHD, New Delhi
	International Conference on Development, Freedom and Welfare, 19-20 December, 2008	NASC, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi

	World Conference 2009 of Animal Nutrition Association, 14-17 February, 2009	ITC Sonar, Kolkata
B. Ganesh Kumar	Review Meeting on Exploring Market Opportunities for Fisheries Sector in India, 19 July, 2008	NCAP, New Delhi
	Consultative Meeting on Domestic Fish Marketing, 28 July, 2008	NFDB, Hyderabad
	National Symposium on Knowledge Systems for Ecosystem Management and Sustainable Development, 26-27 August, 2008	NASC, New Delhi
	Idea Generation Workshop on R&D Challenges and Opportunities in Aquaculture Biotechnology, 28-29 August, 2008	CIFE, Mumbai
	Workshop on Action Plan for Fishermen Cooperatives in Developing Domestic Fish Marketing, 29 September, 2008	NFDB, Hyderabad
	National Symposium on Developing Domestic Fish Markets for self sustaining Aquaculture sector in India – Prospects, Problems & Policy Interventions, 30 October, 2008	CIBA, Chennai
	Brainstorming Workshop on Global Food Crisis and Prices: Implications for India, 17 November, 2008	NASC, New Delhi
	16th Annual Conference of Agricultural Economics Research Association, 21-23 November, 2008	AIM, Lucknow
	8th Indian Fisheries Forum, 22-26 November, 2008	CIFRI, Barrackpore
	68th Annual conference on Indian Society of Agricultural Economics, 28-30 November, 2008	AU, Visakhapatnam
	National Seminar on Current Agrarian Issues: Response of Agricultural Information System, 5-6 December, 2008	NCAP, New Delhi
	Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008	NCAP, New Delhi
	National Consultation Meeting with Directors of Fisheries Research & Development, 23-24 December, 2008	NAARM, Hyderabad
	10th International Seminar on Organized Retailing: Boon or Bane, 4-5 January, 2009	NASC, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi
	Concluding workshop of NFDB sponsored research study on Exploring market opportunities for fisheries sector in India, 11 February, 2009	NCAP, New Delhi
	Foundation Day Lecture on 'Overcoming the World Food and Agriculture Crisis through Policy Change and Science' by Dr. Joachim Von Braun, 6 March, 2009	IARI, New Delhi
	National Consultation on Registration, Evaluation, Valuation and In-situ Conservation of Aquatic Genetic Resources, 20-21 March, 2009	NBFGR, Lucknow

	Launching Workshop of NAIP Project on Developing a Decision Support System for Agricultural Commodity Outlook, 25 March, 2009	NCAP, New Delhi
Sant Kumar	ICAR Vichar Manch on Increasing Global Food Prices: Causes and Remedies, 4 August, 2008	NASC, New Delhi
	Workshop on Scientific Writing in Agriculture, 8 August, 2008	NASC, New Delhi
	Global Food Crisis: Policy Options for Developing Countries, 11 August, 2008	NASC, New Delhi
	Interactive Meet on Conservation and use of Farm Animal and Microbial Genomic Resources, 29 August, 2008	NASC, New Delhi
	World food day celebrations 2008, 16 October, 2008	IARI, New Delhi
	Brainstorming Workshop on Global Food Crisis and Prices: Implications for India, 17 November, 2008	NASC, New Delhi
	Current Agrarian Issues: Response of Agricultural Information System, 5-6 December, 2008	NCAP, New Delhi
	Global Potato Conference 2008: Opportunities and Challenges in the New Millennium, 9-12 December, 2008	NASC, New Delhi
	Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008	NCAP, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi
	Concluding Workshop on NFDB sponsored research study on Exploring Market Opportunities for Fisheries Sector in India, 11 February, 2009	NCAP, New Delhi
	Project Review Meeting of Visioning, Policy Analysis and Gender (VPAGe), 27-28 February, 2009	NCAP, New Delhi
	Launching Workshop on Developing a Decision Support System for Agricultural Commodity Market Outlook, 25 March 2009	NCAP, New Delhi
Shiv Kumar	ICAR-ICRAF Collaborative Research Plan Workshop, 19-20 April 2008	NCAP, New Delhi
	Workshop on Issues in India's Pro-poor Policy, 22 December 2008	NCAP, New Delhi
	Launching Workshop on Risk Assessment and Insurance Products, 20-21 January, 2009	NCAP, New Delhi
	Launching Workshop on Developing a Decision Support System for Agricultural Commodity Market Outlook, 25 March, 2009	NCAP, New Delhi
S. S. Raju	ICAR Vichar Manch, 4th and 11th August, 2008	NASC, New Delhi
	Launch Meeting of Global Hunger Index – 2008, 14 October, 2008	IFPRI, New Delhi
	World Food Day Celebrations 2008, 16 October, 2008	IARI, New Delhi

	Brainstorming Workshop on Global Food Crisis and Prices: Implications for India, 17 November, 2008	NASC, New Delhi
	68th Annual Conference on Indian Society of Agricultural Economics, 28-30 November, 2008	AU, Visakhapatnam
	National Seminar on Current Agrarian Issues: Responses of Agricultural Information System, 5-6 December, 2008	NCAP, New Delhi
	ICAR Vichar Manch, 19 December, 2008	NASC, New Delhi
	Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008	NCAP, New Delhi
	Launching Workshop on Risk and Insurance Products, 20 January, 2009	NCAP, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February 2009	NASC, New Delhi
	Launching Workshop on Developing a Decision Support System for Agricultural Commodity Market Outlook, 25 March, 2009	NCAP, New Delhi
P. Shinoj	Seminar on High Food Prices and Development Challenges, 16 October, 2008	IHC, New Delhi
	Brainstorming Workshop on Global Food Crisis and Prices: Implications for India, 17 November, 2008	NASC, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi
Harbir Singh	ICAR-ICRAF Collaborative Research Plan Workshop, 19-20 April, 2008	IARI, New Delhi
	ICAR Training-cum-Workshop on IP and Technology Management, 23-25 April, 2008	NCAP, New Delhi
	Workshop on Issues in India's Pro-poor Policy, 22 December, 2008	NCAP, New Delhi
	NAIP Launching Workshop on Risk Assessment and Insurance Products, 20-21 January, 2009	NASC, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NCAP, New Delhi
	NAIP Launching Workshop on Developing a Decision Support System for Agricultural Commodity Market Outlook, 25 March, 2009	NASC, New Delhi
Smita Sirohi	National Seminar on Clean Development Mechanism and Carbon Trading Opportunities in Agriculture and Allied Sectors, 8-9 May, 2008	CRIDA, Hyderabad
	International Seminar on Dairy, Poultry, Meat Processing and Aquaculture Trade, 22-24 August, 2008	Pragati Maidan, New Delhi
	International Seminar on National Rural Employment Guarantee Scheme in India: Impact and Implementation Experiences, 16-17 September, 2008	IIC, New Delhi

	Interactive Workshop on Climate Change and Indian Livestock, 20 September, 2008	NDRI, Karnal
	14th Annual International Sustainable Development Research Conference, 21-23 September, 2008	IHC, New Delhi
	National Seminar on Emerging Opportunities for Commercialization in Dairying, 6-7 November, 2008	NDRI, Karnal
	Workshop on Global Food Crisis and Prices: Implications for India, 17 November, 2008	NASC, New Delhi
	16th Annual Conference of Agricultural Economics Research Association, 21-23 November, 2008	AIM, Lucknow
	National Convention on Creating World Class Infrastructure, 22 November, 2008	LMA, Lucknow
	Review Workshop on Issues in India's Pro-Poor Policy, 22 December, 2008.	NCAP, New Delhi
	Launching Workshop of NAIP Project on Risk Assessment and Insurance Products, 20-21 January, 2009	NCAP, New Delhi
	4th World Congress on Conservation Agriculture, 4-7 February, 2009	NASC, New Delhi
All NCAP Scientists	Workshop on Exploring Future of Indian Agriculture for Strategic Planning, 1-2 September, 2008	NCAP, New Delhi
	Workshop on Linking Farmers and Agro-based SMEs to Markets, 17-18 March, 2009	NASC, New Delhi

XIII. VISITS ABROAD

Name of Scientist	Purpose	Place	Duration
Anjani Kumar	Workshop on Village Level Studies, University of Guelph	Ontario, Canada	13-14 November, 2008
P. K. Joshi	Second plenary session of the International Assessment of Agricultural Science and Technology for Development (IAASTD)	Johannesburg, South Africa	6-12 April, 2008
	CGIAR Review Panel Meeting	London, England	24-25 June, 2008
	Regional Consultation on the IFAD Rural Poverty Report 2009	Manila, Philippines	22-24 July, 2008
	CGIAR Impact Assessment, Focal Point Group Meeting SPIA-IAFP	Brasilia, Brazil	10-14 November, 2008
	Governing Board Meeting of SAARC Agricultural Centre	Dhaka, Bangladesh	21-24 October, 2008
Ramesh Chand	As a senior policy adviser to help FAO in strengthening agricultural policy research networking	Bangkok, Thailand	16-31 May, 2008
	7th Asia-Pacific Policy Forum at Seoul	Republic of Korea	9-11 September, 2008
	Panelist for International Symposium on Energy and Food Strategy for Sustainable Economic Growth in East Asia, organised by ERIA, IDE and JETRO	Tokyo, Japan	5 December, 2008
	Meeting on Asian Food Strategy for Sustainable Economic Growth, organised by ERIA, IDE and JETRO	Jakarta, Indonesia,	10-11 November, 2008
	Policy Forum on Agricultural Reforms and trade Liberalization in China and selected Asian Countries: Lessons of Three Decades	Beijing, China	19-20 February, 2009
Shiv Kumar	Social Entrepreneurship Approach to Graduate and Undergraduate Training in Policy Analysis for the Global, National and Local Food Systems at BRAC Centre	Dhaka, Bangladesh	8-12 February, 2009
Suresh Pal	Global Agri-Food Forum 2008, organized by National Agriculture Council	Mexico	12-13 June, 2008

XIV. POLICY ADVOCACY ACTIVITIES

Quantitative techniques for agricultural policy analysis

9-13 June, 2008

The Centre organised a training programme on 'Quantitative Techniques for Agricultural Policy Analysis' during 9-13 June, 2008. Dr. Karl M. Rich, ILRI, Nairobi was the main resource person for the training programme. It was aimed at enhancing the policy analysis skills of agricultural economists in the NARS. The participants found the programme very useful for application in their research work. Dr Anjani Kumar, Senior Scientist, NCAP coordinated this training programme.

WTO issues, codex standards and phyto-sanitary measures: Implications for agricultural producers and exporters

23-24 June, 2008

In order to sensitise the farmers and agri-exporters, and enhance their competitiveness, the National Centre for Agricultural Economics and Policy Research, New Delhi, in collaboration with National Agricultural Marketing Federation Limited (NAFED), New Delhi organised six two-days training workshops on "WTO Issues, Codex Standards and Sanitary and Phyto-sanitary Measures: Implications for Agricultural Producers and Exporters" in Bihar, Karnataka, Uttar Pradesh, Kerala, Meghalaya, and Rajasthan. The first training workshop was organised on 24-25 June, 2008 in Patna and the last was organised in Jaipur on 21-22 August, 2008 (Table 25).

Table 25: Schedule of the training, number of participants and local collaborators

S. No.	Date	Venue	Number of participants	Local collaborator
1.	24-25 June, 2008	Patna	55	State Farmers' Commission
2.	01-02 July, 2008	Bangalore	43	UAS, Bangalore
3.	8-9 July,2008	Kanpur	44	CSAU&T, Kanpur
4.	22-23 July, 2008	Trichur	63	Drishti (NGO), Trichur
5.	29-30 July, 2008	Shillong	68	ICAR-NEH, Shillong
6.	21-22 August, 2008	Jaipur	52	NIAM, Jaipur
	Total number of participants		325	

Several institutions collaborated in conducting these programmes at local level. These included State Farmers Commission, Govt. of Bihar, University of Agricultural Sciences, Bangalore, CSAUA&T, Kanpur, ICAR Research Complex for North-Eastern Hill Region, Barapani, Shrishti-an NGO and CCS National Institute of Agricultural Marketing, Jaipur. The main objective of the training workshops was to create awareness about WTO issues, Codex Standard and Food Safety Measures, which in turn would be helpful in enhancing their competitiveness in the global market. About 300 farmers and exporters from the country were selected as the beneficiaries of the programme. Wide ranging issues pertaining to the above aspect have been covered in these training workshops. Specifically, deliberations included the general understanding of WTO agreements, its implications for farmers, Codex and other international standards for agricultural commodities, SPS and related aspects and good agricultural practices for important exportable commodities of each region.

V-PAGe Workshop on exploring future of Indian agriculture for strategic planning

1-2 September, 2008

The Centre organised a workshop on 1-2 September, 2008 to explore the future of Indian agriculture by means of scenario planning. Four scenarios viz., in the valley, along the edge, over the mountains and through the hills were developed for Indian agriculture in 2030. These scenarios were presented and discussed in detail. The participants came up with some broad sketches of the scenarios and it was suggested to improve them further, and therefore, teams for rain-fed, hill and dairy sector were constituted and work plan for next six months was lined up.

V-PAGe training porgramme on agricultural policy research

15-20 September, 2008

V-PAGe training programme on agricultural policy research, jointly organised by NCAP and Indira Gandhi Institute of Development Research, Mumbai, 15-20 September, 2008 (Suresh Pal).

Risk assessment and insurance products for agriculture

17 October, 2008

Planning Meeting of NAIP project on risk assessment and insurance products for agriculture was organised at NCAP on 17 October, 2008. The purpose of the meeting was to finalise the activities for the next six months by the individual centres; to assess the initial programme and plan of action; to prepare centre-wise definite activity list and fix the targets to achieve short-term as well as long-term goals of the project. Dr. B. C. Barah, PI of the project welcomed the participants and presented a brief introduction and objectives of the project.

Dr. P. K. Joshi, Chairman, Consortium Implementation Committee, addressed the group and urged to develop methodologies and mechanisms for evolving innovative insurance products for agriculture, because the existing insurance products are not efficient and farmer friendly. He also emphasised on the need for developing business model for insurance products, taking lessons from existing successful business models from other sectors. He advised the group to give more importance to output oriented goals for guaranteed visibility. Mr. K. N. Rao (AIC) and Dr. Anil Rai (IASRI) presented elaborate account of the focused activities and expected output of the project. Dr. R. S. Sidhu (PAU Ludhiana) presented few issues on emerging risks in Punjab agriculture. Dr. C. R. Ranganathan and Dr. Suresh Kumar presented a plan of work in Tamil Nadu. Research questions pertaining to different types of risk, coping strategies, management practices, insurance products and policy options were raised. Finally, role and responsibility of each partner was defined.

Current agrarian issues: Response of agricultural information system

5-6 December, 2008

International Extension Forum (IEF), TNAU, Coimbatore organised a national seminar on Current Agrarian Issues: Response of Agricultural Information System at NCAP on 5-6 December, 2008.

The objective of the seminar was to have a stakeholders' dialogue on current agrarian issues and develop strategies, policies and options to strengthen agricultural information system so as to effectively address the issues related to emerging challenges and opportunities of agriculture in future. Prof. A. G. Sawant, President, IEF and Dr. P. K. Joshi welcomed the august gathering. About 80 delegates participated in the seminar. Eminent delegates include Dr. S. A. Patil, Director, IARI, Prof. M. J. Modayil, member, ASRB, Dr. P. Das, DDG (Extension), Dr. V. V. Sadamate, Adviser, Planning Commission and Dr. Baldeo Singh, Joint Director (extension), IARI. The salient recommendations of the seminar were greater thrust on information delivery in rain-fed agriculture, animal husbandry, dairying, fisheries and horticulture, strengthening outreach programmes of ICAR and convergence of national extension programmes like RKVY and food security mission, ATMA and KVK. Greater emphasis was laid on market-driven agricultural information system to meet the challenges of globalisation and increasing profitability for smallholders.

Issues in India's pro-poor policy

22 December, 2008

The Centre organised a workshop on 'Issues in India's Pro-Poor Policy' on 22 December, 2008, to discuss the following key issues identified by the FAO and Ministry of Agriculture, GoI in formulating policies targeted towards the weaker sections of the society: (i) increasing rural non-farm employment for farm household; (ii) infrastructure development for agricultural growth

and poverty alleviation; and (iii) management of common pool resources for poverty reduction in tribal areas of eastern India with reference to small scale culture fisheries and non-timber forest products. Presentations were made on the three aspects listed above by researchers from Institute of Economic Growth, NCAP and Institute of Social and Economic Change. The workshop was attended by about 50 distinguished academicians, senior officers from various ministries and representatives of FAO. The participants provided very useful inputs for strengthening the ongoing research work in the identified areas.

Risk assessment and insurance products

20-21 January, 2009

The launch workshop for the project 'Risk Assessment and Insurance Products' was held during 20-21 January, 2009 at NCAP. Six partner institutions participated in the two-day workshop and discussed in details the workplans for the next one year.

Shri G. C. Pati, Additional Secretary, Ministry of Agriculture, Government of India, was the chief guest at the inaugural session. He mentioned about the scope of the insurance programme and government strategies to implement it throughout the country. Dr. S. S. Acharya, Chairman of the Consortium Advisory Committee, chaired the technical session. He advised for developing farmer friendly insurance products. Dr. A. Bandyopadhaya, Chief General Manager (DEAR), NABARD, Mumbai, offered his suggestions and valuable comments. The workshop ended with a vote of thanks offered by Dr. B. C. Barah, Consortium Leader and Principal Investigator.

Exploring market opportunities for fisheries sector in India

11 February, 2009

The concluding workshop of NFDB sponsored research study on 'Exploring Market Opportunities for Fisheries Sector in India' was organised at NCAP, New Delhi on 11 February, 2009. The workshop was inaugurated by Dr. S. Ayyappan, DDG (Fisheries), ICAR. Dr. P. K. Joshi, Director, NCAP welcomed the gathering and briefed about the outcome of the study conducted in 2008. Dr. P. Krishnaiah, IAS, Chief Executive, NFDB and partners of this study from CIBA, CIFA, CIFRI, CIFE, CMFRI, CoF-Mangalore, FCRI-Thoothukudi, CFSc-Nellore attended the workshop. The group discussed findings of the study, covering both domestic and export fish marketing listed strategies, policy directives and recommendations drawn from the study to the NFDB for creating an efficient domestic fish marketing system in the country.

The NFDB expressed their gratitude to NCAP and study team for successfully completing the study and helping it to devise plans for creating the needed infrastructure and institutions for better domestic marketing.

Release of e-book on contract farming

16-17 February, 2009

An e-book, 'Contract Farming in India: A Resource Book' was released by Dr. Mangala Rai, Secretary, DARE & DG, ICAR on the occasion of the Vice Chancellor's conference during 16-17 February, 2009 in New Delhi. The e-book is a product of India-US Agricultural Knowledge Initiative, and aims to bring together US and Indian experiences with contract farming, and create an opportunity for mutual learning. The book is edited by Dr. Ashok Gulati, Director in Asia, IFPRI, Dr. P. K. Joshi, Director, NCAP, and Dr. Maurice Landice, Senior Economist, Economic Research Service, USDA (log on www.ncap.res.in for details).

Linking farmers and agro-based SMEs to markets

17-18 March, 2009

The Centre organised a workshop on 'Linking Farmers and Agro-based SMEs (Small and Medium Enterprises) to Markets' under Indo-US Agricultural Knowledge Initiative during 17-18 March, 2009 in New Delhi, jointly with Indian Council of Agricultural Research (ICAR), United States Department of Agriculture (USDA) and Federation of Indian Chambers of Commerce and Industry (FICCI).

The main objective of the workshop was to identify suitable agri-business models linking research farmers-agro-based SMEs in India and US and develop capacity in agri-business education. The workshop was inaugurated by Shri A. K. Upadhyay, Additional Secretary (DARE) and Secretary (ICAR). He emphasised the need for better agricultural marketing and higher efficiency, so that farmers could get more share in consumer rupee. In his remarks, Dr. S. P. Tiwari, Deputy Director General (Education & Crop Science), ICAR, stressed on the need for better marketing in view of declining share of agriculture in gross GDP and high growth in other sectors of economy than agriculture. "How to connect agricultural production with marketing is a major challenge", was remarked by Ms. Radha Singh, Advisor (Agriculture), FICCI. Ms. Singh highlighted major areas like agricultural biotechnology, agricultural extension, agricultural marketing, post-harvest infrastructure and risk management in agriculture for PPP. Ms. Holly Higgins, US Embassy in India, remarked that Indo-US partnership under AKI is moving in the right direction and hoped that agribusiness would help small farmers to improve their livelihood. Dr. Mort Neufville, leader of US delegation emphasised on the need of building partnership and strengthening the existing partnership among academia-institution-farmer to learn from each other. Dr. P. K. Joshi, Director, NCAP, welcomed the participants and provided the background of the workshop, and Dr. Pitam Chandra, ADG, presented vote of thanks.

Developing a decision support system for agricultural commodity market outlook

25 March, 2009

Launching workshop of the NAIP project on Developing a Decision Support System for Agricultural Commodity Market Outlook was held at NCAP on 25 March, 2009.

The purpose of the workshop was to review the work plan and fix the targets to achieve short-term as well as longterm goals of the project. Dr. P. K. Joshi, Consortium Leader welcomed the participants and informed about the genesis, history and importance of the project for NCAP as well as for the country. Prof. S. S. Acharya chaired all the technical sessions. Dr. Anjani Kumar, Principal Investigator presented a brief overview of the project, followed by presentations by collaborators. Each presentation was followed by some useful suggestions by the chairman. He expressed satisfaction on the progress and capability of the partners in the project. Finally, role and responsibility of each partner was defined.

XV. LECTURES DELIVERED BY NCAP SCIENTISTS

Name of Scientist	Topic and Date	Venue
P. Adhiguru	Bridging The Gender Gap Through ICT: Training Programme On Gender Issues And Employment In Agriculture 1 September, 2008	IARI, New Delhi
	Policy Framework For Food And Nutritional Security-Institutional Linkages Perspective. In: Training Program On Institutional Linkages For Strengthening Food And Nutritional Security 10 December, 2008	NIPCCD, New Delhi
B. C. Barah	SRI For Sustainable Rice Production. In: Training Programme On Sustainable Agricultural Development For Food Security 16 January, 2009	IARI, New Delhi
Ramesh Chand	Global Food Prices And Its Implication For India And Challenges And Prospects Of Agricultural Growth In XI Plan, In: 37th Refresher Course In Economics 2 September, 2008	JNU, New Delhi
	India's Agricultural Challenges And Prospects Of Achieving 4 Per Cent Agriculture Growth In XI Plan, In: XXIX Batch IES Probationers Training 15 September, 2008	IEG, New Delhi
Rajni Jain	Classification Using Decision Trees. In: Data Mining In Agriculture, A Training Programme Under CAS 11 November, 2008	IASRI, New Delhi
	Rough Set Theory. In: Data Mining In Agriculture, A Training Programme Under CAS 19 November, 2008	IASRI, New Delhi,
	Emerging Trends In Data Mining Techniques. In: Emerging Technology On Data Acquisition, Sri Guru Gobind Singh College Of Commerce 12 February, 2009	DU, Delhi
P. K. Joshi	Assessment Of NRM Technologies. In: Master Class On Impact Assessment, Organised By ICRISAT, ACIAR And The Crawford Fund 24 March, 2009	ICRISAT, Hyderabad
	Meta-Analysis Of Assessing Watershed Programs. In: Master Class On Impact Assessment, Organised By ICRISAT, ACIAR And The Crawford Fund 24 March, 2009	ICRISAT, Hyderabad

Anjani Kumar	Sanitary And Phyto-Sanitary Agreements And Technical Barriers To Trade 23 June, 2008	DNS-RCMI, Patna
	Rules And Regulations For Exporting Agricultural Commodities 24 June, 2008	DNS-RCMI, Patna
	Sanitary And Phyto-Sanitary Agreements And Technical Barriers To Trade 1 July, 2008	UAS, Bangalore
	Rules And Regulations For Exporting Agricultural Commodities 1 July, 2008	UAS, Bangalore
	Feedback From Farmers On Constraints And Opportunities For Agricultural Production And Export 2 July, 2008	UAS, Bangalore
	Sanitary And Phyto-Sanitary Agreements And Technical Barriers To Trade 8 July, 2008	CSAUAT, Kanpur
	Rules And Regulations For Exporting Agricultural Commodities 8 July, 2008	CSAUAT, Kanpur
	Role Of Livestock Sector For Women Empowerment 17 July, 2008	IARI, New Delhi
	Sanitary And Phyto-Sanitary Agreements And Technical Barriers To Trade 29 July, 2008	ICAR-NEH, Barapani
	Rules And Regulations For Exporting Agricultural Commodities 29 July, 2008	ICAR-NEH, Barapani
	Sanitary And Phyto-Sanitary Agreements And Technical Barriers To Trade 21 August, 2008	CECOEDECON, Jaipur
	Rules And Regulations For Exporting Agricultural Commodities 22 August, 2008	CECOEDECON, Jaipur
	Integrating Crop-Livestock Production System For Sustainability 19 January, 2009	IARI, New Delhi

B. Ganesh Kumar	Fisheries Marketing In India. For: Visiting Sri Lankan Delegates 6 January, 2009	NCAP, New Delhi
	Poultry Farming In Manipur: Lasting Hope And Imminent Threat For Sustainable Food And Livelihood Security. In: Refresher Course On Sustainable Agricultural Development For Food Security 14 January, 2009	IARI, New Delhi,
Shiv Kumar	Apmc (Development And Regulation) Act – 2003. In: CAS Training October, 2008	IARI, New Delhi
S. S. Raju	Agricultural Insurance In India: Problems And Prospects 28 December, 2008	ANGRAU, Hyderabad
P. Shinoj	India In The Midst Of WTO Negotiations: Present Status And Implications For Agriculture. In: Advances In Agricultural And Food Marketing, A Training Programme Under CAS 7 November, 2008	IARI, New Delhi
	Common Econometric Tools For Modelling International Trade. In: Advances In Agricultural And Food Marketing, A Training Programme Under CAS 17 November, 2008	IARI, New Delhi
Harbir Singh	Effective Marketing Of Agricultural Inputs, Retail Management And Enhancing Customer Satisfaction 19 February, 2009	AMITY University, Noida
Smita Sirohi	Socio-Economic Impact Of Climate Change" To Participants Of Teach-In Workshop On Unpacking The Climate Crisis Organized By Tata Institute Of Social Science 18 April, 2008	SPC, Mumbai
	Intellectual Property Rights In Indian Agriculture Context. In: Training Programme On World Trade Agreement And Its Implications On Indian Agriculture 18 August, 2008	Shimla, Himachal Pradesh
	Implications Of World Trade Agreement On Animal Husbandry Sector" To Participants Of National Training Programme On World Trade Agreement And Its Implications On Indian AgriCulture Organized By Manage, Hyderabad And Sameti 18 August, 2008	Shimla, Himachal Pradesh

XVI. DISTINGUISHED VISITORS

Dr. Mangala Rai, Secretary, Department of Agricultural Research and Education & Director-General, Indian Council of Agricultural Research, Krishi Bhawan, New Delhi-110 014

Dr. M. S. Swaminathan, Chairman, M S Swaminathan Research Foundation, Chennai, Tamil Nadu

Dr. K. M. Bujarbaruah, DDG (AS), Indian Council of Agricultural Research, Krishi Bhawan, New Delhi

Dr. A. K. Singh, DDG (NRM), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-II, New Delhi

Dr. Nawab Ali, DDG (Engg.), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-II, New Delhi

Prof. S. Mahendra Dev, Chairman, Commission for Agricultural Costs and Prices (CACP), Ministry of Agriculture, Government of India, New Delhi

Dr. H. K. Jain, ex-DDG ISNAR, Hague, The Netherlands

EPMR Panel members from International Crops Research Institute for the Semi-Arid Tropics Patancheru, Andhra Pradesh

Dr. (Ms.) Yuan Zhou, Economist, Basel, Switzerland

Dr. N. S. Johda, Senior Consultant, ICIMoD, Nepal

Dr. P. Chengal Reddy, Secretary General, Consortium of Indian Farmers Association

10-member delegation, CARP, Sri Lanka

Dr. I. P. Abrol, Director, CASA

Dr. A. K. Sikka, Technical Expert, NRAA, Watershed Development

Professor S. S. Johl, former Vice Chairman, Punjab State Planning Board and Chairman of NCAP Quinquennial Review Team

Dr. S. S. Acharya, Honorary Professor, Institute of Development Studies (IDS), Jaipur, Rajasthan

Dr. P. Das, Deputy Director General (Ag. Extn.), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-I, New Delhi-110 012

Dr. S. P. Tiwari, Deputy Director General (Edn), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-II, New Delhi-110 012

Dr. S. Ayyappan, Deputy Director General (Fy), Indian Council of Agricultural Research, Krishi Anusandhan Bhawan-II, New Delhi-110 012

Dr. P. L. Gautam, Deputy Director General (CS), Indian Council of Agricultural Research, Krishi Bhawan, New Delhi-110 014

Dr. P. K. Mishra, Secretary, Ministry of Agriculture, Government of India, Krishi Bhawan, New Delhi-110 001

Dr. S. M. Jharwal, Principal Advisor, Department of Agriculture & Cooperation, Ministry of Agriculture, Krishi Bhawan, New Delhi-110 012

Dr. J. C. Katyal, Vice Chancellor, Chaudhary Charan Singh Haryana Agricultural University, Hisar-125004

Dr. P. G. Chengappa, Vice Chancellor, University of Agricultural Sciences, GKVK, Bangalore-560 065

Dr .V. S. Vyas, Professor Emeritus, Institute of Development Studies, Jaipur-302 018

XVII. PERSONNEL

Scientific

Name	Designation	Area of Specialization
P. K. Joshi	Director	Technology Policy Sustainable Agricultural System
Ramesh Chand	ICAR National Professor	Markets and Trade Agricultural Growth and Modelling
B. C. Barah	Principal Scientist	Agricultural Growth and Modelling Sustainable Agricultural System
K. K. Datta	Principal Scientist	Sustainable Agricultural System Agricultural Growth and Modelling
Suresh Pal	Principal Scientist	Technology Policy Institutional Change
Pratap S. Birthal*	National Fellow	Technology Policy Agricultural Growth and Modelling
Usha Rani Ahuja	Principal Scientist	Technology Policy Sustainable Agricultural System
Smita Sirohi	Principal Scientist	Agricultural Growth and Modelling Markets and Trade
Aldas Janaiah**	Senior Scientist	Technology Policy Agricultural Growth and Modelling
M. B. Dastagiri	Senior Scientist	Markets and Trade Institutional Change
P. Adhiguru	Senior Scientist	Technology Policy Institutional Change
S. S. Raju	Senior Scientist	Institutional Change
Rajni Jain	Senior Scientist	Institutional Change
Anjani Kumar	Senior Scientist	Technology Policy Markets and Trade
Sant Kumar	Senior Scientist	Technology Policy Agricultural Growth and Modeling
Harbir Singh	Senior Scientist	Sustainable Agricultural System Institutional Change
B. Ganesh Kumar	Senior Scientist	Agricultural Growth and Modelling Technology Policy
Shiv Kumar	Senior Scientist	Institutional Change
P. A. Lakshmi Prasanna	Scientist (Sr. Scale)	Institutional Change
P. Shinoj	Scientist	Agricultural Growth Modelling Markets and Trade

* On deputation to ICRISAT Hyderabad since 15 May, 2008
** On deputation to ANGRU, Hyderabad since 25 June, 2007

Technical

Name	Designation
Prem Narayan	Technical Officer (T-6)
Khyali Ram Chaudhary	Technical Officer (T-5)
Mangal Singh Chauhan	Technical Officer (T-5)
Sonia Chauhan	Technical Officer (T-5)
Satinder Singh	Technical Officer (T-3)

Administrative

Name	Designation
Vinod Kumar	Assistant Administrative Officer
S. P. Ashra	Assistant Finance & Accounts Officer (till 31 October, 2008)
S. K. Yadav	Assistant
Inderjeet Sachdeva	Upper Division Clerk
Sanjay Kumar	
Ajay Tanwar	Lower Division Clerk
Umeeta Ahuja	Stenographer
Seema Khatter*	Junior Stenographer
Mahesh Kumar	S.S.Gr II
Mahesh Pal	S.S Gr I

* On deputation to DMR, New Delhi

XVIII. TRAININGS ATTENDED

Scientists

Name	Topic	Duration	Venue
Anjani Kumar, B. Ganesh Kumar, Harbir Singh, M. B. Dastagiri, Rajni Jain, P. Shinoj, Shiv Kumar, S. K. Pandey and S. S. Raju	Quantitative Techniques for Agricultural Policy Analysis	9-13 June, 2008	NCAP, New Delhi
P. A. Laxmi Prasanna	Mathematical Modelling	23-27 February, 2009	NISTADS, New Delhi
P. Shinoj	Eleven-day training on Price trends and market integration	16-25 October, 2008	IASRI, New Delhi
S. K. Pandey	Scientific Writing in Agriculture	8 August, 2008	DIPA (ICAR), New Delhi
Suresh Pal, Shiv Kumar, Harbir Singh, P. A. Lakshmi Prasanna and P. Shinoj	Agricultural Policy Research	15-20 September, 2008	IGIDR, Mumbai

Administration and Others

Name	Topic	Duration	Institution
Vinod Kumar	Interactive Workshop on Administrative and Finance Matters	16-17 April, 2008	ICAR Zonal Coordinating Unit, Zone-I, PAU, Ludhiana
Vinod Kumar Prem Narayan Ajay Tanwar	Implementation of Rajbhasha and its Rules and Regulations	24-26 April, 2008	Rajbhasha and Prabandan Vikas Sanstha, Delhi
Inderjeet Sachdeva	Special Training Programme on Pay Fixation	4-6 August, 2008	ISTM, New Delhi
Sonia Chauhan	Indian Agriculture and Better Environment (Hindi)	16-17 December, 2008	IARI, New Delhi

XIX. OTHER INFORMATION

Participation in ICAR sports meets

NCAP sports team comprising Harbir Singh, Vinod Kumar, S. K. Yadav, Sonia Chauhan, Mangal Singh Chauhan, Prem Narayan, Khyali Ram Chaudhary, Inderjeet Sachdeva, Ajay Tanwar, Satinder Singh,

Mahesh Khokhra, and Mahesh Pal participated in ICAR Zonal Tournament at IARI, New Delhi, during 7-11 April, 2008. The team won six medals. Mrs. Sonia Chauhan bagged medals in 100 and 200 m race, chess, high jump and long jump. She was also adjudged as 'best woman athlete' of the sports meet.

Mr. M. S. Chauhan (Chief-De-Mission and Manager) and Ms. Sonia Chauhan represented NCAP in ICAR inter-zonal sports meet held at Hyderabad on 17-20 November, 2008. Ms. Sonia won two silver medals in 100 m and 200 m races; and a bronze medal in high jump event.

A contingent of 11 sportspersons participated in Central Zone ICAR Sports Meet held at Central Institute of Agricultural Engineering, Bhopal, during 23-27 February, 2009. In athletics events (M), Mr. Inderjeet and Mr. Prem Narayan qualified for 100 m and 200 m final races, respectively. In women's event, Ms. Sonia Chauhan won three silver medals in 100 m, 200 m and high jump events. She was also declared winner in chess (women) and runner-up in carom (women) competition.

NCAP Annual Day

The Centre celebrated its 17th Annual Day on 2nd May, 2008. On this occasion, 1st Prof. Dayanatha Jha Memorial Lecture was delivered by Dr. S. Mahendra Dev, Director, CESS, Hyderabad. Prof. M.

S. Swaminathan, Dr. H. K. Jain, Dr. K. M. Bujarbaruah, Dr. Nawab Ali, Dr. A. K. Singh and other dignitaries graced the function and wished overall development for the Centre.

Hindi Pakhwara

Rajbhasha Samiti at the Centre organised a Hindi awareness workshop on 25 August, 2008 on Badhati mahngaai ki samasya: Karan avam nivaran.

The committee of NCAP organised a series of events to celebrate "Hindi Pakhwara" on 14-28 September, 2008 to create awareness among the staff about use of Hindi. Essay writing on "Prakritik apdao ka krishi par prabhav and arthik vikas ke nam par prakritik sansadhano ka atyadhik dohan", competition programme on objective type general awareness in Rajbhasha, poem recitation, debates on Indo-US nuclear deal: Boon or bane to India, dictation of administrative word in Hindi were organised. The participation was overwhelming. The poem recitation and prize distribution function was chaired by Dr. P. K. Joshi, Director NCAP. Dr. T. P. Trivedi, Director, Directorate of Agricultural Information and Publication, ICAR, New Delhi was the chief guest. Dr. Ranjana Agrawal and Dr. A. K. Vashisht, Principal Scientists, IASRI, New Delhi were the judges to decide the winners. The prizes were distributed to the winners by the chief guest.

The details of events and prize winners were as follows:

S. No.	Events	Prize winners	S. No.	Events	Prize winners
1	Essay writing	Sushil Kumar Yadav Sonia Chauhan Khyali Ram	5	Ashubhashan	Rajni Jain Sonia Chauhan Rashi Mittal
2	Debate (Hindi Bhashi)	Sonia Chauhan Rajni Jain Sushil Kumar Yadav	6	Dictation	Ajay Tanwar Khyali Ram Sushil Kumar Yadav
3	Debate (Non Hindi Bhashi)	P. Adhiguru Ved Moorti M. B. Dastagiri	7	Translation	Inderjeet Sachdeva Sonia Chauhan M S Chauhan
4	Debate (Women cell)	Rajni Jain Sonia Chauhan Rashi Mittal	8	Poem Recitation	Sonia Chauhan Shiv Kumar Singh Mamta Kumari

Retirement

Mr. S. P. Asra (AFAO) superannuated on 31 October, 2008 from NCAP.

विशिष्ट सारांश

राष्ट्रीय कृषि आर्थिकी एवम् नीति अनुसंधान केन्द्र वित्त वर्ष 2008–09 में भी कृषि अर्थशास्त्र एवम् नीति अनुसंधान में उत्कृष्टता बनाये रखने में सफल रहा है। इस केन्द्र द्वारा किये गये अनुसंधान कार्यों से परिषद् को कृषि नीति चर्चाओं एवं निर्णयों में सक्रिय भूमिका निभाने में मद्द मिलती है। प्रावधीन वर्ष के दौरान केन्द्र में कुल 20 वैज्ञानिक (एक राष्ट्रीय प्राध्यापक सहित) तथा 15 अन्य कर्मचारी कार्यरत थे। वर्ष 2008–09 में केन्द्र का कुल बजट 517.37 लाख रूपए था।

एक उच्च–स्तरीय अनुसंधान सलाहकार समिति, केन्द्र के अनुसंधान कार्यक्रमों का निर्धारण एवं मार्गदर्शन करती है, जबकि एक प्रबन्धन समिति, केन्द्र के प्रशासनिक एवं आर्थिक गतिविधियों पर ध्यान रखती है। इनके अतिरिक्त, कई अन्य आन्तरिक समितियाँ जैसे कि बजट समिति, खरीद समिति, प्रकाशन समिति, आदि केन्द्र के विकेन्द्रीकृत प्रबंधन में सहयोग करती हैं।

केन्द्र में समसामयिक विषयों पर अनुसंधान कार्य पाँच प्रमुख क्षेत्रों में किये जाते हैं। ये क्षेत्र हैं : तकनीकी नीति, वहनीय कृषि व्यवस्था, विपणन एवं व्यापार, संस्थागत बदलाव, तथा कृषि वृद्वि एवं माडलीकरण। प्रत्येक प्रमुख वर्णित क्षेत्र में अनुसंधान कार्य एक वरिष्ठ कृषि अर्थशास्त्री के नेतृत्व में किये जाते हैं, जिसे वैज्ञानिकों का एक लघु समूह सहयोग देता है। केन्द्र में शोध अध्ययनों का समन्वय इस प्रकार किया जाता है कि केन्द्र के निर्धारित लक्ष्यों की प्राप्ति की जा सके। वर्ष 2008–09 में केन्द्र में 35 शोध अध्ययनों पर कार्य किया गया। इसी अवधि में केन्द्र ने छः परामर्शी परियोजनाओं को भी पूरा किया। वर्षावधि 2008–09 में केन्द्र की मुख्य शोध उपलब्धियों एवं गतिविधियों की एक झलक का विवरण निम्नवत है।

हाल के वर्षों में कृषि उत्पादकता को बढ़ाने में कृषि तकनीकों की क्षमता पर प्रश्न चिन्ह लग गया है। अतएव केन्द्र ने अनेक कृषि तकनीकों की उपयोगिता का विश्लेषण किया है। शोध विश्लेषण दर्शाता है कि उन्नत कृषि तकनीकों के प्रयोग से विभिन्न फसलों एवं पशु जातियों की उत्पादकता में कई गुना अधिक वृद्धि दर्ज की गयी है। उदाहरण के तौर पर 1999–00 और 2004–05 की वर्षावधि में उत्पादन की उन्नत तकनीकों के प्रयोग से गेहूँ की उत्पादकता में 19.8 प्रतिशत वृद्धि मिली। इसी प्रकार पशु–पालन क्षेत्र में प्रमुख रूप से तकनीकी उपयोग के कारण वर्ष 1970–71 तथा 2003–04 के दौरान 2.3 प्रतिशत की वार्षिक वृद्धि दर्ज की गयी। बिहार प्रान्त में पैन कल्चर (Pen Culture) विधि से मछली उत्पादन में औसत लागत एवं लाभ का अनुपात 1.39 मिला है।

भारत में आलू अनुसंधान में शोध निवेश का विश्लेषण दर्शाता है कि शोध प्रयासों एवम् कीमत बढ़ने से आलू उत्पादन बढ़ाने में सहयोग मिला है। अध्ययन से स्पष्ट है कि अखिल भारतीय स्तर पर आलू अनुसंधान में एक प्रतिशत निवेश बढ़ाने से उसके उत्पादन में एक प्रतिशत वृद्धि की संभावना है, जबकि इसकी कीमत में एक प्रतिशत बढ़ोत्तरी से आलू का उत्पादन 0.68 प्रतिशत बढ़ने की सम्भावना का आकलन किया गया है। इस परिणाम से उत्पादन बढ़ाने में तकनीकी महत्ता को बल मिलता है।

कृषि में महिलाओं की बढ़ती भागीदारी तथा उनके द्वारा किये योगदान को उजागर करने हेतु अध्ययन किया गया। कृषि में महिलाओं की बढ़ती भागीदारी का आकलन दर्शाता है कि पिछले 20 वर्षों के दौरान

(1983–2004) मछली पालन को छोडकर, कृषि क्षेत्र में महिलाओं की भागीदारी बढ़ी है। वर्तमान में कृषि क्षेत्र में महिलाओं की भागीदारी लगभग 12 प्रतिशत है। अध्ययन से पता चला है कि पशु–पालन क्षेत्र में शोध निवेश बढ़ाने से इस क्षेत्र में आय एवं रोजगार बढ़ने की अच्छी संभावनायें हैं। एक अन्य अध्ययन में समन्वित नाशीजीव प्रबंधन में महिलाओं के योगदान के अध्ययन में पाया गया है कि इस तकनीक के प्रयोग से 12 प्रतिशत की अधिक उपज तथा लागत में 16–20 प्रतिशत की कमी आती है। इस तकनीक के बढ़ते प्रयोग से महिलाओं की कृषि आय बढ़ने की सम्भावना है।

केन्द्र में खाद्य–फसलों जैसे कि आलू, गेहूँ आदि के उत्पादन बढ़ने की सम्भावना का अध्ययन किया गया। इसी प्रकार दुग्ध उत्पादन में तकनीकी दक्षता को निर्धारित करने वाले कारकों का विश्लेषण एवं दुग्ध उत्पादन बढ़ाने के उपाय सुझाए गये हैं।

हाल के वर्षों में लगभग सभी फसलों तथा क्षेत्रों में घटती वृद्धि के प्रमुख कारणों में अनुपयुक्त नीतियाँ प्रमुख रूप से उत्तरदायी पायी गयी हैं। गेहूँ में 'कुल कारक उत्पादकता' में वृद्धि, खाद्य सुरक्षा की दृष्टि से काफी महत्वपूर्ण है। इसी प्रकार आलू उत्पादन का विश्लेषण प्रदर्शित करता है कि इसकी उत्पादकता में घटती दर के कारणों में पोषक तत्वों के असंतुलित प्रयोग, सिंचाई सुविधा में कमी, बीजदर बदलाव में देरी, और तापक्रम के घटने–बढ़ने से बीमारी पनपना तथा पाला पड़ना आदि प्रमुख हैं।

दुग्ध उत्पादन में तकनीकी दक्षता के आकलन से मिला है कि मौजूदा संसाधनों एवं तकनीकों के प्रयोग से दुग्ध उत्पादन बढ़ाने की संभावना है। अध्ययन दर्शाता है कि दुग्ध उत्पादक मौजूदा तकनीकी क्षमता के उचित उपयोग से औसतन 25 प्रतिशत तक दुग्ध उत्पादन बढ़ा सकते हैं। अध्ययन यह भी दर्शाता है कि मौजूदा तकनीक छोटे दुग्ध उत्पादकों के लिए उपयुक्त नहीं है। इसलिए इन किसानों के लिए विशेष तकनीकी नीति एवं संस्थागत सुविधायें मुहैया करायी जानी चाहियें।

कृषि विकास में संसाधनों की उपलब्धता में कमी एक महत्वपूर्ण बाधा है। सघन कृषि पद्धतियों के प्रयोग से मृदा, जल तथा अन्य सीमित साधनों की गुणवत्ता में कमी हुई है। अतएव केन्द्र ने कृषि के सतत् विकास हेतु कुछ नीतिगत विकल्प सुझाए हैं।

एक अध्ययन दक्षिण एशिया में कृषि में विविधीकरण अपनाकर खाद्य फसलों का उत्पादन बढ़ाने, तथा जीविका संरक्षण, आदि के सन्दर्भ में किया गया। अध्ययन में पाया गया है कि सर्वेक्षण जिलों में अनाज–आधारित कृषि पद्धति, जीविका संरक्षण में अधिक प्रभावी है। इसके बाद पशु–पालन–आधारित खेती का क्रम आता है। इनके अतिरिक्त, खेतों के छोटे होने के कारण जीविकोपार्जन नीतियों में बदलाव, नगदी फसलें उगाने तथा गैर–कृषि में रोजगार संभावनाओं की तरफ ध्यान दिया जाना चाहिए।

राष्ट्रीय स्तर पर फसलों की जैव विविधता में तेजी से ह्रास हो रहा है। एक अध्ययन से पता चलता है कि पिछले 10 वर्षों में आन्ध्र प्रदेश में 95 प्रतिशत धान की स्थानीय प्रजातियों का लोप हुआ है, जबकि पूर्वोत्तर राज्यों में 10 प्रतिशत, तथा त्रिपुरा में 12–73 प्रतिशत धान की स्थानीय जातियाँ विलुप्त हो गयी हैं। अध्ययन दर्शाता है कि आर्थिक एवं सामाजिक विकास की नीतियों के साथ–साथ जैव–विविधता के संरक्षण हेतु उचित राष्ट्रीय नीति अविलंब बनायी जानी चाहिए।

कृषि उत्पादों का विपणन इनके मूल्य प्राप्ति में एक प्रमुख प्रक्रिया है। विश्व–व्यापार संगठन के अस्तित्व में आने तथा साथ–साथ अन्य संबंधित विकास प्रयासों से कृषि वस्तुओं तथा कृषि सेवाओं के व्यापार में, देश में तथा देश से बाहर काफी तेजी आयी है। केन्द्र ने इस क्षेत्र की गतिविधियों को अपने अनुसंधान में काफी अहमियत दी है, साथ ही में बागवानी, पशु–पालन, मत्स्य पालन एवं कृषि के अन्य उपक्षेत्रों में कई अध्ययन शुरू किये हैं।

प्रक्षेत्र स्तर पर दुग्ध उत्पादन में खाद्य–संरक्षण उपायों को अपनाने से संबंधित अध्ययन में मिला है कि पशुओं की संख्या तथा दुग्ध मूल्य में सार्थक सकारात्मक संबंध है। औपचारिक सहकारी दुग्ध समितियाँ खाद्य संरक्षण उपायों को सकारात्मक रूप में देखती हैं। अध्ययन दर्शाता है कि प्रक्षेत्र स्तर पर खाद्य संरक्षण उपायों को अपनाने में जागरूकता अभियान तथा उत्पादकों की कुशलता में वृद्धि जैसे उपाय काफी कारगर साबित हो सकते हैं।

विश्व–व्यापार संगठन के प्रभावी होने के बाद बागवानी तथा मत्स्य विपणन मॉडलों के अध्ययन में मिला है कि उपभोक्ता द्वारा चुकाये गये 3.50 रूपये में किसान को केवल एक रूपया मिलता हैं जबकि खुदरा विक्रेता को 0.75 रूपया मिलता हैं। अध्ययन में मिला है कि बागवानी फसलों के विपणन में निजी क्षेत्रों के नवीनतम मॉडल जैसे कि रिलायन्स तथा सुभिक्षा मॉडल, अपने पूर्ववर्ती विपणन मॉडलों की अपेक्षा कार्यावधि, उपभोक्ता को संतुष्टि दिलाने, स्वच्छता तथा अन्य मामलों मे अधिक लोकप्रिय हैं।

एक अध्ययन में उर्वरकों के प्रयोग में वृद्धि, इनके असंतुलित प्रयोग तथा अनुदान का आकलन दर्शाता है कि वर्ष 1999–00 तथा 2003–04 की अवधि में उर्वरकों का प्रयोग 18.07 मिलियन टन से घटकर 16.79 मिलियन टन रह गया है जो कि कृषि–वृद्धि में कमी आने का प्रमुख कारण है। अध्ययन से पता चला है कि देश की उर्वरक निर्भरता दूसरे देशों पर करीब 35 प्रतिशत है। इसे कम करने के लिए देश में उर्वरकों के उत्पादन बढ़ाने की क्षमता हेतु निवेश किया जाना चाहिए। देश में उर्वरकों पर प्रति हेक्टेयर अनुदान राजस्थान में 393 रूपये है जबकि पंजाब में 3167 रूपये है। विश्लेषण से पता चला है कि उर्वरकों पर जारी अनुदान को पूरी तरह खत्म करने से कुल अनाजों के उत्पादन में करीब 9 प्रतिशत की कमी आ सकती है।

देश के पशु–उत्पादों के जारी निर्यात परिणामों का अध्ययन दर्शाता है कि आयात करने वाले देशों के सकल घरेलू उत्पाद में करीब 1 प्रतिशत की वृद्धि होने पर भारतीय पशु–उत्पादों का निर्यात 0.21 प्रतिशत बढ़ने की संम्भावना है। प्रति व्यक्ति सकल घरेलू उत्पाद का दुग्ध उत्पादों के निर्यात पर नकारात्मक प्रभाव मिला है। भारत तथा दुग्ध आयातित देशों के बीच 1 प्रतिशत की दर से दूरी बढ़ने पर दुग्ध उत्पादों के निर्यात में 0.74 प्रतिशत, मास उत्पादों में 0.90 प्रतिशत तथा अंडों में 0.28 प्रतिश्त की कमी पाई गई है। व्यापार नीति सूचकांक का सार्थक महत्व केवल समग्र पशु–उत्पादों के निर्यात में ही मिला है। अध्ययन में सुझाव दिया गया है कि दुग्ध उत्पादों के निर्यात बढ़ाने हेतु देश में व्यापक स्तर पर उपलब्ध संसाधनों को काफी मजबूत बनाना होगा।

एक अन्य अध्ययन में पाया गया है कि दुग्ध बाजारों के बीच समन्वय, इसकी आवक सुनिश्चित करने में अहम् है। विश्लेषण दर्शाता है कि दीर्घावधि में देश के पाँच प्रमुख बाजारों– चेन्नई, दिल्ली, कानपुर, कोलकाता व मुम्बई – के बीच सहसमन्वय बना रहेगा।

कृषि में मत्स्य क्षेत्र का योगदान काफी तेजी से बढ़ रहा है। केन्द्र ने इस वर्षावधि में मत्स्य उत्पादन के विभिन्न आयामों जैसे कि माँग–आपूर्ति, व्यापार तथा मूल्यों में समन्वय का अध्ययन किया है।

देश में पिछले 25 वर्षों में मत्स्य उत्पादन में तीन गुणा बढ़ोत्तरी दर्ज की गयी है, जोकि वर्ष 1980 में 2.44 मिलियन टन से बढ़कर वर्ष 2005 में 6.4 मिलियन टन हो गया है। विश्लेषण दर्शाता है कि आधार वर्ष के संदर्भ में देश में मछली की माँग की दर वर्ष 2000 और वर्ष 2020 के बीच 2.5 प्रतिशत वार्षिक होगी। देश में स्थलीय मत्स्यकी का उत्पादन 3 प्रतिशत बढ़ने की संम्भावना है तथा झिंगा मछली (Shrimp) की निर्यात दर सबसे अधिक (4.73 प्रतिशत) रहने की संभावना है। एक अध्ययन में विभिन्न मछली बाजारों के बीच मूल्यों में परस्पर समन्वय का विश्लेषण दर्शाता है कि मत्स्य उत्पादों के मूल्य निर्धारण की विधियाँ काफी जटिल हैं। इसे दूर करने के लिए आपूर्ति में बाधा पहुंचाने वाले कारकों को दूर करने की आवश्यकता है।

देश में मछली की विभिन्न प्रजातियों की विपणन दक्षता का विश्लेषण दर्शाता है कि इनसे उचित मूल्य पाने के लिए पैकेजिंग में व्यापारी की उद्यमशीलता तथा नवीनता काफी अहम् कारक है। अध्ययन दर्शाता है कि वर्ष 2007–08 (अप्रैल से मार्च) में भारत द्वारा निर्यातित मत्स्य उत्पादों की कुल कंसाइन्मैटों में से 47 को अमेरिका ने पैकेजिंग तथा प्रसंस्करण में निर्धारित मापदंडों के न अपनाने के कारण अस्वीकृत कर दिया था।

केन्द्र में उभरती संस्थागत व्यवस्थाओं/सुविधाओं जैसे कि अनुबंध–खेती, कृषि विकास एवं मूलभूत सुविधाओं का समन्वय, किसानों को शोध, प्रसार तथा बाजार सूचनाओं की जानकारी, ऋण और बीमा आदि का भारतीय कृषि में पड़ने वाले प्रभावों का अध्ययन किया गया हैं।

अध्ययन दर्शाता है कि आलू प्रसंस्करण में सहयोग करने वाली कड़ियों में प्रसंस्करणकर्ता, खुदरा विक्रेताओं तथा उपभोक्ताओं के बीच संबंध संतोषजनक हैं, जबकि आलू उत्पादकों, सरकारी शोध एवं विकास संस्थाओं, प्रसार कार्यकर्ताओं तथा खाद्य प्रसंस्करण उद्योग के बीच कमजोर संबंध हैं। ऐसी स्थिति इन कड़ियों के बीच स्पष्ट एवं कमजोर समन्वय के कारण है। अनुबंध–आधारित आलू उत्पादक परम्परागत आलू उत्पादकों की अपेक्षा 19–24 प्रतिशत शुद्ध लाभ हासिल करते हैं।

मूलभूत सुविधाओं तथा कृषि विकास के बीच संबंधों का अध्ययन दर्शाता है कि कृषि उत्पादकता बढ़ाने में परिवहन, बिजली, सिंचाई सुविधाओं, तथा अनुंसधान संस्थान काफी अहम हैं। वैकल्पिक मूलभूत सुविधाओं का आय–व्यय विश्लेषण दर्शाता हैं कि यद्यपि निर्मित सुविधाओं की संरक्षण लागत काफी अधिक होती है परन्तु इनसे कई गुना अधिक लाभ मिलते हैं, साथ ही में उपलब्ध आर्थिक एवं सामाजिक सुविधाओं का उपयोग कर और भी कई गुणा अधिक लाभ प्राप्त कर सकते हैं। एक अन्य अध्ययन में केले के छिलके तथा अन्य जैव संसाधनों के बीच संबंधों का लाभ हासिल करने के लिए शोध–प्रसार कार्यक्रमों, किसानों तथा बाजारों के बीच सहयोग की आवश्कता पर बल दिया गया है।

भारत सरकार द्वारा वर्ष 2008 में कृषि में 'ऋण माफी एवं ऋण राहत योजना' के प्रभाव का अध्ययन दर्शाता है कि (क) लाभार्थी तथा गैर–लाभार्थी किसानों के बीच सामाजिक समरसता में कोई कमी नहीं आयी है; (ख) समय पर ऋण चुकता करने वाले किसान भी कुछ लाभ की आशा रखते हैं; (ग) इससे फसल ऋण की अदायगी की दर में कमी आयी है; (घ) किसानों में संस्थागत स्त्रोतों से ऋण लेने की प्रवृति बढ़ी है; तथा (ङ) एकल चुकता योजना काफी सफल नहीं रही है।

एक अन्य अध्ययन में आन्ध्र प्रदेश सरकार की 5000/– रूपये की ऋण उपहार योजना का अध्ययन दर्शाता है कि समय पर ऋण चुकता करने वाले किसान इस योजना से काफी उत्साहित नहीं थे। उनका मानना है कि सरकार का इस तरह का पक्षपाती व्यवहार किसानों के बीच प्रभावी नहीं होगा।

कृषि बीमा का अध्ययन दर्शाता है कि खराब मौसम के कारण कृषि उपज में हुए नुकसान की भरपाई करने में मौसम आधारित बीमा योजना काफी लाभदायक है। वर्तमान में इस योजना के अन्तर्गत 5.39 लाख किसानों को लाभ पहुँचा है। इस योजना की मुख्य विशेषताओं में : (क) कम अग्रिम देय दर; (ख) पंजीकृत बीमा किसानों द्वारा जान बूझकर नुकसान करने पर नियंत्रण; (ग) बीमा देय का त्वरित भुगतान; (घ) प्रशासनिक खर्च में कमी; (ङ) अग्रिम बीमा राशि देय योग्य; (च) जाँच में आसानी एवं पारदर्शिता, आदि प्रमुख हैं।

मत्स्य विपणन की मौजूदा अनेक सफल पद्धतियों का आकलन दर्शाता है कि इनको देश के विभिन्न भागों में उनके समरूप सामाजिक–आर्थिक एवं राजनैतिक परिवेश में अपनाकर मछली उत्पादन से अधिक लाभ प्राप्त किया जा सकता है।

केन्द्र में कृषि फसलों एवं पशु–पालन में वृद्धि दर में ठहराव की स्थिति, वैश्विक खाद्य एवं वित्तीय संकट, सरकारी एवं निजी निवेश की प्रवृत्ति तथा ग्रामीण रोजगार आदि मुदद्ों पर अध्ययन किया गया है। पिछले वर्षों में कृषि में धीमी वृद्धि के कारण भारतीय कृषि में संकट की स्थिति उत्पन्न हो गयी है। कृषि वृद्धि दर में तेजी से सुधार करना वैज्ञानिकों एवं नीति निर्माताओं के समक्ष एक कठिन चुनौती है।

अध्ययन दर्शाता है कि वैश्विक खाद्य पदार्थों के मूल्य में बढ़ोत्तरी के कारणों में : (क) कच्चे तेल के मूल्यों में बढोत्तरी; (ख) माँग एवं आपूर्ति के बीच अन्तर; (ग) खाद्य अनाजों का जैव–ईधनों की प्राप्ति में उपयोग, आदि प्रमुख हैं। अध्ययन दर्शाता है कि आधार वर्ष 2005 के संदर्भ में भविष्य में अनाजों के मूल्य बढ़ने की प्रवृत्ति जारी रहेगी। वैश्विक समुदाय को खाद्य–पदार्थों की बढ़ती कीमतों एवं इनसे गरीबों तथा उनकी पोषण सुरक्षा पर पड़ने वाले प्रभावों को कम करने के लिए व्यवहारिक नीतियों को अमल में लाना चाहिए।

वर्ष 1980–81 तथा 1991–92 की अवधि में भारत की प्रति–व्यक्ति आय में 3.1 प्रतिशत तथा वर्ष 1992–93 तथा 2004–05 की अवधि में इसमें 3.8 प्रतिशत की वार्षिक वृद्धि दर्ज की गयी है। इस संदर्भ में राज्यवार परिणाम दर्शातें हैं कि 1991 से जारी आर्थिक सुधार के बाद के वर्षों में क्षेत्रीय विषमता में वृद्धि हुई है। कृषि में तकनीकी गतिविधियों तथा इनके प्रभावी उपायों का विश्लेषण दर्शाता है कि वर्ष 1980–81 तथा 2004–05 की अवधि में आय के संदर्भ में मध्यवर्गीय राज्यों ने अच्छा किया है। आर्थिक सम्पन्न राज्यों में इसमें गिरावट आयी है जबकि गरीब राज्यों (बिहार, उडीसा, उत्तर प्रदेश तथा मध्य प्रदेश) की स्थिति में कोई सुधार नहीं हुआ है। अध्ययन दर्शाता है कि उपरोक्त गरीब राज्यों में रोजगार के संदर्भ में कृषि पर निर्भरता बहुत अधिक है जोकि छिपी बेरोजगारी (disguised unemployment) की स्थिति दर्शाता है। इन राज्यों के ग्रामीण श्रमिकों की कार्यकुशलता भी कम है जिससे कि जो भी रोजगार सीमित मात्रा में उद्योंगों में उपलब्ध हैं उन्हें भी प्राप्त नहीं कर पा रहे हैं। ऐसी स्थिति से निपटने के लिए ग्रामीण जनसंख्या को रोजगार उपलब्ध कराने के लिए ग्रामीण क्षेत्रों में ही कृषि पर आधारित उद्योग लगाए जाने चाहियें।

एक अन्य अध्ययन में सरकारी एवं निजी निवेश का, उत्पादन में वृद्धि पर पड़ने वाले प्रभाव का अध्ययन दर्शाता है कि सरकारी निवेश में कमी आने के बावजूद भी निजी निवेश की गति एवं सीमा पर कोई विपरीत प्रभाव नही पड़ा है।

कृषि में विविधिकरण की स्थिति, प्रवृत्ति तथा सफल अध्ययनों का विश्लेषण दर्शाता है कि वर्ष 1970–71 से ही राष्ट्रीय एवं राज्य स्तर पर बागवानी फसलों की तरफ झुकाव बढ़ रहा है। इसका कारण बागवानी फसलों द्वारा अन्य फसलों की अपेक्षा अधिक आमदनी प्रदान करना है। वर्ष 1980–81 तथा 2004–05 की अवधि में देश के कुल कृषित क्षेत्रफल में फलों एवं सब्जियों का क्षेत्रफल 2.8 प्रतिशत से बढ़कर 4.9 प्रतिशत हो गया है, साथ ही में कुल फसलों से प्राप्त आय में फलों एवं सब्जियों से प्राप्त आय का हिस्सा 15.95 प्रतिशत से बढ़कर 25.61 प्रतिशत तक पहुँच गया है। वर्ष 2000–01 में सभी वर्गों की फसलों की उत्पादकता वृद्धि में कमी परिलक्षित होती है, लेकिन फलों एवं सब्जियों में यह परिर्वतन नकारात्मक है तथा इसे दूर करने की आवश्यकता है।

पशुपालन क्षेत्र की वृद्धि को प्रभावित करने वाले कारकों का आकलन बताता है कि पशुओं के लिए चारा एवं संकेन्द्रित पशु आहार, पशुओं की जातियों एवं उनके अनुपात में बदलाव, चिकित्सा सुविधाओं एवं उत्पादों की बिक्री, तथा संस्थागत जरूरतों को पूरा करके पशुधन क्षेत्र में उचित वृद्धि दर प्राप्त की जा सकती है। पशु–पालन क्षेत्र में निर्दिष्ट 6 प्रतिशत की वार्षिक वृद्धि हासिल करने के लिए मूलभूत सुविधाओं में विकास, संस्थागत प्रयास तथा चारे एवं संकेद्रित पशु आहारों की उपलब्धता में 50 प्रतिशत कि वृद्धि आवश्यक होगी।

पूर्वोत्तर राज्यों में कृषि उत्पादकता काफी कम तथा जोखिमपूर्ण है। अतएव यह जरूरी है कि देश के पूर्वोत्तर राज्यों में भविष्य में वृद्धि के स्रोतों की पहचान की जाए। अध्ययन दर्शाता है कि इस क्षेत्र में : (क) कृषि क्रियाओं में विविधिकरण; तथा (ख) देश की बदलती अर्थव्यवस्था के अनुरूप क्षेत्र विकास के उपाय किये जाने चाहियें। इस क्षेत्र में मौजूदा निर्यात गतिविधियों में सुधार कर इस क्षेत्र में कृषि में विविधिकरण लाया जा सकता है।

केन्द्र की वेबसाइट (http://www.ncap.res.in) का पुनर्निधारण किया गया है तथा इसे नियमित तौर पर अद्यतन भी किया जाता है। केन्द्र के सभी प्रकाशन पी.डी.एफ. प्रारूप में उपलब्ध हैं तथा इन्हें डाउनलोड किया जा सकता है। उपलब्ध आकड़ों के अनुसार इस वर्ष, केन्द्र द्वारा प्रकाशित नीति सार (Policy Brief), कार्यशाला वृत्ति (Workshop Proceedings), तथा नीति पत्र (Policy Paper) सर्वाधिक अवलोकित किये गये।

केन्द्र द्वारा स्थापित 'कृषि शोध सूचना प्रणाली' (ARIS) इसके कर्मचारियों को ई–मेल तथा इन्टरनेट सुविधाएं उपलब्ध करा रही है। केन्द्र का अपना ई–मेल सर्वर है जिसकी क्षमता का भरपूर उपयोग किया जा रहा है। केन्द्र की उपलब्ध लीज लाईन की क्षमता को बढ़ाकर 2 MBPS कर दिया गया है।

केन्द्र ने अपने शोध अध्ययनों के परिणामों को सभी तक पहुँचाने के लिए इस वर्ष 32 शोध पत्र (Research Papers), पुस्तकों में 25 लेख (Book Chapters), 6 चर्चा पत्र (Discussion Papers)/रिसर्च रिपोर्ट (Research Report) तथा 5 नीति सार (Policy Briefs) प्रकाशित किए।

केन्द्र के वैज्ञानिकों ने अनेक व्यवसायिक, नीति संबंधी कार्यक्रमों तथा अनेक परियोजनाओं में भाग लिया। इस वर्षावधि में केन्द्र ने 41 राष्ट्रीय तथा 12 अन्तर्राष्ट्रीय संस्थाओं के साथ अपने शोध अनुबंधों को कायम् रखते हुए उन्हें और भी अधिक सुदृढ़ एवं व्यापक बनाया। इस वर्ष भी केन्द्र द्वारा अनेक कार्यशालाओं, संगोष्ठियों, ब्रेनस्टार्मिंग सैशनों तथा नीति समर्थन कार्यक्रमों का आयोजन किया गया। इन सभी प्रयासों से केन्द्र की ख्याति तथा अनुसंधान विश्वसनीयता में वृद्धि हुई है।

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